EXHIBIT 21

Turkey Point Units 6 & 7

SITE CERTIFICATION APPLICATION

0838-7584

FPL

JUNE 2009

EXHIBIT 21

E9.3.7 Biological and Physical Environment of the Corridor Area

E9.3.7.1 Land Use/Vegetation

The existing land use and vegetation cover types (generally 5 acres or larger in size) were identified for the East Preferred Corridor and classified using FDOT's Florida Land Use, Cover and Forms Classification System (FLUCFCS) published in 1999 as modified by SFWMD (2004). SFWMD used Categories II, III, and IV to identify land uses and vegetation types within SFWMD's boundaries. The classifications were obtained from SFWMD GIS data and overlaid on aerial photographs. Additionally, FPL performed field surveys in preparation for the environmental resource permit (ERP) informational data submittal for this Project in many areas of the East Preferred Corridor for which FPL had access (Golder Associates, Inc. [GAI], 2009). The FLUCFCS coverages were mapped/revised in the field to reflect current conditions. These data were then used to supplement those from SFWMD. The land use and vegetation classifications that occur within the corridor and the 0.5-mile area adjacent to either side are shown in Figure 9.1.0-4 (Map Sheets 1 through 20) (vegetation/land cover maps) at the end of this Section E9.0. Table E9.3.7-1 lists the various land use and vegetation categories identified within the East Preferred Corridor. Descriptions of the major land use and vegetation classifications that occur within this corridor are provided in the following subsections. For more detailed descriptions of those coverages that also occur on-Site, refer to Section 3.3.5.

Land Use

Most of the land use/cover classifications that occur along the East Preferred Corridor reflect significant human-induced changes within the landscape. That is, much of the historical vegetation that occurred along the corridor and in the region has been cleared for residential, agricultural, or industrial uses. Table E9.3.7-1 lists land uses that were identified within the East Preferred Corridor based on the SFWMD-modified FLUCFCS.

Urban and built-up land uses (100 series classifications) consist of lands primarily occupied by man-made structures and associated activities. Included in this category are low-, medium-, and high-density single-family units; rural residential units; units under construction; mobile home units; and low- and high-rise multiple dwelling units. This category also includes commercial and services, retail sales and services, other light industrial, institutional, educational facilities, recreational, parks and zoos, and open land. These categories dominate the corridor north of the Davis substation all the way to the Miami substation.

TABLE E9.3.7-1
LAND USE AND VEGETATION CLASSIFICATIONS OCCURRING WITHIN EAST PREFERRED CORRIDOR

Number	Land Use Designation
111	Low Density: Fixed Single Family Units
118	Low Density: Rural Residential
119	Low Density: Under Construction
121	Medium density: Fixed Single Family Units
131	High Density: Fixed Single Family Units
132	High Density: Mobile Home Units
133	High Density: Low Rise Multiple Dwelling Units
134	High Density: High Rise Multiple Dwelling Units
140	Commercial and Services
141	Retail Sales and Services
155	Other Light Industrial
170	Institutional
171	Educational Facilities
180	Recreational
185	Parks and Zoos
190	Open Land
211	Improved Pastures
212	Unimproved Pastures
214	Row Crops
222	Fruit Orchards
223	Other Groves
241	Tree Nurseries
242	Sod Farms
243	Ornamentals
251	Horse Farms
261	Fallow Cropland
310	Herbaceous (Dry Prairie)
320	Upland Shrub and Brushland
330	Mixed Rangeland
411	Pine Flatwoods
420	Upland Hardwood Forests
422	Brazilian Pepper
510	Canals
511	Ditches
512	Channelized River, Stream, Waterway
530	Reservoirs
534	Reservoirs < 10 acres
612	Mangrove Swamps
612/617	Mangrove Swamps/Mixed Wetland Hardwoods
612/619	Mangrove Swamps/Exotic Wetland Hardwoods
612 B	Dwarf Mangroves
617	Mixed Wetland Hardwoods

EXHIBIT 21

TABLE E9.3.7-1
LAND USE AND VEGETATION CLASSIFICATIONS OCCURRING WITHIN EAST PREFERRED CORRIDOR
(Continued, Page 2 of 2)

Number	Land Use Designation
619	Exotic Wetland Hardwoods
630	Wetland Forested Mixed
641	Freshwater Marshes
642	Saltwater Marshes
651	Tidal Flats
744	Fill Areas: Highways and Railways
810	Transportation
812	Railroads
814	Roads and Highways
831	Electric Power Facilities
832	Electrical Power Transmission Lines

Sources: FDOT, 1999.
SFWMD, 2004.
GAI, 2009.

The agricultural land uses (200 series classifications) make up the majority of land use along the East Preferred Corridor from the Clear Sky substation to Davis substation and mostly consist of pasture and tree/ornamental nurseries. Areas of improved pasture are typically dominated by bahia grass (*Paspalum notatum*), Bermuda grass (*Cynodon dactylon*), carpetgrasses (*Axonopus* spp.), smutgrass (*Sporobolus indicus*), and occasionally pangola grass (*Digitaria eriantha*). Pastures that have become overgrown usually contain the same species as found in improved pasture but also typically have become colonized by old field species including dog fennel (*Eupatorium capillizolium*), slender goldenrod (*Euthamia caroliniana*), blackberries (*Rubus cuneifolius* and *R. trivialis*), broomsedges (*Andropogon* spp.), bluestems (*Schizachyrium* spp.), paspalums (*Paspalum* spp.), manyflower marshpennywort (*Hydrocotyle umbellata*), coinwort (*Centella asiatica*), and southeastern sunflower (*Helianthus agrestis*). Other agricultural land uses within the corridor include sod farms, fruit orchards, other groves, horse farms, row crops, and fallow cropland.

Barren land (700 series classifications) has little or no vegetation and limited potential to support vegetative communities. Fill areas for highways and railways fall into this category and are present within the East Preferred Corridor.

Transportation, communication, and utilities (800 series classifications) consist of land primarily occupied by manmade facilities, which are necessary for movement of people and goods, airwave communications, power generating, and water supply and treatment plants. Specifically, this category includes existing transportation, railroads, roads and highways, electric power facilities, and electrical power transmission lines.

Vegetation

Although most of the areas within the East Preferred Corridor have been altered by the various land uses described previously, a variety of plant communities of varying quality exist within the corridors. Descriptions of the upland communities (300 and 400 series classifications), aquatic communities (500 series classifications), and wetland communities (600 series classifications) found within the corridor are presented in the following subsections. Most of the natural communities described in the following paragraphs occur from the Turkey Point Units 6 & 7 Site to Davis substation. For more detailed descriptions of these coverages that occur in the on-Site portions of the corridor, refer to Section 3.3.5 of this SCA.

EXHIBIT 21

Upland Communities

Upland communities found within the corridor range from less disturbed communities to areas vegetated by a variety of nuisance or weedy shrubs and/or herbs (Brazilian pepper [*Schinus terebinthifolius*]- and Australian pine [*Casuarina equisetifolia*]-dominated areas). The upland communities that exist within the East Preferred Corridor are summarized in the following paragraphs.

Herbaceous (Dry Prairie)—310

This plant association is dominated by a variety of herbs and may include scattered clumps of shrubs. Typical herbs include broomsedges, bluestems, bahia grass, wire grass (*Aristida stricta* var. *beyrichiana*), crabgrasses (*Digitaria* spp.), love grasses (*Eragrostis* spp.), dog fennel, sweetbroom (*Scoparia dulcis*), slender goldenrod, smutgrass, finger grass (*Eustachys petraea*), buttonweeds (*Spermacoce* spp.), paspalums, witchgrasses (*Dichanthelium* spp.), and blackberries. Shrubs are often present but not dominant. They include Brazilian pepper, saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), and groundsel tree (*Baccharis halimifolia*). This community is similar to unimproved pasture and likely represents former pasture that has not been used in some time.

Upland Shrub and Brush Land—320

This plant association exists where historical plant cover was cleared for grazing or other uses and allowed to go fallow. These areas are dominated by a variety of weedy or adventive shrubs including wax myrtle, groundsel tree, Brazilian pepper, winged sumac (*Rhus copallina*), saw palmetto, and immature cabbage palm (*Sabal palmetto*). Herbs are usually abundant and similar to those described for herbaceous (dry prairie).

Mixed Rangeland—330

This classification describes a mixture of weedy shrubs and herbs where shrubs and herbs comprise at least one-third of the total cover. Typical shrubs include Brazilian pepper, wax myrtle, saw palmetto, and groundsel tree. Herbs include broomsedges, bahia grass, finger grass, beggarticks (*Bidens alba*), dog fennel, sweetbroom, and slender goldenrod.

Pine Flatwoods—411

The pine flatwoods community is rare within the East Preferred Corridor and was mapped in a few isolated locations, as well as in the vicinity of the Miami Metro Zoo. Typically, a scattered to dense canopy of slash pine (*Pinus elliottii*) with an understory dominated by saw palmetto exists in pine flatwoods with a variety of herbs growing in open spaces between clumps of saw palmetto.

Pine rockland community is a variant of a pine flatwoods community. It is unique to the area because it grows on weathered outcrops of limestone, often supporting a distinct flora. Rockdale Pineland Park supports one such community and is located outside the East Preferred Corridor but within 0.5 mile.

Upland Hardwood Forests—420

This is a catchall designation for upland hardwood forests that are not easily classified under the classifications as defined by FLUCFCS. Generally, these areas are a mixture of live oak (*Quercus virginiana*), laurel oak (*Quercus hemisphaerica*), and water oak (*Quercus nigra*) that is second-growth on land cleared in the past.

Rockland hammock community is a variant of an upland hardwood community. It is a unique community because it grows on limestone outcrops, often supporting a distinct flora. Rockland hammock is the advanced successional stage of pine rockland. Pine rockland community is similar to rockland hammock, and differs only by canopy trees consisting mostly of pines instead of hardwoods. Simpson Park and Vizcaya Museum and Gardens support rockland hammock communities. Both occur within 0.5 mile of the corridor. However, based on current aerial photography, other areas reported by FNAI prior to 1975 seem to have since been developed.

Brazilian Pepper—422

This association is dominated by the exotic Brazilian pepper with lesser amounts of other shrubs including groundsel tree and wax myrtle. Herbs are usually uncommon in the interiors of these areas where the cover of Brazilian pepper completely shades the ground but are abundant at the margins of these communities. Common herbs usually include smutgrass, dog fennel, bahia grass, John Charles (*Hyptis verticillata*), and cottonweed (*Froelichia floridana*). Vines are usually present, especially muscadine grape (*Vitis rotundifolia*) and peppervine (*Ampelopsis arborea*). This type of community normally becomes established on fallow land, berms, or other disturbed areas where the native vegetation was destroyed.

Aquatic and Wetland Communities

Four aquatic communities occur within the East Preferred Corridor and include canals, ditches, channelized river/stream/waterway, ditches, reservoirs, and reservoirs less than 10 acres. No natural aquatic communities exist within the corridor. Most are vegetated by a variety of floating or emergent

EXHIBIT 21

herbs, many of which are considered nuisance species by the Florida Exotic Plant Pest Council. Categories or classifications of aquatic habitats that occur within the East Preferred Corridor are described in the following paragraphs.

Forested and herbaceous wetlands in the East Preferred Corridor are comprised of 10 different associations. Of these, mangrove swamps, mixed wetland hardwoods, and freshwater marsh/wet prairie associations are the most prevalent. The quality of wetlands ranges from those exhibiting expected floristic and structural characteristics providing valuable wildlife habitat to those that have been so impacted by drainage or location within/next to intensive agricultural or developed areas that inherent functional values such as wildlife habitat, water quality, and flood attenuation have been severely degraded. The extensive drainage system (canals/ditches) that has been constructed in the region has drastically altered the historical hydrology of the wetland communities in the corridors with a concomitant change to structure and functional attributes. This is often manifested by the proliferation of transitional or even upland species, as well as nuisance exotics in many wetlands within the region.

Canals/Channelized River, Stream, Waterway—510/512

Several canals are crossed by the East Preferred Corridor. Manmade canals associated with the existing Turkey Point Plant industrial wastewater facility are located in the extreme south portion of the corridor. Vegetation in this system includes submerged, rooted marine plants, primarily widgeon grass and marine algae, as well as terrestrial woody vegetation along the berms such as Brazilian pepper, Australian pine, wild sage (*Lantana involucrata*), and buttonwood (*Conocarpus erectus*). Other canals located along the remainder of the corridor are typically vegetated by a variety of floating and emergent hydrophytes. Common plants include water lettuce (*Pistia stratiotes*), water hyacinth (*Eichhornia crassipes*), galingale (*Cyperus odoratus*), Cuban bulrush (*Scirpus cubensis*), primrose willow (*Ludwigia* sp.), Mexican primrose willow (*Ludwigia octovalvis*), smartweeds (*Polygonum* spp.), torpedo grass (*Panicum repens*), duck potato (*Sagittaria lancifolia*), pickerelweed (*Pontederia cordata*), and common reed (*Phragmites australis*). Most of the linear waterways are periodically maintained by the spraying of herbicides to maintain flow. Much of the vegetation in these canals is considered nuisance species, either native or exotic. The banks (spoil areas) along these linear water bodies are also dominated by weedy, often nuisance, native and exotic plants. The species observed adjacent to canals include elephant grass (*Pennisetum purpureum*), largeflower Mexican clover (*Richardia grandiflora*), beggarticks, cottonweed, camphorweed (*Heterotheca subaxillaris*), finger grass, bahia grass, Brazilian pepper, immature cabbage palm, wax myrtle, guinea grass (*Panicum maximum*), swamp flatsedge (*Cyperus ligularis*), southern beeblossum (*Gaura angustifolia*), and numerous others.

Ditches—511

Ditches are usually smaller and shallower than canals and generally contain/convey less water than canals. They are often located adjacent to roads and are typically vegetated with a mixture of nuisance/exotic species such as Brazilian pepper, cattail (*Typha domingensis* and/or *latifolia*), parrot feather (*Myriophyllum aquaticum*), torpedo grass, primrose willow, and wild taro (*Colocasia esculenta*), as well as native species including arrowhead (*Sagittaria lancifolia*), water spangles (*Salvinia minima*), mosquitofern (*Azolla caroliniana*), and beggarticks.

Reservoirs—530

This classification is used to describe open water areas that have been created from borrow pits. Generally, they are square or rectangular deepwater pits with cattails and/or primrose willow growing at the margins. They are often bordered with spoil piles vegetated with species listed previously under the description of spoil areas for canals.

Reservoirs <10 acres—534

This classification further narrows the reservoirs (530) land use into a category of reservoirs that are less than 10 acres in size.

Mangrove Swamps—612

This community type is located in some of the undeveloped portions of the Turkey Point plant property. Dominant species present in these coastal hardwood communities usually include red (*Rhizophora mangle*), black (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*); buttonwood; sea grape (*Coccoloba uvifera*); leather fern (*Acrostichum* spp.); cankerberry (*Solanum bahamense*); and cocoplum (*Chrysobalanus icaco*).

Mangrove Swamps/Mixed Wetland Hardwoods—612/617

This category describes mangrove swamps intermixed with hardwood wetland community species. Plant species commonly encountered in this association are a combination of those described in mangrove swamps (612) and mixed wetland hardwoods (617).

Mangrove Swamps/Exotic Wetland Hardwoods—612/619

This category describes mangrove swamps that have been invaded by exotic hardwoods. Species typical of this community include red, black, and white mangrove, buttonwood, Brazilian pepper, sea grape, Australian pine, poisonwood, leather fern, cankerberry, rubber vine (*Rhabdadenia biflora*), and cocoplum.

Dwarf Mangroves—612 B

Patches of the dwarf mangrove community are located within the undeveloped portions of the existing Turkey Point plant property and contain mangroves less than 24 inches in height, stunted in response to decreased nutrient availability and increased salinity (McKee, 1996). Approximately 90 percent of the red mangroves are characteristic of the dwarf mangrove community, while approximately 10 percent are large individuals located adjacent to tidal creeks. Buttonwood is a common subdominant canopy component, along with occasional white and black mangroves. Additional vegetative species observed within the dwarf mangrove community include occasional Brazilian pepper, Australian pine, seaside oxeye, grey nicker (*Caesalpinia bonduc*), groundsel tree, and cordgrass (*Spartina* sp.).

Mixed Wetland Hardwoods—617

Most of these community types occur south of where the East Preferred Corridor crosses Florida's Turnpike. Mixed wetland hardwood forests are typically dominated by sweet bay (*Magnolia virginiana*, swamp laurel oak (*Quercus laurifolia*), and swamp red bay (*Persea palustris*) in association with other hardwoods including buttonwood, Australian pine, cocoplum, red mangrove, Brazilian pepper, and Carolina willow (*Salix caroliniana*). The shrub stratum is typically sparse, comprised of scattered individuals of wax myrtle and buttonbush (*Cephalanthus occidentalis*), among others. The stratum density varies with degree of shading. Typically, lizard's tail (*Saururus cernuus*), pickerelweed, beakrushes (*Rhynchospora* spp.), royal fern (*Osmunda regalis*), and swamp fern (*Blechnum serrulatum*) are found. These forests are characteristically flooded or saturated for much of the year, drying only for short periods during the dry winter season. Construction of ditches and canals has shortened the hydroperiod of many of these forests.

Exotic Wetland Hardwoods—619

Areas dominated by Brazilian pepper are classified as exotic wetland hardwoods. Subdominant species include primrose willow, wild taro, Johnson grass (*Sorghum halepense*), and beggarticks.

Wetland Forested Mixed—630

This association is similar floristically and structurally to mixed wetland hardwoods (617), with the notable exception that either pond cypress (*Taxodium ascendens*) or slash pine comprise at least one-third of the canopy cover. These coverages occur in the southernmost portions of the East Preferred Corridor.

Freshwater Marshes—641

Freshwater marshes occur in some locations within the East Preferred Corridor. They are dominated by a wide assortment of herbaceous plant species growing on sandy or organic soils in areas of variable water depths and inundation regimes. Species characteristic of the marshes in the study area include sawgrass (*Cladium* spp.), pickerelweed, maidencane (*Panicum hemitomon*), fireflag (*Thalia geniculata*), cattails, smartweeds, and sedges (*Cyperus haspan*, *C. odoratus*, and *C.* spp.). In more disturbed areas, primrose willows, Brazilian pepper, poisonwood (*Metopium toxiferum*), Australian pine, musky mint (*Hyptis alata*), silktree (*Albizia julibrissin*), nettletree (*Trema micranthum*), and torpedo grass are abundant. The best quality marshes exhibit zonation and a variety of desirable, native herbs. Many marshes within the East Preferred Corridor have been impacted by drainage and agricultural practices to varying degrees.

Saltwater Marshes—642

Saltwater marshes consist of non-woody, salt-tolerant plant species such as needlerush (*Juncus roemerianus*), bushy seaside oxeye (*Borrichia frutescens*), saltmeadow and saltmarsh cordgrass (*Spartina patens* and *S. alternifolia*), and glassworts (*Salicornia* spp.). Saltwater marshes' extent and vegetative composition depend on factors such as salinity, tidal range and duration, wave energy, and topographic relief.

Tidal Flats—651

Small areas of this vegetative community occur in the corridor at the Turkey Point plant property. Vegetative cover is sparse in the tidal flat area due to the high salinity and routine fluctuations in water levels. Species present in this area include saltwort, sea oxeye, daisies, woody glasswort, and dwarf glasswort.

E9.3.7.2 Affected Waters and Wetlands

Surface water bodies and wetlands that are crossed/included within the East Preferred Corridor were identified using SFWMD land cover mapping, 2007 aerial photographs, hydrologic information from Miami-Dade County GIS and SFWMD, and field surveys conducted for this Project (GAI, 2009).

EXHIBIT 21

Water Bodies

Major water bodies crossed by the corridors are listed in Tables E9.3.7-2 and E9.3.7-3, which list those for the East Preferred Corridor from the Clear Sky substation to Davis substation and between the Davis substation and Miami substation, respectively. According to Section 62-302.400, F.A.C., there are no designated Florida Class I or II waters within the East Preferred Corridor. Most of the waters crossed by the East Preferred Corridor are considered Class III waters, which means they are of sufficient quality to support fish and wildlife populations.

Wetlands

Wetlands within and 0.5 mile of the corridor, as identified by SFWMD (2004) and updated by FPL in many areas where access was available (GAI, 2009), are identified in maps presented in Figure E9.1.0-4. Descriptions of the wetland communities are found in Section E9.3.7.1

E9.3.7.3 Ecology

The East Preferred Corridor crosses some significant wetland habitats north of the Site, but natural upland habitats are limited and usually small. Therefore, it is expected that plants and wildlife found in these corridor areas will be those adapted to wetland cover types or man-induced habitats such as nurseries, agricultural operations, disturbed areas, low-density residential, etc., especially south of the Davis substation area. From the Davis substation to Miami substation, the residential and transportation uses increase dramatically and limit habitats to primarily ruderal areas and parks. Some of these remnant isolated uplands are pine rockland communities, which are unique and may harbor certain listed species.

Wildlife species typically found in Miami-Dade County will be expected to occur in the East Preferred Corridor since it covers typical natural habitats found in the county. FPL conducted ecological surveys of the corridor areas as part of the fieldwork to develop the information typically required for an ERP application. A summary of the ecological resources for this Project can be found in Section 3.3.6 and Appendix 10.7.1.

Based on FPL’s findings along accessible areas of the corridor and near the Turkey Point plant property, common wildlife species are generally comprised of wetland-dependent species.

TABLE E9.3.7-2
WATER BODIES CROSSED BY THE EAST PREFERRED CORRIDOR BETWEEN CLEAR SKY AND DAVIS SUBSTATIONS

Water Body	Jurisdiction	Comments
Existing Turkey Point cooling canals of the industrial wastewater facility	FPL	On FPL Turkey Point plant property
BNP	FDEP	Outstanding Florida Water
Florida City Canal	Miami-Dade County	Crosses the East Preferred Corridor at Palm Drive
L-31E Canal	SFWMD	Intersects the East Preferred Corridor at SW 328th Street
North Canal	SFWMD	Intersects the East Preferred Corridor at SW 328th Street
C-103 (Mowry) Canal	SFWMD	Crosses the East Preferred Corridor at SW 320th Street
Unnamed canal	Unknown	Crosses the East Preferred Corridor at SW 312th Street
Military Canal	SFWMD	Crosses the East Preferred Corridor at SW 300th Street
Princeton Canal	SFWMD	Crosses the East Preferred Corridor at Moody Drive and again both east and west of Florida’s Turnpike and again north of U.S. 1
C-102 Extension Canal	SFWMD	Crosses the East Preferred Corridor at SW 134th Avenue
Black Creek Canal	SFWMD	Crosses and then runs adjacent to the East Preferred Corridor from SW 176th Street to CSX Railroad.

TABLE E9.3.7-3
WATER BODIES CROSSED BY THE EAST PREFERRED CORRIDOR BETWEEN DAVIS AND MIAMI SUBSTATIONS

Water Body	Jurisdiction	Comments
Cutler Drain (C-100 Canal)	SFWMD	Crosses the East Preferred Corridor at SW 112th Court; adjacent to the corridor between SW 112th Court and SW 117th Avenue
C-100A Canal	SFWMD	Crosses the East Preferred Corridor at the corridor intersection with U.S. 1 and again crosses the corridor just north of SW 108th Street
C-2 (Snapper Creek) Canal	SFWMD	Included within the East Preferred Corridor north of Dadeland Mall from Palmetto Expressway east to U.S. 1
Coral Gables Canal	City of Coral Gables	Crosses the East Preferred Corridor south of Dickinson Drive and again south of Riviera Drive
Miami River (C-6 Canal)	SFWMD, USACE, U.S. Coast Guard	Crosses the East Preferred Corridor just south of Miami substation
Biscayne Bay Aquatic Preserve (Miami River)	FDEP	Designated part of Biscayne Bay Aquatic Preserve system

Common bird species include a variety of herons and egrets, terns, sandpipers, gulls, and birds of prey such as bald eagle (*Haliaeetus leucocephalus*), red-shouldered hawk (*Buteo lineatus*), snail kite (*Rostrhamus sociabilis*), and American kestrel (*Falco sparverius*).

Upland bird species commonly observed include the northern cardinal (*Cardinalis cardinalis*), turkey vulture (*Cathartes aura*), mockingbird (*Mimus polyglottos*), and mourning dove (*Zenaida macroura*).

Common mammals found include opossum (*Didelphis virginiana*), white-tailed deer (*Odocoileus virginianus*), marsh rabbit (*Sylvilagus palustris*), and raccoon (*Procyon lotor*).

Reptiles include Carolina anole (*Anolis carolinensis*), eastern diamondback rattlesnake (*Crotalus adamanteus*), and American crocodile (*Crocodylus acutus*), which occurs in the existing Turkey Point cooling canals of the industrial wastewater facility.

Amphibians include various frogs and treefrogs (*Rana* sp. and *Hyla* spp.) and the southern toad (*Bufo terrestris*).

Since much of the East Preferred Corridor from the Clear Sky substation to Davis substation is relatively undeveloped, these species are expected to occur there.

North of the Davis substation to Miami substation, the natural habitats are severely diminished due to urban development and transportation corridors. Therefore, wildlife species expected to be found consist of ruderal- and urban-adapted species, such as the cardinal or mockingbird. The exotic monk parakeet (*Myiopsitta monachus*) is also a common species in the urbanized areas of Miami-Dade County. Wetland-dependent species will be uncommon in this portion of the East Preferred Corridor except along canals crossed by the corridor.

Threatened and Endangered Species

Floral and faunal species listed by USFWS as endangered, threatened, or proposed for listing; Florida Fish and Wildlife Conservation Commission (FWC) as endangered, threatened, or of special concern; and Florida Department of Agriculture and Consumer Services (FDACS) as endangered or threatened were evaluated for their potential to occur along the East Preferred Corridor. Sources included FPL's field surveys, as well as information contained in Section 3.3.6 and Appendix 10.4. Known occurrences of listed species within 1,500 ft of the East Preferred Corridor are illustrated in Figure E9.1.0-4 on Map Sheets 1 through 20.

The FNAI database also was used to identify known occurrences of listed species throughout Miami-Dade County (FNAI, 2009). It should be noted that FNAI records can be based on collections made years ago. It is possible that many of the occurrences reflected in FNAI records may no longer exist, having been eliminated by subsequent development or natural events (hurricanes, fires). However FNAI data are discussed in the following subsections. Where available, other listed plant species data are also presented in Appendix 10.4.

Plant Species

A total of 173 regulated plant species or subspecies is known to occur within Miami-Dade County in habitats similar to those found within the study area. All were evaluated for the potential to occur within the East Preferred Corridor or within the vicinity of it. Table E9.3.7-4 lists the plants known to occur within the region that were evaluated for the likelihood of occurrence within the East Preferred Corridor.

Five plants on the comprehensive list for the county are designated by USFWS as endangered, one is listed as threatened, and eight are listed as candidates for listing (those plants that have sufficient information on biological vulnerability to support proposing to list the species as endangered or threatened). In the eastern study area, *Linum arenicola*, listed as a candidate for federal listing, was observed within the boundaries of the corridor during field surveys. Several individuals are located within the corridor between SW 328th Street and SW 334th Street north of the Turkey Point plant property. It should be noted that these individuals occur on an existing FPL-maintained right-of-way, indicating those managed habitats are suitable for the plants.

For the East Preferred Corridor, a total of 27 plant taxa listed by FDACS are either present within the boundaries of the corridor based on FPL field surveys and/or FNAI records or are known based on FNAI records to occur within 1,500 ft of the East Preferred Corridor. Nine species or subspecies/varieties are recorded as occurring within the corridor. Of these, two are listed as state endangered: *Linum arenicola* and *Trema lamarckianum*. Seven are listed as threatened: *Angadenia berteroi, Bletia purpurea, Crossopetalum ilicifolium, Melanthera parvifolia, Pteris bahamensis, Solanum donianum,* and *Thelypteria augescens.* Eighteen additional plants have been documented as occurring within 1,500 ft of the corridor according to FNAI records. Of these, twelve are listed as state-

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Acoelorraphe wrightii	Paurotis palm	—	T	Swamps, everglades, and hammocks	L
Acrostichum aureum	Golden leather fern	—	T	Mangrove swamps, saltmarshes, and limestone sinks	M
Actinostachys pennula	Ray fern	—	E	Swamps	L
Adiantum melanoleucum	Fragrant maidenhair fern	—	E	Limestone sinks in rockland hammocks	L
Adiantum tenerum	Brittle maidenhair fern	—	E	Limestone sinks in rockland hammocks	L
Aeschynomene pratensis	Meadow jointvetch	—	E	Marl prairies, cypress domes, and swales	L
Aletris bracteata	Bracted colic-root	—	E	Rocky pine savannahs	L
Alvaradoa amorphoides	Everglades leaf lace	—	E	Pine rocklands, transition zone between pine rocklands and rockland hammocks	L
Amorpha herbacea var. *crenulata*	Crenulate lead-plant	E	E	Rockland hammocks and pine rocklands	L-M
Anemia wrightii	Wright’s pineland fern	—	E	Limestone outcrops in moist hammocks, pine rocklands, and prairies	L
Angadenia berteroi	Pineland golden trumpet	—	T	Pinelands	H-P
Argythamnia blodgettii	Blodgett’s wild-mercury	C	E	Open gaps in pine rocklands, rockland hammocks, and coastal berms	L
Asplenium dentatum	American toothed spleenwort	—	E	Limestone outcrops in moist hammocks	L
Asplenium serratum	American bird’s nest fern	—	E	Cypress swamps and moist hardwood hammocks	L
Asplenium verecundum	Modest spleenwort	—	E	Limestone outcrops in rockland hammocks	L
Basiphyllaea corallicola	Rockland orchid	—	E	Openings in pine rocklands, leaf litter, and in moist hardwood hammocks	L-M
Beloglottis costaricensis	Costa Rican ladies’-tresses	—	E	Hardwood hammocks	L
Bletia purpurea	Pine pink	—	T	Pine rocklands; stumps and tree bases, and cypress swamps	H-P
Bourreria cassinifolia	Smooth strongbark	—	E	Pine rocklands	L
Bourreria succulent	Bahama strongbark	—	E	Hardwood hammocks	L
Brickellia mosieri	Florida brickell-bush	C	E	Pinelands	L-M§
Byrsonima lucida	Locustberry	—	T	Pine rocklands, hardwood hammocks	L
Calyptranthes pallens	Spicewood	—	T	Hardwood hammocks	L
Calyptranthes zuzygium	Myrtle-of-the-river	—	E	Rockland hammocks - coastal strand	L
Catopsis berteroniana	Powdery catopsis	—	E	Hardwood hammocks, mangroves, and hardwood trees in pinelands	L
Catopsis floribunda	Many-flowered catopsis	—	E	Hardwood hammocks	L
Chamaesyce deltoidea ssp. *adhaerens*	Hairy deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *Deltoidea*	Deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *pinetorum*	Pinelands spurge	C	E	Pine rocklands	L
Chamaesyce garberi	Garber’s spurge	T	E	Pinelands and dunes	L-M§
Chamaesyce pergamena	Southern Florida sandmat	—	T	Pine rocklands	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 2 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Chamaesyce porteriana	Porter's broad-leaved spurge	—	E	Pine rocklands, rockland hammocks, coastal rock barrens, and marl prairies	L
Chaptalia albicans	Sunbonnets	—	T	Pinelands	L
Chrysophyllum oliviforme	Satinleaf	—	T	Hardwood hammocks and pinelands	L
Coccothrinax argentata	Silver palm	—	T	Pine rocklands and dunes	M§
Colubrina cubensis var. floridana	Cuban snake-bark	—	E	Pine rocklands, rockland hammocks on Miami rock ridges, and Everglades Keys	L
Colubrina elliptica	Soldierwood	—	E	Hardwood hammocks	L
Crossopetalum ilicifolium	Christmas berry	—	T	Pinelands	H-P
Crossopetalum rhacoma	Maidenberry	—	T	Pinelands, hardwood hammocks	L
Croton humilis	Pepperbush	—	E	Hardwood hammocks	L
Ctenitis sloanei	Florida tree fern	—	E	Hardwood hammocks, often on limestone outcrops	L
Ctenitis submarginalis	Brown-hair comb-fern	—	E	Swamps and wet hardwood hammocks	L
Cynanchum blodgettii	Blodgett's swallowwort	—	T	Hardwood hammocks	L
Cyperus filiformis	Wiry flatsedge	—	E	Dry, sandy open areas	M
Cyrtopodium punctatum	Cowhorn orchid	—	E	Cypress swamps, scrub cypress strands, coastal hammocks, rarely terrestrial in rock pinelands, and marl prairies	L
Dalbergia brownei	Browne's Indian rosewood	—	E	Margins of hardwood hammocks and mangroves	L
Dalea carthagenensis var. *floridana*	Florida prairie clover	C	E	Pine rocklands and rockland hammocks, coastal uplands, and marl prairies	L
Digitaria filiformis var. *dolichophylla*	Caribbean crabgrass	—	T	Rock pinelands	L
Digitaria pauciflora	Few-flowered fingergrass	C	E	Rock pinelands	L
Drypetes lateriflora	Guiana plum	—	T	Hardwood hammocks	L
Eltroplectris calcarata	Spurred neottia	—	E	Mesic hardwood hammocks and rockland hammocks	L
Elytraria caroliniensis var. *angustifolia*	Narrow-leaved Carolina scalystem	—	N	Wet pinelands	L
Epidendrum amphistomum	Dingy flowered star orchid	—	E	Swamps	L
Epidendrum floridensis	Florida star orchid	—	E	Cypress and hardwood swamps	L
Epidendrum nocturnum	Night-scented orchid	—	E	Cypress swamps, moist hardwood hammocks, and mangroves	L
Epidendrum rigidum	Stiff flower star orchid	—	E	Swamps and moist hammocks	L
Erithalis fruticosa	Black torch	—	T	Coastal hammocks and dunes	L
Ernodea cokeri	Coker's beach creeper	—	E	Pine rocklands, dunes	L
Eugenia confusa	Tropical ironwood	—	E	Hardwood hammocks	L-M§
Eugenia rhombea	Red stopper	—	E	Rockland hammocks	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 3 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Evolvulus convolvuloides	Bindweed dwarf morning-glory	—	E	Pine rocklands	L
Exostema caribaeum	Princewood	—	E	Pine rocklands and rockland hammocks	L
Galactia smallii	Small's milk pea	E	E	Pine rocklands	L
Galeandra bicarinata	Two-keeled helmet orchid	—	E	Hardwood hammocks	L
Glandularia maritima	Coastal vervain	—	E	Dunes, coastal pinelands	L
Gossypium hirsutum	Wild cotton	—	E	Coastal hammocks, beaches, disturbed sites, and shell mound spoil piles	L
Govenia floridana	Florida govenia	—	E	Hardwood hammocks	L
Guzmania monostachia	Fakahatchee guzmania	—	E	Swamps and wet hardwood hammocks	L
Habenaria nivea	Snowy platanthera	—	T	Wet pinelands, prairies, and wet ditches	L
Harrisia simpsonii	Simpson's prickly apple	—	E	Shell mounds, xeric coastal hammocks, and scrubby flatwoods	L
Hibiscus poeppigiii	Poeppig's rosemallow	—	E	Hardwood hammocks	L
Hippomane mancinella	Manchineel	—	E	Coastal berms and hammocks	L
Hypelate trifoliata	White ironwood	—	E	Pine rocklands and rocklands	L
Ilex krugiana	Krug's holly	—	T	Pinelands and hardwood hammocks	L
Ionopsis utricularioides	Delicate violet orchid	—	E	Cypress swamps and citrus groves	L
Ipomoea microdactyla	Wild potato morning glory	—	E	Pine rocklands	L-M§
Ipomoea tenuissima	Rocklands morning glory	—	E	Pine rocklands	L-M§
Jacquemontia curtisii	Pineland jacquemontia	—	T	Pinelands	L-M§
Jacquemontia pentanthos	Skyblue clustervine	—	E	Pine rocklands and disturbed edges, areas of rockland hammocks, and coastal rock barrens	L
Jacquinia keyensis	Joewood	—	T	Coastal hammocks	L
Koanophyllum villosum	Villose fennel	—	E	Hammocks and pinelands	L
Lantana canescens	Small-headed lantana	—	E	Transition zones between rockland hammocks and pine rocklands	L
Lantana depressa var. *depressa*	Florida lantana	—	E	Rock pinelands	L-M§
Lantana depressa var. *floridana*	Atlantic Coast Florida lantana	—	E	Dry, open dunes and sandy ridges, primarily along coasts	L-M§
Leiphaimos parasitica	Ghost plant	—	E	Hardwood hammocks	L
Licaria triandra	Gulf licaria	C	E	Hardwood hammocks	L-M§
Linum arenicola	Sand flax	C	E	Pine rocklands, marl prairies, and adjacent disturbed areas	H-P
Linum carteri var. carteri	Carter's small-flowered flax	C	E	Pine rocklands	L-M§
Linum carteri var. smallii	Carter's large-flowered flax	—	E	Pine flatwoods, pine rocklands, and adjacent disturbed areas	L-M§
Lomariopsis kunzeana	Holly vine fern	—	E	Wet hardwood hammocks, limestone outcrop in wet hardwood hammocks	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 4 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Manilkara jaimiqui ssp. *emarginata*	Wild dilly	—	T	Hardwood hammocks	L
Maytenus phyllanthoides	Florida mayten	—	T	Coastal hammocks and dunes	L
Melanthera parvifolia	Small-leaved melanthera	—	T	Old coral reefs, limestone, pine forests	H-P
Mesadenus lucayana	Florida Keys ladies'-tresses	—	E	Dry calcareous hardwood hammocks and coastal middens	L
Microgramma heterophylla	Climbing vine fern	—	E	Hardwood hammocks, limestone outcrops in hardwood hammocks	L
Myrcianthes fragrans	Simpson stopper	—	T	Coastal hammocks; rarely, inland hardwood hammocks	L
Nephrolepis biserrata	Giant sword fern	—	T	Swamps and wet hardwood hammocks	L
Ocimum campechianum	Wild basil	—	E	Disturbed sites	M
Odontosoria clavata	Wedgelet fern	—	E	Rock pinelands and rockland hammocks, often on limestone	L
Oncidium floridanum	Florida dancinglady orchid	—	E	Pine rocklands, rockland hammocks, mangroves, and cypress swamps	L
Oncidium undulatum	Muleear orchid	—	E	Mangrove swamps, cypress swamps, and hardwood hammocks	L
Ophioglossum palmatum	Hand fern	—	E	Wet hammocks, epiphytic on sabal palmetto	L
Opuntia stricta	Erect pricklypear	—	T	Shell middens, dunes, and coastal hammocks	L
Paspalidium chapmanii	Coral paspalum	—	E	Hardwood hammocks, prairies, and disturbed sites	M
Passiflora pallens	Pineland passionflower	—	E	Rockland hammocks, coastal berms, and strand swamps	L
Passiflora sexflora	Everglades Key passion-flower	—	E	Hardwood hammocks	L
Pavonia paludicola	Mangrove mallow	—	E	Hardwood hammocks	L-M
Peperomia humilis	Low peperomia	—	E	Shell mounds and limestone outcrops in mesic hardwood hammocks, coastal berms, and cypress swamps	L
Peperomia obtusifolia	Blunt-leaved peperomia	—	E	Rockland hammocks, wet hardwood hammocks, and strand swamps	L
Phyla stoechadifolia	Southern frog-fruit	—	E	Wet pinelands and glades	L
Picramnia pentandra	Bitter bush	—	E	Hammocks	L-M§
Pithecellobium keyense	Black bead	—	T	Coastal hammocks and strands	L
Poinsettia pinetorum	Pineland spurge	—	E	Pine rocklands	L-M§
Polygala smallii	Tiny polygala	E	E	Pine rocklands, scrub, sandhills, and open coastal spoil piles	L
Polystachya concreta	Greater yellowspice orchid	—	E	Cypress swamps, hardwood hammocks, and mangroves	L
Ponthieva brittoniae	Britton's shadow-witch	—	E	Rock pinelands and rockland hammocks	L
Prosthechea boothiana var. *erythronioides*	Dollar orchid	—	E	Hardwood hammocks and mangroves	L
Prosthechea cochleata var. *triandra*	Clamshell orchid	—	E	Swamps, mangroves, and hardwood hammocks	L
Prunus myrtifolia	West Indian cherry	—	T	Rock pinelands and rockland hammocks	L
Psidium longipes	Mangrove berry	—	T	Pine rocklands and rockland hammocks	L-M§
Psychotria ligustrifolia	Bahama wild coffee	—	E	Pine rocklands and rockland hammocks	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 5 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Pteris bahamensis	Bahama brake	—	T	Pine rocklands and edges of rockland hammocks	H-P
Pteroglossaspis ecristata	Giant orchid	—	T	Sandhills, scrubs, pine flatwoods, and pine rocklands	L
Reynosia septentrionalis	Darlingplum	—	T	Hardwood hammocks and margins of mangroves	L
Rhipsalis baccifera	Mistletoe cactus	—	E	Rockland hammocks and mangroves	L
Rhynchosia parviflora	Small-leaf snoutbean	—	T	Pinelands and beaches	L
Roystonea elata	Florida royal palm	—	E	Wet hardwood hammocks, swamps, and cypress sloughs	L
Sachsia polycephala	Bahama sachsia	—	T	Rock pinelands	L
Sacoila lanceolata var. *paludicola*	Fahkahatchee ladies'-tresses	—	T	Wet hardwood hammocks, cypress swamps, and middens	L
Savia bahamensis	Bahama maidenbush	—	E	Coastal thickets, pine rocklands, and rockland hammocks	L
Schaefferia frutescens	Florida boxwood	—	E	Rockland hammocks	L
Scleria lithosperma	Florida Keys nutrush	—	E	Pine rocklands and rockland hammocks	L
Scutellaria havanensis	Havana skullcap	—	E	Rock pinelands	L
Selaginella eatonii	Eaton's spikemoss	—	E	Moist limestone outcrops in rock pinelands and rockland hammocks	L
Senna mexicana var. *chapmanii*	Bahama senna	—	T	Rock pinelands, rockland hammocks, and dunes	L
Smilax havanensis	Everglades greenbrier	—	T	Rock pinelands and rockland hammocks	L
Solanum donianum	Mulle in nightshade	—	T	Coastal hammocks and dunes, marl prairies, edges or roads in mangroves	H-P
Spiranthes laciniata	Lacelip ladies-tresses	—	T	Hypericum-sedge wetlands, marshes, open cypress swamp	L
Spiranthes longilabris	Longlip ladies'-tresses	—	T	Wet prairies and pine rocklands	L
Spiranthes torta	Southern ladies'-tresses	—	E	Pine rocklands and marl prairies	L
Stylosanthes calcicola	Pineland pencil flower	—	E	Pine rocklands, marl prairies, and transitional areas between them	L
Swietenia mahagoni	West Indies mahogany	—	T	Coastal strands, rockland hammocks, and hammocks also naturalized in disturbed areas from cultivated trees	L
Tectaria fimbriata	Least halberd fern	—	E	Limestone outcrops in rockland hammocks	L
Tectaria heracleifolia	Broad halberd fern	—	T	Limestone outcrops in rockland hammocks	L
Tephrosia angustissima var. angustissima	Devil's shoestring	—	E	Pine rocklands	L
Tephrosia angustissima var. *corallicola*	Rockland hoary-pea	—	E	Pine rocklands	L
Tephrosia angustissima var. *curtisii*	Coastal hoary-pea	—	E	Coastal strands	L
Tetrazygia bicolor	Florida clover ash	—	T	Rock pinelands and rockland hammocks	L
Thelypteris augescens	Abrupt tip maiden fern	—	T	Rockland hammocks	H-P
Thelypteris patens	Grid-scale maiden fern	—	E	Rockland hammocks	L
Thelypteris reptans	Creeping maiden fern	—	E	Limestone sinks in rockland hammocks	L
Thelypteris reticulata	Lattice-vein fern	—	E	Wet hardwood hammocks and cypress swamps	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 6 of 6)

Scientific Name	**Common Name**	**Federal Status***	**State Status†**	**Habitat Preference**	**Likelihood of Species Occurrence within Corridor‡**
Thelypteris sclerophylla	Stiff-leaved maiden fern	—	E	Rockland hammocks	L
Thelypteris serrata	Toothed maiden fern	—	E	Cypress swamps and slough floodplains	L
Thrinax morrisii	Brittle thatch palm	—	E	Rockland hammocks and rock pinelands	L
Thrinax radiata	Florida thatch palm	—	E	Coastal thickets on limestone	L-M§
Tillandsia balbisiana	Twisted wildpine	—	T	Hammocks	M
Tillandsia fasciculata var. *densispica*	Cardinal airplant	—	E	Cypress swamps and hardwood hammocks	L
Tillandsia flexuosa	Banded wildpine	—	T	Cypress swamps and hardwood hammocks	L
Tillandsia utriculata	Giant wildpine	—	E	Hardwood hammocks, pinelands, and scrub	M
Tillandsia variabilis	Leatherleaf airplant	—	T	Cypress swamps and hardwood hammocks	L
Tournefortia hirsutissima	Chiggery grapes	—	E	Hammocks	L
Tragia saxicola	Pineland noseburn	—	T	Rock pinelands	L-M§
Trema lamarckianum	Lamarck's trema	—	E	Hardwood hammocks and shell middens	H-P
Trichomanes krausii	Kraus' bristle fern	—	E	Rockland hammocks	L
Trichomanes punctatum ssp. *floridanum*	Florida filmy fern	—	E	Rockland hammocks, shell middens, limestone sinks, and limestone boulders	L
Tripsacum floridanum	Florida gama grass	—	T	Rock pinelands	L-M§
Vallesia antillana	Tearshrub	—	E	Rockland hammocks	L
Vanilla barbellata	Worm-vine orchid	—	E	Mangroves, coastal hardwood hammocks, pine rocklands, rockland hammocks, and road banks	L
Vanilla inodora	Mexican vanilla	—	E	Wet rockland hammocks	L
Vanilla phaeantha	Leafy vanilla	—	E	Cypress swamps and moist hammocks	L
Zanthoxylem coriaceum	Biscayne pricklash	—	E	Coastal hammocks	L
Zephyranthes simpsonii	Simpson's zephyrlily	—	T	Wet flatwoods and prairies	H§

*Listing by USFWS. E = endangered. T = threatened. C = candidate for listing.
†Listing by FDACS. E = endangered. T = threatened.
‡L = low. M = medium. H = high. P = present in corridor. PE = possibly extinct.
§Species rated L, M, or H for occurrence due to presence within 1,500 ft of the corridor. L-M indicates optimal habitat lacking or limited; H indicates abundant optimal habitat is present.

Sources: USFWS, http://ecos.fws.gov/tess_public//pub/stateListing.jsp?state=FL&status=listed, 2009.
FDACS Regulated Plants: Section 5B-40.0055, F.A.C.

endangered: *Brickellia mosieri*, *Picramnia peltandra*, *Licaria triandra*, *Linum carteri* var. *carteri*, *Linum carteri* var. *smallii*, *Poinsettia pinetorum*, *Thrinax radiate*, *Lantana depressa* var. *floridana*, *Chamaesyce garberi*, *Eugenia confusa*, *Ipomoea microdactyla*, and *Ipomoea tenuissima*. Six are listed as threatened: *Coccothrinax argentata*, *Jacquemontia curtissii*, *Psidium longipes*, *Zephyranthes simpsonii*, *Tripsacum floridanum*, and *Tragia saxicola*. Figure E9.1.0-4 (Map Sheets 1 through 20) depicts the locations of FNAI-listed plant species occurrences within 1,500 ft of the East Preferred Corridor.

Wildlife Species

State- or federally listed wildlife species, potentially occurring in Miami-Dade County, are depicted in Table E9.3.7-5. Also shown in Table E9.3.7-5 are the species' current status and their likelihood for occurrence in the East Preferred Corridor.

Amphibians

Gopher Frog (*Rana capito*)—The gopher frog is a species of special concern as identified by FWC. This amphibian is typically considered a commensal species to the gopher tortoise. Therefore, habitat requirements tend to be xeric upland habitats that support gopher tortoise populations. Therefore, along the East Preferred Corridor, there is a low likelihood this species may be present due to a general lack of suitable habitats for gopher tortoises.

Reptiles

American Alligator (*Alligator mississippiensis*)—The alligator is listed by USFWS as threatened due to similarity of appearance to the American crocodile and a species of special concern by FWC. This reptile will be present in wetlands and water bodies along the East Preferred Corridor.

American Crocodile (*Crocodylus acutus*)—This federally threatened/state-endangered species successfully inhabits the canals and berms located within the existing Turkey Point cooling canals of the industrial wastewater facility. This canal system is part of the federally designated critical habitat for the crocodile. The East Preferred Corridor does not cross the primary crocodile habitat areas of the Turkey Point plant property.

Florida Pine Snake (*Pituophis melanoleucus mugitus*)—The Florida pine snake prefers well-drained sandy soils associated with upland pine areas. Its likelihood of occurrence is considered low because of the lack of suitable habitat.

EXHIBIT 21

TABLE E9.3.7-5
STATE OR FEDERALLY LISTED WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE EAST PREFERRED CORRIDOR

(Page 1 of 2)

		Designated Status		
Common Name	**Scientific Name**	**USFWS**	**FWC**	**Likelihood of Occurrence within East Preferred Corridor**
Amphibians				
Gopher frog	*Rana capito*	—	SSC	Low, and only in areas where gopher tortoise burrows may be found
Reptiles				
American alligator	*Alligator mississippiensis*	T(S/A)	SSC	Likely in wetlands all along the corridor
American crocodile	*Crocodylus acutus*	T	E	Present on the Turkey Point plant property, existing Turkey Point cooling canals of the industrial wastewater facility
Florida pine snake	*Pituophis melanoleucus mugitus*	—	SSC	Low, primarily along coastal areas with well-drained soils
Rim rock crowned snake	*Tantilla oolitica*	—	T	Moderate, could be found in sandy or rocky upland habitats found along the corridor
Eastern indigo snake	*Drymarchon corais couperi*	T	T	High in suitable habitats; FNAI records indicate observations near the corridor north of Turkey Point
Gopher tortoise	*Gopherus polyphemus*	—	T	Low due to range and minimal habitats present
Birds				
Bald eagle	*Haliaeetus leucocephalus*	—	—*	Moderate likelihood of foraging in suitable habitats along the southern portion of the East Preferred Corridor; no known nests near the East Preferred Corridor, but has been observed near the Site
Snail kite	*Rostrhamus sociabilis plumbeus*	E	E	Low because of the lack of habitat
Southeastern American kestrel	*Falco sparverius paulus*	—	T	Low because of known range in Florida
Florida burrowing owl	*Speotyto cunicularia floridana*	—	SSC	Moderate in open lands along corridor; FNAI (2009) reports historical observation near Dadeland Mall east of corridor
White-crowned pigeon	*Patagioenas leucocephala*	—	T	Present, found in hammocks with fruit trees; has been observed on the Turkey Point plant property
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E	E	Unlikely, found in certain marshes near Shark Slough in the lower ENP
Florida sandhill crane	*Grus canadensis pratensis*	—	T	Low, most suitable habitat is west of corridor
Limpkin	*Aramus guarauna*	—	SSC	Low; suitable habitat is minimal
Little blue heron	*Egretta caerulea*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property
Peregrine falcon	*Falco peregrinus*	—	E	Low, but possible near open water
Snowy egret	*Egretta thula*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property

EXHIBIT 21

TABLE E9.3.7-5
STATE OR FEDERALLY LISTED WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE EAST CORRIDOR
(Page 2 of 2)

		Designated Status		
Common Name	**Scientific Name**	**USFWS**	**FWC**	**Likelihood of Occurrence within East Preferred Corridor**
Tricolored heron	*Egretta tricolor*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property
White ibis	*Eudocimus albus*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property
Wood stork	*Mycteria americana*	E	E	Likely foraging in suitable wetlands along corridor; observed on the plant property; closest known colonies are more than 13 miles to the west in the ENP
Piping plover	*Charadrius melodus*	T	T	Low, sandy beaches along coast
Reddish egret	*Egretta rufescens*	—	SSC	Low, normally along coast and mangrove islands
American oystercatcher	*Haematopus palliatus*	—	SSC	Low, found on beaches and coastal sandbars
Brown pelican	*Pelecanus occidentalis carolinensis*	—	SSC	Low for most of the corridor, perhaps flying over canals nearer the plant property; observed on the plant property
Roseate spoonbill	*Platalea ajaja*	—	SSC	Low to moderate, could be found foraging in wetlands along the corridor
Black skimmer	*Rhynchops niger*	—	SSC	Low, found on the coast
Least tern	*Sterna antillarum*	—	T	Low, found on sandy or gravel habitats along the coast; they have been recorded from the existing Turkey Point industrial wastewater facility cooling canal berms south of the corridor (FNAI, 2009)
<u>Mammals</u>				
Florida bonneted (mastiff) bat	*Eumops glaucinus floridanus*	—	E	Moderate; could be found roosting in trees or buildings along the corridor
Florida manatee	*Trichechus manatus latirostris*	E	E	Low, primarily found along the coast and some of the canals north of the Turkey Point plant property; reported by FNAI (2009) to formerly have congregated in Coral Gables Canal
Florida mouse	*Podomys floridanus*	—	SSC	Unlikely, found in more central/northern Florida in dry sandy habitats; usually associated with gopher tortoise burrows
Everglades mink	*Mustela vison evergladensis*	—	T	Unlikely due to known range
Florida black bear	*Ursus americanus floridanus*	—	T	Unlikely along corridor; more likely found west of the Study Area
Florida panther	*Puma concolor coryi*	E	E	Unlikely along the corridor

Note: E = endangered. T = threatened.
SSC = species of special concern. T(S/A) = threatened due to similarity in appearance to a federally listed species.

*The eagle has recently been delisted by FWC with the adoption of the Bald Eagle Management Guidelines found in Section 68A-16.002, F.A.C. It is included here due to the regulatory protection still afforded it.

Sources: FWC, 2008.
FNAI, 2009.

<u>Rim Rock Crowned Snake (*Tantilla oolitícus*)</u>—This snake occupies a wide variety of habitats in southern Florida and, therefore, is considered to have a moderate likelihood of occurrence. Some of the pine rockland habitats found along the corridor could serve as potential habitats. An old record of occurrence exists for the corridor north of U.S. 1 along SW 27th Avenue (FNAI, 2009).

<u>Eastern Indigo Snake (*Drymarchon corais couperi*)</u>—This distinctive large, bluish-black snake can occur in suitable habitats throughout Florida. It has a wide range of habitat preferences and prey species. Often considered as a gopher tortoise commensal, it can be found in xeric habitats, but uses more mesic habitats as well. It has a moderate likelihood to occur along the East Preferred Corridor within these habitat types. FNAI (2009) lists a record of this individual less than 1 mile from the East Preferred Corridor. The indigo is listed as a threatened species by both USFWS and FWC.

<u>Gopher Tortoise (*Gopherus polyphemus*)</u>—The gopher tortoise's range in Florida extends into northern Miami-Dade County. The gopher tortoise is currently listed as a threatened species by FWC, but its likelihood along the East Preferred Corridor is considered low.

Birds

<u>Bald Eagle (*Haliaeetus leucocephalus*)</u>—The bald eagle was delisted by USFWS and FWC within the past year. It is still included here because of special rules protecting it (Section 68A-16.002, F.A.C.). The eagle is making a comeback in population numbers in the United States, and eagle nests are becoming more common in Florida. No known nests exist near the East Preferred Corridor, but it is possible the bird could be found foraging along the southern half of the corridor. An individual bald eagle was observed along the northwest corner of the industrial wastewater facility just west of the East Preferred Corridor.

<u>Snail Kite (*Rostrhamus sociabilis plumbeus*)</u>—Often called the Everglades snail kite, this bird is listed as endangered by USFWS and FWC. Its habitat requirements are also specific. It prefers freshwater marsh systems with distinct vegetation profiles. Since its primary food source is the apple snail (*Pomacea paludosa*), hydrological regime is critical to both the food source and nesting of this bird. It may occur in some of the marsh systems along the southern portion of the corridor, but, overall, its likelihood of occurrence is considered low.

EXHIBIT 21

Southeastern American Kestrel (*Falco sparverius paulus*)—This subspecies of the American kestrel is a common resident of open land habitats throughout Florida south to the Lake Okeechobee area. It has been documented in Miami-Dade County and is state-listed as threatened by FWC. The more northern subspecies migrates here in the winter months, but the southeastern kestrel breeds here in summer. Since it prefers open habitats for foraging, it is commonly seen alongside road and transmission line rights-of-way. However, due to its known range and relative few documented occurrences in the county, its likelihood of occurrence is considered low.

Florida Burrowing Owl (*Speotyto cunicularia*)—The small Florida burrowing owl is listed as a species of special concern by FWC. It is most common in central Florida and lives in burrows in sandy soils associated with cattle pastures, prairies, and sandhills. It has a moderate likelihood of occurrence in open, drier habitats along the East Preferred Corridor. FNAI (2009) reports one historic observation near the corridor in the vicinity of the Dadeland Mall.

White-Crowned Pigeon (*Patagioenas leucocephala*)—This state-listed threatened bird forages in fruit-bearing trees in hardwood hammocks in southern Florida. It has been observed at the Turkey Point plant property; therefore, its presence is likely in other suitable habitats along the East Preferred Corridor.

Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*)—This endangered, ecologically isolated bird is restricted to the marl prairies of Big Cypress National Preserve and the ENP. Therefore, it is unlikely to occur in the East Preferred Corridor.

Florida Sandhill Crane (*Grus canadensis pratensis*)—This large bird is state-listed as threatened by FWC. It commingles with the greater sandhill crane, which migrates to Florida. Sandhills prefer shallow marshes for nesting and wet prairies and pastures for foraging. It would more likely be found farther west in the county, so its likelihood of occurrence is considered low for most of the East Preferred Corridor.

Limpkin (*Aramus guarauna*)—The secretive limpkin is listed as a species of special concern and is found in suitable habitats throughout most of the state. It prefers large, slow-moving watercourses, such as the Everglades. Therefore, its likelihood of occurrence is low in the East Preferred Corridor.

EXHIBIT 21

Little Blue Heron (*Egretta caerula*)—This wading bird is listed as a species of special concern by FWC and is found in suitable wetlands throughout Florida. They prefer freshwater habitats for foraging. This heron is likely to be found in suitable habitats along the East Preferred Corridor and has been observed near the Site.

Peregrine Falcon (*Falco peregrinus*)—This state-listed endangered migratory bird winters in Florida. It is often seen over coastlines or large water bodies, where it hunts waterfowl. Since these habitats are generally absent from the East Preferred Corridor, the peregrine falcon’s likelihood of occurrence in much of the corridor is low, but it could be observed near the Turkey Point plant property.

Snowy Egret (*Egretta thula*)—Snowy egrets, like the other wading birds discussed, are listed as a species of special concern by FWC. This bird is widely distributed in Florida in both fresh and saltwater systems. It is likely to occur in wetlands along the East Preferred Corridor. It was observed near the Site.

Tricolored Heron (*Egretta tricolor*)—The tricolored heron (formerly called Louisiana heron) is a species of special concern as listed by FWC. It likes estuarine habitats, but can be found foraging in almost any wetland system. It is likely to be found along the East Preferred Corridor. It was observed near the Site.

White Ibis (*Eudocimus albus*)—The white ibis is one of the most common wading birds in Florida, but it is listed as a species of special concern by FWC. Large flocks of this bird are often seen foraging in shallow marshes or wet pastures. The white ibis is likely to occur along the East Preferred Corridor. It was observed near the Site.

Wood Stork (*Mycteria americana*)—The wood stork is an endangered species listed by both USFWS and FWC. This large bird prefers nesting in cypress swamps, and some of the largest nesting areas in Florida occur in the Corkscrew Swamp Sanctuary well west of the study area. The closest known wood stork colonies occur within the ENP approximately 13 miles west of the East Preferred Corridor. Certainly the wood stork could be found foraging in suitable habitats along the East Preferred Corridor. They were observed foraging near the Site.

Piping Plover (*Charadrius melodus*)—This federal- and state-listed threatened bird occurs on sandy beaches along the Atlantic Coast. Therefore, its likelihood of occurrence in the East Preferred Corridor is considered low.

Reddish Egret (*Egretta rufescens*)—This state-listed bird is a species of special concern, more coastal than the other egrets, and, while it could be occasionally observed along the southern portion of the East Preferred Corridor near the Site, its likelihood of occurrence is considered low.

American Oystercatcher (*Haematopus palliatus*)—This state-listed coastal bird is a species of special concern and may be found around the Turkey Point plant property, but its likelihood of occurrence along the remainder of the East Preferred Corridor is considered low.

Brown Pelican (*Pelecanus occidentalis carolinensis*)—This state-listed coastal bird is a species of special concern and may be found flying over or near the Turkey Point plant property, but its likelihood of occurrence for the East Preferred Corridor is considered low.

Roseate Spoonbill (*Platalea ajaja*)—This state-listed species of special concern forages and nests in estuarine systems of South Florida. It may be found occasionally foraging inland along the East Preferred Corridor.

Black Skimmer (*Rhynchops niger*)—This state-listed species of special concern is primarily found along undisturbed coastlines of Florida. There is a low likelihood of its occurrence along the corridor.

Least Tern (*Sterna antillarum*)—The least tern is state-listed as threatened and is usually found near the coast where they nest on sandy or gravel surfaces. While they have been previously recorded on the berms of the existing Turkey Point cooling canals within the industrial wastewater facility, their likelihood of occurrence in the corridor is low.

Mammals

Florida Bonneted (Mastiff) Bat (*Eumops glaucinus floridanus*)—This state-listed endangered bat typically roosts in trees or buildings. It is known to occur in Miai-Dade County, so there is a moderate likelihood it could be found along the East Preferred Corridor.

Florida Manatee (*Trichechus manatus latirostris*)—This endangered mammal occurs along the coast and perhaps in some of the canals connecting to the coast. USFWS designates much of coastal Miami-Dade County as federal critical habitat for this animal. FNAI (2009) reports a former manatee congregation area in the Coral Gables Canal, which crosses the East Preferred Corridor. However, its likelihood of occurrence in or near the transmission corridor is generally considered low. In any event, transmission lines will span waterbodies likely to support manatees.

Florida Mouse (*Podomys floridanus*)—This state-listed species of special concern is likely only to be found in northern Miami-Dade County in sandy, well-drained soils. Along the East Preferred Corridor, its likelihood of occurrence is considered unlikely.

Everglades Mink (*Mustela vison evergladensis*)—This threatened species is a subspecies of the southeastern mink. It is found in a variety of wetlands in and around the Everglades. Its likelihood of occurrence is therefore considered unlikely in the East Preferred Corridor.

Florida Black Bear (*Ursus americanus floridanus*)—The Florida black bear is currently listed as threatened by FWC. This large mammal is known to occur west of the study area and prefers large swamps and dense thickets. It is unlikely this animal occurs along the East Preferred Corridor because of the lack of large swamp systems and presence of high-density development.

Florida Panther (*Puma concolor coryi*)—The panther is listed by USFWS and FWC as endangered. This large cat prefers most natural vegetation communities of south Florida. Its primary range includes southwest Florida and the western Everglades. The panther’s range in this area makes it unlikely to occur along the East Preferred Corridor.

E9.3.7.4 Other Environmental Features

There are no other environmental features to address that have not been addressed in the previous sections.

E9.4 Effects of Right-of-Way Preparation and Transmission Line Construction

E9.4.1 Construction Techniques

Construction phases will typically consist of right-of-way clearing (where required), access road and structure pad construction (where necessary), line construction, and right-of-way restoration. The fol-

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS

Scientific Name	**Common Name**	**Federal Status***	**State Status†**	**Habitat Preference**	**Likelihood of Species Occurrence within Corridors‡**
Acoelorraphe wrightii	Paurotis palm	—	T	Swamps, everglades, and hammocks	L
Acrostichum aureum	Golden leather fern	—	T	Mangrove swamps, saltmarshes, and limestone sinks	L
Actinostachys pennula	Ray fern	—	E	Swamps	L
Adiantum melanoleucum	Fragrant maidenhair fern	—	E	Limestone sinks in rockland hammocks	L
Adiantum tenerum	Brittle maidenhair fern	—	E	Limestone sinks in rockland hammocks	L-M
Aeschynomene pratensis	Meadow jointvetch	—	E	Marl prairies, cypress domes, and swales	H-P
Aletris bracteata	Bracted colic-root	—	E	Rocky pine savannahs	L
Alvaradoa amorphoides	Everglades leaf lace	—	E	Pine rocklands, transition zone between pine rocklands and rockland hammock	L
Amorpha herbacea var. *crenulata*	Crenulate lead-plant	E	E	Rockland hammocks and pine rocklands	L-M
Anemia wrightii	Wright’s pineland fern	—	E	Limestone outcrops in moist hammocks, pine rocklands, and prairies	L
Angadenia berteroi	Pineland golden trumpet	—	T	Pinelands	H-P
Argythamnia blodgettii	Blodgett’s wild-mercury	C	E	Open gaps in pine rocklands, rockland hammocks, and coastal berms	L
Asplenium dentatum	American toothed spleenwort	—	E	Limestone outcrops in moist hammocks	L
Asplenium serratum	American bird’s nest fern	—	E	Cypress swamps and moist hardwood hammocks	L
Asplenium verecundum	Modest spleenwort	—	E	Limestone outcrops in rockland hammocks	L
Basiphyllaea corallicola	Rockland orchid	—	E	Openings in pine rocklands, leaf litter, and in moist hardwood hammocks	L
Beloglottis costaricensis	Costa Rican ladies’-tresses	—	E	Hardwood hammocks	L
Bletia purpurea	Pine pink	—	T	Pine rocklands; stumps and tree bases and cypress swamps	H-P
Bourreria cassinifolia	Smooth strongbark	—	E	Pine rocklands	L
Bourreria succulenta	Bahama strongbark	—	E	Hardwood hammocks	L
Brickellia mosieri	Florida brickell-bush	C	E	Pinelands	H-P
Byrsonima lucida	Locustberry	—	T	Pine rocklands, hardwood hammocks	H-P
Calyptranthes pallens	Spicewood	—	T	Hardwood hammocks	L
Calyptranthes zuzygium	Myrtle-of-the-river	—	E	Rockland hammocks - coastal strand	L
Catopsis berteroniana	Powdery catopsis	—	E	Hardwood hammocks, mangroves, and hardwood trees in pinelands	L
Catopsis floribunda	Many-flowered catopsis	—	E	Hardwood hammocks	L
Chamaesyce deltoidea ssp. *adhaerens*	Hairy deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *deltoidea*	Deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *pinetorum*	Pinelands spurge	C	E	Pine rocklands	H-P
Chamaesyce garberi	Garber’s spurge	T	E	Pinelands and dunes	L
Chamaesyce pergamena	Southern Florida sandmat	—	T	Pine rocklands	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 2 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Chamaesyce porteriana	Porter’s broad-leaved spurge	—	E	Pine rocklands, rockland hammocks, coastal rock barrens, and marl prairies	L-M
Chaptalia albicans	Sunbonnets	—	T	Pinelands	H-P
Chrysophyllum oliviforme	Satinleaf	—	T	Hardwood hammocks and pinelands	L
Coccothrinax argentata	Silver palm	—	T	Pine rocklands and dunes	H-P
Colubrina cubensis var. floridana	Cuban snake-bark	—	E	Pine rocklands, rockland hammocks on Miami rock ridges, and Everglades Keys	L-M
Colubrina elliptica	Soldierwood	—	E	Hardwood hammocks	L
Crossopetalum ilicifolium	Christmas berry	—	T	Pinelands	H-P
Crossopetalum rhacoma	Maidenberry	—	T	Pinelands, hardwood hammocks	L
Croton humilis	Pepperbush	—	E	Hardwood hammocks	L
Ctenitis sloanei	Florida tree fern	—	E	Hardwood hammocks, often on limestone outcrops	L
Ctenitis submarginalis	Brown-hair comb-fern	—	E	Swamps and wet hardwood hammocks	L
Cynanchum blodgettii	Blodgett's swallowwort	—	T	Hardwood hammocks	H-P
Cyperus filiformis	Wiry flatsedge	—	E	Dry, sandy open areas, shell ridges	L
Cyrtopodium punctatum	Cowhorn orchid	—	E	Cypress swamps, scrub cypress strands, coastal hammocks, rarely terrestrial in rock pinelands, and marl prairies	L
Dalbergia brownei	Browne's Indian rosewood	—	E	Margins of hardwood hammocks and mangroves	L
Dalea carthagenensis var. *floridana*	Florida prairie clover	C	E	Pine rocklands and rockland hammocks, coastal uplands, and marl prairies	L
Digitaria filiformis var. *dolichophylla*	Caribbean crabgrass	—	T	Rock pinelands	L-M
Digitaria pauciflora	Few-flowered fingergrass	C	E	Rock pinelands	L-M
Drypetes lateriflora	Guiana plum	—	T	Hardwood hammocks	L
Eltroplectris calcarata	Spurred neottia	—	E	Mesic hardwood hammocks and rockland hammocks	L-M
Epidendrum amphistomum	Dingy flowered star orchid	—	E	Swamps	L
Epidendrum floridensis	Florida star orchid	—	E	Cypress and hardwood swamps	L
Epidendrum nocturnum	Night-scented orchid	—	E	Cypress swamps, moist hardwood hammocks, and mangroves	L
Epidendrum rigidum	Stiff flower star orchid	—	E	Swamps and moist hammocks	L
Erithalis fruticosa	Black torch	—	T	Coastal hammocks and dunes	L
Ernodea cokeri	Coker’s beach creeper	—	E	Pine rocklands, dunes	L-M
Eugenia confusa	Tropical ironwood	—	E	Hardwood hammock	L
Eugenia rhombea	Red stopper	—	E	Rockland hammocks	L
Evolvulus convolvuloides	Bindweed dwarf morning-glory	—	E	Pine rocklands	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 3 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Exostema caribaeum	Princewood	—	E	Pine rocklands and rockland hammocks	L
Galactia smallii	Small’s milk pea	E	E	Pine rocklands	L
Galeandra bicarinata	Two-keeled helmet orchid	—	E	Hardwood hammocks	L
Glandularia maritima	Coastal vervain	—	E	Dunes, coastal pinelands	L
Gossypium hirsutum	Wild cotton	—	E	Coastal hammocks, beaches, disturbed sites, and shellmound spoil piles	L
Govenia floridana	Florida govenia	—	E	Hardwood hammocks	L
Guzmania monostachia	Fakahatchee guzmania	—	E	Swamps and wet hardwood hammocks	L
Habenaria nivea	Snowy platanthera	—	T	Wet pinelands, prairies, and wet ditches	L
Harrisia simpsonii	Simpson’s prickly apple	—	E	Shell mounds, xeric coastal hammocks, and scrubby flatwoods	L
Hibiscus poeppigiii	Poeppig's rosemallow	—	E	Hardwood hammocks	L
Hippomane mancinella	Manchineel	—	E	Coastal berms and hammocks	L
Hypelate trifoliata	White ironwood	—	E	Pine rocklands and rocklands	L
Ilex krugiana	Krug’s holly	—	T	Pinelands and hardwood hammocks	H-P
Ionopsis utricularioide	Delicate violet orchid	—	E	Cypress swamps and citrus groves	L
Ipomoea microdactyla	Wild potato morning glory	—	E	Pine rocklands	L-M
Ipomoea tenuissima	Rocklands morning glory	—	E	Pine rocklands	H-P
Jacquemontia curtisii	Pineland jacquemontia	—	T	Pinelands	H-P
Jacquemontia pentanthos	Skyblue clustervine	—	E	Pine rocklands and disturbed edges, areas of rockland hammocks, and coastal rock barrens	L
Jacquinia keyensis	Joewood	—	T	Coastal hammocks	L
Koanophyllum villosum	Villose fennel	—	E	Hammocks and pinelands	H-P
Lantana canescens	Small-headed lantana	—	E	Transition zones between rockland hammocks and pine rocklands	L
Lantana depressa var. *depressa*	Florida lantana	—	E	Rock pinelands	H-P
Lantana depressa var. *floridana*	Atlantic Coast Florida lantana	—	E	Dry, open dunes and sandy ridges, primarily along coasts	L
Leiphaimos parasitica	Ghost plant	—	E	Hardwood hammocks	L
Licaria triandra	Gulf licaria	C	E	Hardwood hammocks	L-M
Linum arenicola	Sand flax	C	E	Pine rocklands, marl prairires, and adjacent disturbed areas	M-H
Linum carteri var. carteri	Carter’s small-flowered flax	C	E	Pine rocklands	L-M
Linum carteri var. smallii	Carter’s large-flowered flax	—	E	Pine flatwoods, pine rocklands, and adjacent disturbed areas	M
Lomariopsis kunzeana	Holly vine fern	—	E	Wet hardwood hammocks, limestone outcrops in wet hardwood hammocks	L
Manilkara jaimiqui ssp. *emarginata*	Wild dilly	—	T	Hardwood hammocks	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 4 of 6)

Scientific Name	**Common Name**	**Federal Status***	**State Status†**	**Habitat Preference**	**Likelihood of Species Occurrence within Corridors‡**
Maytenus phyllanthoides	Florida mayten	—	T	Coastal hammocks and dunes	L
Melanthera parvifolia	Small-leaved melanthera	—	T	Old coral reefs, limestones, pine forests	H-P
Mesadenus lucayana	Florida Keys ladies'-tresses	—	E	Dry calcareous hardwood hammocks and coastal middens	L
Microgramma heterophylla	Climbing vine fern	—	E	Hardwood hammocks, limestone outcrops in hardwood hammocks	L
Myrcianthes fragrans	Simpson stopper	—	T	Coastal hammocks; rarely, inland hardwood hammocks	L
Nephrolepis biserrata	Giant sword fern	—	T	Swamps and wet hardwood hammocks	L
Ocimum campechianum	Wild basil	—	E	Disturbed sites	L-M
Odontosoria clavata	Wedgelet fern	—	E	Rock pinelands and rockland hammocks, often on limestones	L
Oncidium floridanum	Florida dancinglady orchid	—	E	Pine rocklands, rockland hammocks, mangroves, and cypress swamps	L
Oncidium undulatum	Muleear orchid	—	E	Mangrove swamps, cypress swamps, and hardwood hammocks	L
Ophioglossum palmatum	Hand fern	—	E	Wet hammocks, epiphytic on sabal palmetto	L
Opuntia stricta	Erect pricklypear	—	T	Shell middens, dunes, and coastal hammocks	L
Paspalidium chapmanii	Coral paspalum	—	E	Hardwood hammocks, prairies, and disturbed sites	M
Passiflora pallens	Pineland passionflower	—	E	Rockland hammocks, coastal berms, and strand swamps	L
Passiflora sexflora	Everglades Key passion-flower	—	E	Hardwood hammocks	L
Pavonia paludicola	Mangrove mallow	—	E	Hardwood hammocks	L
Peperomia humilis	Low peperomia	—	E	Shell mounds and limestone outcrops in mesic hardwood hammocks, coastal berms, and cypress swamps	L
Peperomia obtusifolia	Blunt-leaved peperomia	—	E	Rockland hammocks, wet hardwood hammocks, and strand swamps	L
Phyla stoechadifolia	Southern frog-fruit	—	E	Wet pinelands and glades	H-P
Picramnia pentandra	Bitter bush	—	E	Hammocks	L
Pithecellobium keyense	Black bead	—	T	Coastal hammocks and strands	L
Poinsettia pinetorum	Pineland spurge	—	E	Pine rocklands	H-P
Polygala smallii	Tiny polygala	E	E	Pine rocklands, scrubs, sandhills, and open coastal spoil piles	L
Polystachya concreta	Greater yellowspice orchid	—	E	Cypress swamps, hardwood hammocks, and mangroves	L
Ponthieva brittoniae	Britton's shadow-witch	—	E	Rock pinelands and rockland hammocks	L
Prosthechea boothiana var. *erythronioides*	Dollar orchid	—	E	Hardwood hammocks and mangroves	L
Prosthechea cochleata var. *triandra*	Clamshell orchid	—	E	Swamps, mangroves, and hardwood hammocks	L
Prunus myrtifolia	West Indian cherry	—	T	Rock pinelands and rockland hammocks	L
Psidium longipes	Mangrove berry	—	T	Pine rocklands and rockland hammocks	L
Psychotria ligustrifolia	Bahama wild coffee	—	E	Pine rocklands and rockland hammocks	L
Pteris bahamensis	Bahama brake	—	T	Pine rocklands and edges of rockland hammocks	H-P

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 5 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Pteroglossaspis ecristata	Giant orchid	—	T	Sandhills, scrubs, pine flatwoods, and pine rocklands	L
Reynosia septentrionalis	Darlingplum	—	T	Hardwood hammocks and margins of mangroves	L
Rhipsalis baccifera	Mistletoe cactus	—	E	Rockland hammocks and mangroves	L
Rhynchosia parviflora	Small-leaf snoutbean	—	T	Pinelands and beaches	H-P
Roystonea elata	Florida royal palm	—	E	Wet hardwood hammocks, swamps, and cypress sloughs	L
Sachsia polycephala	Bahama sachsia	—	T	Rock pinelands	H-P
Sacoila lanceolata var. *paludicola*	Fahkahatchee ladies’-tresses	—	T	Wet hardwood hammocks, cypress swamps, and middens	L
Savia bahamensis	Bahama maidenbush	—	E	Coastal thickets, pine rocklands, and rockland hammocks	L
Schaefferia frutescens	Florida boxwood	—	E	Rockland hammocks	L
Scleria lithosperma	Florida Keys nutrush	—	E	Pine rocklands and rockland hammocks	L
Scutellaria havanensis	Havana skullcap	—	E	Rock pinelands	L-M
Selaginella eatonii	Eaton’s spikemoss	—	E	Moist limestone outcrops in rock pinelands and rockland hammocks	L
Senna mexicana var. *chapmanii*	Bahama senna	—	T	Rock pinelands, rockland hammocks, and dunes	L
Smilax havanensis	Everglades greenbrier	—	T	Rock pinelands and rockland hammocks	L
Solanum donianum	Mulle in nightshade	—	T	Coastal hammocks and dunes, marl prairies, edges or roads in mangroves	H-P
Spermacoce terminalis	Everglades Keys false button-weed	—	T	Pine rocklands	H-P
Spiranthes laciniata	Lacelip ladies-tresses	—	T	Hypericum-sedge, marshes, and open cypress swamps	L
Spiranthes longilabris	Longlip ladies'-tresses	—	T	Wet prairies and pine rocklands	L
Spiranthes torta	Southern ladies’-tresses	—	E	Pine rocklands and marl prairies	M
Stylosanthes calcicola	Pineland pencil flower	—	E	Pine rocklands, marl prairies, and transitional areas between them	H-P
Swietenia mahagoni	West Indies mahogany	—	T	Coastal strands, rockland hammocks, and hammocks also naturalized in disturbed areas from cultivated trees	L
Tectaria fimbriata	Least halberd fern	—	E	Limestone outcrops in rockland hammocks	L
Tectaria heracleifolia	Broad halberd fern	—	T	Limestone outcrops in rockland hammocks	L
Tephrosia angustissima var. angustissima	Devil’s shoestring	—	E	Pine rocklands	L
Tephrosia angustissima var. *corallicola*	Rockland hoary-pea	—	E	Pine rocklands	L
Tephrosia angustissima var. *curtisii*	Coastal hoary-pea	—	E	Coastal strands	L
Tetrazygia bicolor	Florida clover ash	—	T	Rock pinelands and rockland hammocks	H-P
Thelypteris augescens	Abrupt tip maiden fern	—	T	Rockland hammocks	H-P
Thelypteris patens	Grid-scale maiden fern	—	E	Rockland hammocks	L
Thelypteris reptans	Creeping maiden fern	—	E	Limestone sinks in rockland hammocks	L
Thelypteris reticulata	Lattice-vein fern	—	E	Wet hardwood hammocks and cypress swamps	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 6 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Thelypteris sclerophylla	Stiff-leaved maiden fern	—	E	Rockland hammocks	L
Thelypteris serrata	Toothed maiden fern	—	E	Cypress swamps and slough floodplains	L
Thrinax morrisii	Brittle thatch palm	—	E	Rockland hammocks and rock pinelands	L
Thrinax radiata	Florida thatch palm	—	E	Coastal thickets on limestone	L
Tillandsia balbisiana	Twisted wildpine	—	T	Hammocks	M
Tillandsia fasciculata var. *densispica*	Cardinal airplant	—	E	Cypress swamps and hardwood hammocks	L
Tillandsia flexuosa	Banded wildpine	—	T	Cypress swamps and hardwood hammocks	L
Tillandsia utriculata	Giant wildpine	—	E	Hardwood hammocks, pineland, and scrubs	M
Tillandsia variabilis	Leatherleaf airplant	—	T	Cypress swamps and hardwood hammocks	L
Tournefortia hirsutissima	Chiggery grapes	—	E	Rockland hammocks, cypress swamps	L
Tragia saxicola	Pineland noseburn	—	T	Rock pinelands	H-P
Trema lamarckianum	Lamarck’s trema	—	E	Hardwood hammocks and shell middens	H-P
Trichomanes krausii	Kraus’ bristle fern	—	E	Rockland hammocks	L
Trichomanes punctatum ssp. *floridanum*	Florida filmy fern	—	E	Rockland hammocks, shell middens, limestone sinks, and limestone boulders	L
Tripsacum floridanum	Florida gama grass	—	T	Rock pinelands, hammock edges	H-P
Vallesia antillana	Tearshrub	—	E	Rockland hammocks	L
Vanilla barbellata	Worm-vine orchid	—	E	Mangroves, coastal hardwood hammocks, pine rocklands, rockland hammocks, and road banks	L
Vanilla inodora	Mexican vanilla	—	E	Wet rockland hammocks	L
Vanilla phaeantha	Leafy vanilla	—	E	Cypress swamps and moist hammocks	L
Zanthoxylem coriaceum	Biscayne pricklash	—	E	Coastal hammocks	L
Zephyranthes simpsonii	Simpson's zephyrlily	—	T	Wet flatwoods and prairie	H

*Listing by USFWS. E = endangered. T = threatened. C = candidate for listing.
†Listing by FDACS. E = endangered. T = threatened.
‡L = low. M = medium. H = high. P = present in corridor. PE = possibly extinct.

Sources: USFWS, http://ecos.fws.gov/tess_public//pub/stateListing.jsp?state=FL&status=listed, 2009.
FDACS Regulated Plants: Section 5B-40.0055, F.A.C.

P9.3 Corridor

P9.3.1 Corridor Selection

The corridor for the reclaimed water pipelines was selected to utilize, to the greatest extent practicable, existing infrastructure in order to minimize environmental impacts. Because of the location of the South District Wastewater Treatment Plant, the majority of the corridor is within an existing FPL-owned transmission right-of-way and other FPL-owned property, with about 6.5 miles or about 70 percent in FPL fee ownership.

The north portion of the corridor allows several alternate routes for the reclaimed water pipelines from the South District Wastewater Treatment Plant to the existing FPL transmission right-of-way and includes areas where the pipelines could be located within existing roadways (e.g., SW 97th Avenue, SW 102nd Avenue, SW 248th Street/Coconut Palm Drive). Within the FPL transmission right-of-way, the pipelines would lie along an existing patrol road in the transmission right-of-way. At SW 344th Street/Palm Drive, the reclaimed water pipeline corridor will follow the existing FPL Turkey Point Plant access road.

P9.3.2 Corridor Description

The reclaimed water pipeline corridor varies in width from 500 ft to one mile. The first 2.5 miles of the reclaimed pipeline corridor extends from the South District Wastewater Treatment Plant to the existing FPL-owned transmission right-of-way. Figure P9.0.0-3 shows five potential alternate routes under consideration within the one-mile-wide reclaimed water pipeline corridor from the South District Wastewater Treatment Plant to the FPL transmission right-of-way. There are two canal crossings along these routes [i.e., the Black Creek Canal (C-1) and the Goulds Canal].

From the existing FPL transmission right-of-way, the reclaimed water pipeline corridor narrows to 500 ft and continues south for approximately 4.5 miles, collocated with the existing FPL transmission right-of-way and adjacent road and canal rights-of-way, until just south of SW 328th Street/North Canal Drive. Along this segment, the corridor crosses the Princeton (C-102), Military, unnamed, Mowry (C-103), and Homestead (North) Canals.

South of SW 328th Street/North Canal Drive, the 500 ft corridor extends about two miles, south and then generally southeast, to the FPL reclaimed water treatment facility. This segment of the corridor follows L-31E Canal to SW 344th Street/Palm Drive, where it crosses the L-31E Canal. The corridor

EXHIBIT 21

Turkey Point Units 6 & 7

SITE CERTIFICATION APPLICATION

0838-7584

FPL

JUNE 2009

EXHIBIT 21

E9.3.7 Biological and Physical Environment of the Corridor Area

E9.3.7.1 Land Use/Vegetation

The existing land use and vegetation cover types (generally 5 acres or larger in size) were identified for the East Preferred Corridor and classified using FDOT's Florida Land Use, Cover and Forms Classification System (FLUCFCS) published in 1999 as modified by SFWMD (2004). SFWMD used Categories II, III, and IV to identify land uses and vegetation types within SFWMD's boundaries. The classifications were obtained from SFWMD GIS data and overlaid on aerial photographs. Additionally, FPL performed field surveys in preparation for the environmental resource permit (ERP) informational data submittal for this Project in many areas of the East Preferred Corridor for which FPL had access (Golder Associates, Inc. [GAI], 2009). The FLUCFCS coverages were mapped/revised in the field to reflect current conditions. These data were then used to supplement those from SFWMD. The land use and vegetation classifications that occur within the corridor and the 0.5-mile area adjacent to either side are shown in Figure 9.1.0-4 (Map Sheets 1 through 20) (vegetation/land cover maps) at the end of this Section E9.0. Table E9.3.7-1 lists the various land use and vegetation categories identified within the East Preferred Corridor. Descriptions of the major land use and vegetation classifications that occur within this corridor are provided in the following subsections. For more detailed descriptions of those coverages that also occur on-Site, refer to Section 3.3.5.

Land Use

Most of the land use/cover classifications that occur along the East Preferred Corridor reflect significant human-induced changes within the landscape. That is, much of the historical vegetation that occurred along the corridor and in the region has been cleared for residential, agricultural, or industrial uses. Table E9.3.7-1 lists land uses that were identified within the East Preferred Corridor based on the SFWMD-modified FLUCFCS.

Urban and built-up land uses (100 series classifications) consist of lands primarily occupied by man-made structures and associated activities. Included in this category are low-, medium-, and high-density single-family units; rural residential units; units under construction; mobile home units; and low- and high-rise multiple dwelling units. This category also includes commercial and services, retail sales and services, other light industrial, institutional, educational facilities, recreational, parks and zoos, and open land. These categories dominate the corridor north of the Davis substation all the way to the Miami substation.

EXHIBIT 21

TABLE E9.3.7-1
LAND USE AND VEGETATION CLASSIFICATIONS OCCURRING WITHIN EAST PREFERRED CORRIDOR

Number	Land Use Designation
111	Low Density: Fixed Single Family Units
118	Low Density: Rural Residential
119	Low Density: Under Construction
121	Medium density: Fixed Single Family Units
131	High Density: Fixed Single Family Units
132	High Density: Mobile Home Units
133	High Density: Low Rise Multiple Dwelling Units
134	High Density: High Rise Multiple Dwelling Units
140	Commercial and Services
141	Retail Sales and Services
155	Other Light Industrial
170	Institutional
171	Educational Facilities
180	Recreational
185	Parks and Zoos
190	Open Land
211	Improved Pastures
212	Unimproved Pastures
214	Row Crops
222	Fruit Orchards
223	Other Groves
241	Tree Nurseries
242	Sod Farms
243	Ornamentals
251	Horse Farms
261	Fallow Cropland
310	Herbaceous (Dry Prairie)
320	Upland Shrub and Brushland
330	Mixed Rangeland
411	Pine Flatwoods
420	Upland Hardwood Forests
422	Brazilian Pepper
510	Canals
511	Ditches
512	Channelized River, Stream, Waterway
530	Reservoirs
534	Reservoirs < 10 acres
612	Mangrove Swamps
612/617	Mangrove Swamps/Mixed Wetland Hardwoods
612/619	Mangrove Swamps/Exotic Wetland Hardwoods
612 B	Dwarf Mangroves
617	Mixed Wetland Hardwoods

EXHIBIT 21

TABLE E9.3.7-1
LAND USE AND VEGETATION CLASSIFICATIONS OCCURRING WITHIN EAST PREFERRED CORRIDOR
(Continued, Page 2 of 2)

Number	Land Use Designation
619	Exotic Wetland Hardwoods
630	Wetland Forested Mixed
641	Freshwater Marshes
642	Saltwater Marshes
651	Tidal Flats
744	Fill Areas: Highways and Railways
810	Transportation
812	Railroads
814	Roads and Highways
831	Electric Power Facilities
832	Electrical Power Transmission Lines

Sources: FDOT, 1999.
SFWMD, 2004.
GAI, 2009.

The agricultural land uses (200 series classifications) make up the majority of land use along the East Preferred Corridor from the Clear Sky substation to Davis substation and mostly consist of pasture and tree/ornamental nurseries. Areas of improved pasture are typically dominated by bahia grass (*Paspalum notatum*), Bermuda grass (*Cynodon dactylon*), carpetgrasses (*Axonopus* spp.), smutgrass (*Sporobolus indicus*), and occasionally pangola grass (*Digitaria eriantha*). Pastures that have become overgrown usually contain the same species as found in improved pasture but also typically have become colonized by old field species including dog fennel (*Eupatorium capillizolium*), slender goldenrod (*Euthamia caroliniana*), blackberries (*Rubus cuneifolius* and *R. trivialis*), broomsedges (*Andropogon* spp.), bluestems (*Schizachyrium* spp.), paspalums (*Paspalum* spp.), manyflower marshpennywort (*Hydrocotyle umbellata*), coinwort (*Centella asiatica*), and southeastern sunflower (*Helianthus agrestis*). Other agricultural land uses within the corridor include sod farms, fruit orchards, other groves, horse farms, row crops, and fallow cropland.

Barren land (700 series classifications) has little or no vegetation and limited potential to support vegetative communities. Fill areas for highways and railways fall into this category and are present within the East Preferred Corridor.

Transportation, communication, and utilities (800 series classifications) consist of land primarily occupied by manmade facilities, which are necessary for movement of people and goods, airwave communications, power generating, and water supply and treatment plants. Specifically, this category includes existing transportation, railroads, roads and highways, electric power facilities, and electrical power transmission lines.

<u>Vegetation</u>

Although most of the areas within the East Preferred Corridor have been altered by the various land uses described previously, a variety of plant communities of varying quality exist within the corridors. Descriptions of the upland communities (300 and 400 series classifications), aquatic communities (500 series classifications), and wetland communities (600 series classifications) found within the corridor are presented in the following subsections. Most of the natural communities described in the following paragraphs occur from the Turkey Point Units 6 & 7 Site to Davis substation. For more detailed descriptions of these coverages that occur in the on-Site portions of the corridor, refer to Section 3.3.5 of this SCA.

EXHIBIT 21

Upland Communities

Upland communities found within the corridor range from less disturbed communities to areas vegetated by a variety of nuisance or weedy shrubs and/or herbs (Brazilian pepper [*Schinus terebinthifolius*]- and Australian pine [*Casuarina equisetifolia*]-dominated areas). The upland communities that exist within the East Preferred Corridor are summarized in the following paragraphs.

Herbaceous (Dry Prairie)—310

This plant association is dominated by a variety of herbs and may include scattered clumps of shrubs. Typical herbs include broomsedges, bluestems, bahia grass, wire grass (*Aristida stricta* var. *beyrichiana*), crabgrasses (*Digitaria* spp.), love grasses (*Eragrostis* spp.), dog fennel, sweetbroom (*Scoparia dulcis*), slender goldenrod, smutgrass, finger grass (*Eustachys petraea*), buttonweeds (*Spermacoce* spp.), paspalums, witchgrasses (*Dichanthelium* spp.), and blackberries. Shrubs are often present but not dominant. They include Brazilian pepper, saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), and groundsel tree (*Baccharis halimifolia*). This community is similar to unimproved pasture and likely represents former pasture that has not been used in some time.

Upland Shrub and Brush Land—320

This plant association exists where historical plant cover was cleared for grazing or other uses and allowed to go fallow. These areas are dominated by a variety of weedy or adventive shrubs including wax myrtle, groundsel tree, Brazilian pepper, winged sumac (*Rhus copallina*), saw palmetto, and immature cabbage palm (*Sabal palmetto*). Herbs are usually abundant and similar to those described for herbaceous (dry prairie).

Mixed Rangeland—330

This classification describes a mixture of weedy shrubs and herbs where shrubs and herbs comprise at least one-third of the total cover. Typical shrubs include Brazilian pepper, wax myrtle, saw palmetto, and groundsel tree. Herbs include broomsedges, bahia grass, finger grass, beggarticks (*Bidens alba*), dog fennel, sweetbroom, and slender goldenrod.

Pine Flatwoods—411

The pine flatwoods community is rare within the East Preferred Corridor and was mapped in a few isolated locations, as well as in the vicinity of the Miami Metro Zoo. Typically, a scattered to dense canopy of slash pine (*Pinus elliottii*) with an understory dominated by saw palmetto exists in pine flatwoods with a variety of herbs growing in open spaces between clumps of saw palmetto.

EXHIBIT 21

Pine rockland community is a variant of a pine flatwoods community. It is unique to the area because it grows on weathered outcrops of limestone, often supporting a distinct flora. Rockdale Pineland Park supports one such community and is located outside the East Preferred Corridor but within 0.5 mile.

Upland Hardwood Forests—420

This is a catchall designation for upland hardwood forests that are not easily classified under the classifications as defined by FLUCFCS. Generally, these areas are a mixture of live oak (*Quercus virginiana*), laurel oak (*Quercus hemisphaerica*), and water oak (*Quercus nigra*) that is second-growth on land cleared in the past.

Rockland hammock community is a variant of an upland hardwood community. It is a unique community because it grows on limestone outcrops, often supporting a distinct flora. Rockland hammock is the advanced successional stage of pine rockland. Pine rockland community is similar to rockland hammock, and differs only by canopy trees consisting mostly of pines instead of hardwoods. Simpson Park and Vizcaya Museum and Gardens support rockland hammock communities. Both occur within 0.5 mile of the corridor. However, based on current aerial photography, other areas reported by FNAI prior to 1975 seem to have since been developed.

Brazilian Pepper—422

This association is dominated by the exotic Brazilian pepper with lesser amounts of other shrubs including groundsel tree and wax myrtle. Herbs are usually uncommon in the interiors of these areas where the cover of Brazilian pepper completely shades the ground but are abundant at the margins of these communities. Common herbs usually include smutgrass, dog fennel, bahia grass, John Charles (*Hyptis verticillata*), and cottonweed (*Froelichia floridana*). Vines are usually present, especially muscadine grape (*Vitis rotundifolia*) and peppervine (*Ampelopsis arborea*). This type of community normally becomes established on fallow land, berms, or other disturbed areas where the native vegetation was destroyed.

Aquatic and Wetland Communities

Four aquatic communities occur within the East Preferred Corridor and include canals, ditches, channelized river/stream/waterway, ditches, reservoirs, and reservoirs less than 10 acres. No natural aquatic communities exist within the corridor. Most are vegetated by a variety of floating or emergent herbs, many of which are considered nuisance species by the Florida Exotic Plant Pest Council. Categories or classifications of aquatic habitats that occur within the East Preferred Corridor are described in the following paragraphs.

Forested and herbaceous wetlands in the East Preferred Corridor are comprised of 10 different associations. Of these, mangrove swamps, mixed wetland hardwoods, and freshwater marsh/wet prairie associations are the most prevalent. The quality of wetlands ranges from those exhibiting expected floristic and structural characteristics providing valuable wildlife habitat to those that have been so impacted by drainage or location within/next to intensive agricultural or developed areas that inherent functional values such as wildlife habitat, water quality, and flood attenuation have been severely degraded. The extensive drainage system (canals/ditches) that has been constructed in the region has drastically altered the historical hydrology of the wetland communities in the corridors with a concomitant change to structure and functional attributes. This is often manifested by the proliferation of transitional or even upland species, as well as nuisance exotics in many wetlands within the region.

Canals/Channelized River, Stream, Waterway—510/512

Several canals are crossed by the East Preferred Corridor. Manmade canals associated with the existing Turkey Point Plant industrial wastewater facility are located in the extreme south portion of the corridor. Vegetation in this system includes submerged, rooted marine plants, primarily widgeon grass and marine algae, as well as terrestrial woody vegetation along the berms such as Brazilian pepper, Australian pine, wild sage (*Lantana involucrata*), and buttonwood (*Conocarpus erectus*). Other canals located along the remainder of the corridor are typically vegetated by a variety of floating and emergent hydrophytes. Common plants include water lettuce (*Pistia stratiotes*), water hyacinth (*Eichhornia crassipes*), galingale (*Cyperus odoratus*), Cuban bulrush (*Scirpus cubensis*), primrose willow (*Ludwigia* sp.), Mexican primrose willow (*Ludwigia octovalvis*), smartweeds (*Polygonum* spp.), torpedo grass (*Panicum repens*), duck potato (*Sagittaria lancifolia*), pickerelweed (*Pontederia cordata*), and common reed (*Phragmites australis*). Most of the linear waterways are periodically maintained by the spraying of herbicides to maintain flow. Much of the vegetation in these canals is considered nuisance species, either native or exotic. The banks (spoil areas) along these linear water bodies are also dominated by weedy, often nuisance, native and exotic plants. The species observed adjacent to canals include elephant grass (*Pennisetum purpureum*), largeflower Mexican clover (*Richardia grandiflora*), beggarticks, cottonweed, camphorweed (*Heterotheca subaxillaris*), finger grass, bahia grass, Brazilian pepper, immature cabbage palm, wax myrtle, guinea grass (*Panicum maximum*), swamp flatsedge (*Cyperus ligularis*), southern beeblossum (*Gaura angustifolia*), and numerous others.

Ditches—511

Ditches are usually smaller and shallower than canals and generally contain/convey less water than canals. They are often located adjacent to roads and are typically vegetated with a mixture of nuisance/exotic species such as Brazilian pepper, cattail (*Typha domingensis* and/or *latifolia*), parrot feather (*Myriophyllum aquaticum*), torpedo grass, primrose willow, and wild taro (*Colocasia esculenta*), as well as native species including arrowhead (*Sagittaria lancifolia*), water spangles (*Salvinia minima*), mosquitofern (*Azolla caroliniana*), and beggarticks.

Reservoirs—530

This classification is used to describe open water areas that have been created from borrow pits. Generally, they are square or rectangular deepwater pits with cattails and/or primrose willow growing at the margins. They are often bordered with spoil piles vegetated with species listed previously under the description of spoil areas for canals.

Reservoirs <10 acres—534

This classification further narrows the reservoirs (530) land use into a category of reservoirs that are less than 10 acres in size.

Mangrove Swamps—612

This community type is located in some of the undeveloped portions of the Turkey Point plant property. Dominant species present in these coastal hardwood communities usually include red (*Rhizophora mangle*), black (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*); buttonwood; sea grape (*Coccoloba uvifera*); leather fern (*Acrostichum* spp.); cankerberry (*Solanum bahamense*); and cocoplum (*Chrysobalanus icaco*).

Mangrove Swamps/Mixed Wetland Hardwoods—612/617

This category describes mangrove swamps intermixed with hardwood wetland community species. Plant species commonly encountered in this association are a combination of those described in mangrove swamps (612) and mixed wetland hardwoods (617).

Mangrove Swamps/Exotic Wetland Hardwoods—612/619

This category describes mangrove swamps that have been invaded by exotic hardwoods. Species typical of this community include red, black, and white mangrove, buttonwood, Brazilian pepper, sea grape, Australian pine, poisonwood, leather fern, cankerberry, rubber vine (*Rhabdadenia biflora*), and cocoplum.

Dwarf Mangroves—612 B

Patches of the dwarf mangrove community are located within the undeveloped portions of the existing Turkey Point plant property and contain mangroves less than 24 inches in height, stunted in response to decreased nutrient availability and increased salinity (McKee, 1996). Approximately 90 percent of the red mangroves are characteristic of the dwarf mangrove community, while approximately 10 percent are large individuals located adjacent to tidal creeks. Buttonwood is a common subdominant canopy component, along with occasional white and black mangroves. Additional vegetative species observed within the dwarf mangrove community include occasional Brazilian pepper, Australian pine, seaside oxeye, grey nicker (*Caesalpinia bonduc*), groundsel tree, and cordgrass (*Spartina* sp.).

Mixed Wetland Hardwoods—617

Most of these community types occur south of where the East Preferred Corridor crosses Florida's Turnpike. Mixed wetland hardwood forests are typically dominated by sweet bay (*Magnolia virginiana*, swamp laurel oak (*Quercus laurifolia*), and swamp red bay (*Persea palustris*) in association with other hardwoods including buttonwood, Australian pine, cocoplum, red mangrove, Brazilian pepper, and Carolina willow (*Salix caroliniana*). The shrub stratum is typically sparse, comprised of scattered individuals of wax myrtle and buttonbush (*Cephalanthus occidentalis*), among others. The stratum density varies with degree of shading. Typically, lizard's tail (*Saururus cernuus*), pickerelweed, beakrushes (*Rhynchospora* spp.), royal fern (*Osmunda regalis*), and swamp fern (*Blechnum serrulatum*) are found. These forests are characteristically flooded or saturated for much of the year, drying only for short periods during the dry winter season. Construction of ditches and canals has shortened the hydroperiod of many of these forests.

Exotic Wetland Hardwoods—619

Areas dominated by Brazilian pepper are classified as exotic wetland hardwoods. Subdominant species include primrose willow, wild taro, Johnson grass (*Sorghum halepense*), and beggarticks.

Wetland Forested Mixed—630

This association is similar floristically and structurally to mixed wetland hardwoods (617), with the notable exception that either pond cypress (*Taxodium ascendens*) or slash pine comprise at least one-

EXHIBIT 21

third of the canopy cover. These coverages occur in the southernmost portions of the East Preferred Corridor.

Freshwater Marshes—641

Freshwater marshes occur in some locations within the East Preferred Corridor. They are dominated by a wide assortment of herbaceous plant species growing on sandy or organic soils in areas of variable water depths and inundation regimes. Species characteristic of the marshes in the study area include sawgrass (*Cladium* spp.), pickerelweed, maidencane (*Panicum hemitomon*), fireflag (*Thalia geniculata*), cattails, smartweeds, and sedges (*Cyperus haspan*, *C. odoratus*, and *C.* spp.). In more disturbed areas, primrose willows, Brazilian pepper, poisonwood (*Metopium toxiferum*), Australian pine, musky mint (*Hyptis alata*), silktree (*Albizia julibrissin*), nettletree (*Trema micranthum*), and torpedo grass are abundant. The best quality marshes exhibit zonation and a variety of desirable, native herbs. Many marshes within the East Preferred Corridor have been impacted by drainage and agricultural practices to varying degrees.

Saltwater Marshes—642

Saltwater marshes consist of non-woody, salt-tolerant plant species such as needlerush (*Juncus roemerianus*), bushy seaside oxeye (*Borrichia frutescens*), saltmeadow and saltmarsh cordgrass (*Spartina patens* and *S. alternifolia*), and glassworts (*Salicornia* spp.). Saltwater marshes' extent and vegetative composition depend on factors such as salinity, tidal range and duration, wave energy, and topographic relief.

Tidal Flats—651

Small areas of this vegetative community occur in the corridor at the Turkey Point plant property. Vegetative cover is sparse in the tidal flat area due to the high salinity and routine fluctuations in water levels. Species present in this area include saltwort, sea oxeye, daisies, woody glasswort, and dwarf glasswort.

E9.3.7.2 Affected Waters and Wetlands

Surface water bodies and wetlands that are crossed/included within the East Preferred Corridor were identified using SFWMD land cover mapping, 2007 aerial photographs, hydrologic information from Miami-Dade County GIS and SFWMD, and field surveys conducted for this Project (GAI, 2009).

EXHIBIT 21

Water Bodies

Major water bodies crossed by the corridors are listed in Tables E9.3.7-2 and E9.3.7-3, which list those for the East Preferred Corridor from the Clear Sky substation to Davis substation and between the Davis substation and Miami substation, respectively. According to Section 62-302.400, F.A.C., there are no designated Florida Class I or II waters within the East Preferred Corridor. Most of the waters crossed by the East Preferred Corridor are considered Class III waters, which means they are of sufficient quality to support fish and wildlife populations.

Wetlands

Wetlands within and 0.5 mile of the corridor, as identified by SFWMD (2004) and updated by FPL in many areas where access was available (GAI, 2009), are identified in maps presented in Figure E9.1.0-4. Descriptions of the wetland communities are found in Section E9.3.7.1

E9.3.7.3 Ecology

The East Preferred Corridor crosses some significant wetland habitats north of the Site, but natural upland habitats are limited and usually small. Therefore, it is expected that plants and wildlife found in these corridor areas will be those adapted to wetland cover types or man-induced habitats such as nurseries, agricultural operations, disturbed areas, low-density residential, etc., especially south of the Davis substation area. From the Davis substation to Miami substation, the residential and transportation uses increase dramatically and limit habitats to primarily ruderal areas and parks. Some of these remnant isolated uplands are pine rockland communities, which are unique and may harbor certain listed species.

Wildlife species typically found in Miami-Dade County will be expected to occur in the East Preferred Corridor since it covers typical natural habitats found in the county. FPL conducted ecological surveys of the corridor areas as part of the fieldwork to develop the information typically required for an ERP application. A summary of the ecological resources for this Project can be found in Section 3.3.6 and Appendix 10.7.1.

Based on FPL's findings along accessible areas of the corridor and near the Turkey Point plant property, common wildlife species are generally comprised of wetland-dependent species.

EXHIBIT 21

TABLE E9.3.7-2
WATER BODIES CROSSED BY THE EAST PREFERRED CORRIDOR BETWEEN CLEAR SKY AND DAVIS SUBSTATIONS

Water Body	Jurisdiction	Comments
Existing Turkey Point cooling canals of the industrial wastewater facility	FPL	On FPL Turkey Point plant property
BNP	FDEP	Outstanding Florida Water
Florida City Canal	Miami-Dade County	Crosses the East Preferred Corridor at Palm Drive
L-31E Canal	SFWMD	Intersects the East Preferred Corridor at SW 328th Street
North Canal	SFWMD	Intersects the East Preferred Corridor at SW 328th Street
C-103 (Mowry) Canal	SFWMD	Crosses the East Preferred Corridor at SW 320th Street
Unnamed canal	Unknown	Crosses the East Preferred Corridor at SW 312th Street
Military Canal	SFWMD	Crosses the East Preferred Corridor at SW 300th Street
Princeton Canal	SFWMD	Crosses the East Preferred Corridor at Moody Drive and again both east and west of Florida’s Turnpike and again north of U.S. 1
C-102 Extension Canal	SFWMD	Crosses the East Preferred Corridor at SW 134th Avenue
Black Creek Canal	SFWMD	Crosses and then runs adjacent to the East Preferred Corridor from SW 176th Street to CSX Railroad.

TABLE E9.3.7-3
WATER BODIES CROSSED BY THE EAST PREFERRED CORRIDOR BETWEEN DAVIS AND MIAMI SUBSTATIONS

Water Body	Jurisdiction	Comments
Cutler Drain (C-100 Canal)	SFWMD	Crosses the East Preferred Corridor at SW 112th Court; adjacent to the corridor between SW 112th Court and SW 117th Avenue
C-100A Canal	SFWMD	Crosses the East Preferred Corridor at the corridor intersection with U.S. 1 and again crosses the corridor just north of SW 108th Street
C-2 (Snapper Creek) Canal	SFWMD	Included within the East Preferred Corridor north of Dadeland Mall from Palmetto Expressway east to U.S. 1
Coral Gables Canal	City of Coral Gables	Crosses the East Preferred Corridor south of Dickinson Drive and again south of Riviera Drive
Miami River (C-6 Canal)	SFWMD, USACE, U.S. Coast Guard	Crosses the East Preferred Corridor just south of Miami substation
Biscayne Bay Aquatic Preserve (Miami River)	FDEP	Designated part of Biscayne Bay Aquatic Preserve system

Common bird species include a variety of herons and egrets, terns, sandpipers, gulls, and birds of prey such as bald eagle (*Haliaeetus leucocephalus*), red-shouldered hawk (*Buteo lineatus*), snail kite (*Rostrhamus sociabilis*), and American kestrel (*Falco sparverius*).

Upland bird species commonly observed include the northern cardinal (*Cardinalis cardinalis*), turkey vulture (*Cathartes aura*), mockingbird (*Mimus polyglottos*), and mourning dove (*Zenaida macroura*).

Common mammals found include opossum (*Didelphis virginiana*), white-tailed deer (*Odocoileus virginianus*), marsh rabbit (*Sylvilagus palustris*), and raccoon (*Procyon lotor*).

Reptiles include Carolina anole (*Anolis carolinensis*), eastern diamondback rattlesnake (*Crotalus adamanteus*), and American crocodile (*Crocodylus acutus*), which occurs in the existing Turkey Point cooling canals of the industrial wastewater facility.

Amphibians include various frogs and treefrogs (*Rana* sp. and *Hyla* spp.) and the southern toad (*Bufo terrestris*).

Since much of the East Preferred Corridor from the Clear Sky substation to Davis substation is relatively undeveloped, these species are expected to occur there.

North of the Davis substation to Miami substation, the natural habitats are severely diminished due to urban development and transportation corridors. Therefore, wildlife species expected to be found consist of ruderal- and urban-adapted species, such as the cardinal or mockingbird. The exotic monk parakeet (*Myiopsitta monachus*) is also a common species in the urbanized areas of Miami-Dade County. Wetland-dependent species will be uncommon in this portion of the East Preferred Corridor except along canals crossed by the corridor.

Threatened and Endangered Species

Floral and faunal species listed by USFWS as endangered, threatened, or proposed for listing; Florida Fish and Wildlife Conservation Commission (FWC) as endangered, threatened, or of special concern; and Florida Department of Agriculture and Consumer Services (FDACS) as endangered or threatened were evaluated for their potential to occur along the East Preferred Corridor. Sources included FPL's field surveys, as well as information contained in Section 3.3.6 and Appendix 10.4. Known occurrences of listed species within 1,500 ft of the East Preferred Corridor are illustrated in Figure E9.1.0-4 on Map Sheets 1 through 20.

The FNAI database also was used to identify known occurrences of listed species throughout Miami-Dade County (FNAI, 2009). It should be noted that FNAI records can be based on collections made years ago. It is possible that many of the occurrences reflected in FNAI records may no longer exist, having been eliminated by subsequent development or natural events (hurricanes, fires). However FNAI data are discussed in the following subsections. Where available, other listed plant species data are also presented in Appendix 10.4.

Plant Species

A total of 173 regulated plant species or subspecies is known to occur within Miami-Dade County in habitats similar to those found within the study area. All were evaluated for the potential to occur within the East Preferred Corridor or within the vicinity of it. Table E9.3.7-4 lists the plants known to occur within the region that were evaluated for the likelihood of occurrence within the East Preferred Corridor.

Five plants on the comprehensive list for the county are designated by USFWS as endangered, one is listed as threatened, and eight are listed as candidates for listing (those plants that have sufficient information on biological vulnerability to support proposing to list the species as endangered or threatened). In the eastern study area, *Linum arenicola*, listed as a candidate for federal listing, was observed within the boundaries of the corridor during field surveys. Several individuals are located within the corridor between SW 328th Street and SW 334th Street north of the Turkey Point plant property. It should be noted that these individuals occur on an existing FPL-maintained right-of-way, indicating those managed habitats are suitable for the plants.

For the East Preferred Corridor, a total of 27 plant taxa listed by FDACS are either present within the boundaries of the corridor based on FPL field surveys and/or FNAI records or are known based on FNAI records to occur within 1,500 ft of the East Preferred Corridor. Nine species or subspecies/varieties are recorded as occurring within the corridor. Of these, two are listed as state endangered: *Linum arenicola* and *Trema lamarckianum*. Seven are listed as threatened: *Angadenia berteroi, Bletia purpurea, Crossopetalum ilicifolium, Melanthera parvifolia, Pteris bahamensis, Solanum donianum,* and *Thelypteria augescens.* Eighteen additional plants have been documented as occurring within 1,500 ft of the corridor according to FNAI records. Of these, twelve are listed as state-

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Acoelorraphe wrightii	Paurotis palm	—	T	Swamps, everglades, and hammocks	L
Acrostichum aureum	Golden leather fern	—	T	Mangrove swamps, saltmarshes, and limestone sinks	M
Actinostachys pennula	Ray fern	—	E	Swamps	L
Adiantum melanoleucum	Fragrant maidenhair fern	—	E	Limestone sinks in rockland hammocks	L
Adiantum tenerum	Brittle maidenhair fern	—	E	Limestone sinks in rockland hammocks	L
Aeschynomene pratensis	Meadow jointvetch	—	E	Marl prairies, cypress domes, and swales	L
Aletris bracteata	Bracted colic-root	—	E	Rocky pine savannahs	L
Alvaradoa amorphoides	Everglades leaf lace	—	E	Pine rocklands, transition zone between pine rocklands and rockland hammocks	L
Amorpha herbacea var. *crenulata*	Crenulate lead-plant	E	E	Rockland hammocks and pine rocklands	L-M
Anemia wrightii	Wright’s pineland fern	—	E	Limestone outcrops in moist hammocks, pine rocklands, and prairies	L
Angadenia berteroi	Pineland golden trumpet	—	T	Pinelands	H-P
Argythamnia blodgettii	Blodgett’s wild-mercury	C	E	Open gaps in pine rocklands, rockland hammocks, and coastal berms	L
Asplenium dentatum	American toothed spleenwort	—	E	Limestone outcrops in moist hammocks	L
Asplenium serratum	American bird’s nest fern	—	E	Cypress swamps and moist hardwood hammocks	L
Asplenium verecundum	Modest spleenwort	—	E	Limestone outcrops in rockland hammocks	L
Basiphyllaea corallicola	Rockland orchid	—	E	Openings in pine rocklands, leaf litter, and in moist hardwood hammocks	L-M
Beloglottis costaricensis	Costa Rican ladies’-tresses	—	E	Hardwood hammocks	L
Bletia purpurea	Pine pink	—	T	Pine rocklands; stumps and tree bases, and cypress swamps	H-P
Bourreria cassinifolia	Smooth strongbark	—	E	Pine rocklands	L
Bourreria succulent	Bahama strongbark	—	E	Hardwood hammocks	L
Brickellia mosieri	Florida brickell-bush	C	E	Pinelands	L-M§
Byrsonima lucida	Locustberry	—	T	Pine rocklands, hardwood hammocks	L
Calyptranthes pallens	Spicewood	—	T	Hardwood hammocks	L
Calyptranthes zuzygium	Myrtle-of-the-river	—	E	Rockland hammocks - coastal strand	L
Catopsis berteroniana	Powdery catopsis	—	E	Hardwood hammocks, mangroves, and hardwood trees in pinelands	L
Catopsis floribunda	Many-flowered catopsis	—	E	Hardwood hammocks	L
Chamaesyce deltoidea ssp. *adhaerens*	Hairy deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *Deltoidea*	Deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *pinetorum*	Pinelands spurge	C	E	Pine rocklands	L
Chamaesyce garberi	Garber’s spurge	T	E	Pinelands and dunes	L-M§
Chamaesyce pergamena	Southern Florida sandmat	—	T	Pine rocklands	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 2 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Chamaesyce porteriana	Porter’s broad-leaved spurge	—	E	Pine rocklands, rockland hammocks, coastal rock barrens, and marl prairies	L
Chaptalia albicans	Sunbonnets	—	T	Pinelands	L
Chrysophyllum oliviforme	Satinleaf	—	T	Hardwood hammocks and pinelands	L
Coccothrinax argentata	Silver palm	—	T	Pine rocklands and dunes	M§
Colubrina cubensis var. floridana	Cuban snake-bark	—	E	Pine rocklands, rockland hammocks on Miami rock ridges, and Everglades Keys	L
Colubrina elliptica	Soldierwood	—	E	Hardwood hammocks	L
Crossopetalum ilicifolium	Christmas berry	—	T	Pinelands	H-P
Crossopetalum rhacoma	Maidenberry	—	T	Pinelands, hardwood hammocks	L
Croton humilis	Pepperbush	—	E	Hardwood hammocks	L
Ctenitis sloanei	Florida tree fern	—	E	Hardwood hammocks, often on limestone outcrops	L
Ctenitis submarginalis	Brown-hair comb-fern	—	E	Swamps and wet hardwood hammocks	L
Cynanchum blodgettii	Blodgett's swallowwort	—	T	Hardwood hammocks	L
Cyperus filiformis	Wiry flatsedge	—	E	Dry, sandy open areas	M
Cyrtopodium punctatum	Cowhorn orchid	—	E	Cypress swamps, scrub cypress strands, coastal hammocks, rarely terrestrial in rock pinelands, and marl prairies	L
Dalbergia brownei	Browne's Indian rosewood	—	E	Margins of hardwood hammocks and mangroves	L
Dalea carthagenensis var. *floridana*	Florida prairie clover	C	E	Pine rocklands and rockland hammocks, coastal uplands, and marl prairies	L
Digitaria filiformis var. *dolichophylla*	Caribbean crabgrass	—	T	Rock pinelands	L
Digitaria pauciflora	Few-flowered fingergrass	C	E	Rock pinelands	L
Drypetes lateriflora	Guiana plum	—	T	Hardwood hammocks	L
Eltroplectris calcarata	Spurred neottia	—	E	Mesic hardwood hammocks and rockland hammocks	L
Elytraria caroliniensis var. *angustifolia*	Narrow-leaved Carolina scalystem	—	N	Wet pinelands	L
Epidendrum amphistomum	Dingy flowered star orchid	—	E	Swamps	L
Epidendrum floridensis	Florida star orchid	—	E	Cypress and hardwood swamps	L
Epidendrum nocturnum	Night-scented orchid	—	E	Cypress swamps, moist hardwood hammocks, and mangroves	L
Epidendrum rigidum	Stiff flower star orchid	—	E	Swamps and moist hammocks	L
Erithalis fruticosa	Black torch	—	T	Coastal hammocks and dunes	L
Ernodea cokeri	Coker’s beach creeper	—	E	Pine rocklands, dunes	L
Eugenia confusa	Tropical ironwood	—	E	Hardwood hammocks	L-M§
Eugenia rhombea	Red stopper	—	E	Rockland hammocks	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 3 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Evolvulus convolvuloides	Bindweed dwarf morning-glory	—	E	Pine rocklands	L
Exostema caribaeum	Princewood	—	E	Pine rocklands and rockland hammocks	L
Galactia smallii	Small's milk pea	E	E	Pine rocklands	L
Galeandra bicarinata	Two-keeled helmet orchid	—	E	Hardwood hammocks	L
Glandularia maritima	Coastal vervain	—	E	Dunes, coastal pinelands	L
Gossypium hirsutum	Wild cotton	—	E	Coastal hammocks, beaches, disturbed sites, and shell mound spoil piles	L
Govenia floridana	Florida govenia	—	E	Hardwood hammocks	L
Guzmania monostachia	Fakahatchee guzmania	—	E	Swamps and wet hardwood hammocks	L
Habenaria nivea	Snowy platanthera	—	T	Wet pinelands, prairies, and wet ditches	L
Harrisia simpsonii	Simpson's prickly apple	—	E	Shell mounds, xeric coastal hammocks, and scrubby flatwoods	L
Hibiscus poeppigiii	Poeppig's rosemallow	—	E	Hardwood hammocks	L
Hippomane mancinella	Manchineel	—	E	Coastal berms and hammocks	L
Hypelate trifoliata	White ironwood	—	E	Pine rocklands and rocklands	L
Ilex krugiana	Krug's holly	—	T	Pinelands and hardwood hammocks	L
Ionopsis utricularioides	Delicate violet orchid	—	E	Cypress swamps and citrus groves	L
Ipomoea microdactyla	Wild potato morning glory	—	E	Pine rocklands	L-M§
Ipomoea tenuissima	Rocklands morning glory	—	E	Pine rocklands	L-M§
Jacquemontia curtisii	Pineland jacquemontia	—	T	Pinelands	L-M§
Jacquemontia pentanthos	Skyblue clustervine	—	E	Pine rocklands and disturbed edges, areas of rockland hammocks, and coastal rock barrens	L
Jacquinia keyensis	Joewood	—	T	Coastal hammocks	L
Koanophyllum villosum	Villose fennel	—	E	Hammocks and pinelands	L
Lantana canescens	Small-headed lantana	—	E	Transition zones between rockland hammocks and pine rocklands	L
Lantana depressa var. *depressa*	Florida lantana	—	E	Rock pinelands	L-M§
Lantana depressa var. *floridana*	Atlantic Coast Florida lantana	—	E	Dry, open dunes and sandy ridges, primarily along coasts	L-M§
Leiphaimos parasitica	Ghost plant	—	E	Hardwood hammocks	L
Licaria triandra	Gulf licaria	C	E	Hardwood hammocks	L-M§
Linum arenicola	Sand flax	C	E	Pine rocklands, marl prairies, and adjacent disturbed areas	H-P
Linum carteri var. carteri	Carter's small-flowered flax	C	E	Pine rocklands	L-M§
Linum carteri var. smallii	Carter's large-flowered flax	—	E	Pine flatwoods, pine rocklands, and adjacent disturbed areas	L-M§
Lomariopsis kunzeana	Holly vine fern	—	E	Wet hardwood hammocks, limestone outcrop in wet hardwood hammocks	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 4 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Manilkara jaimiqui ssp. *emarginata*	Wild dilly	—	T	Hardwood hammocks	L
Maytenus phyllanthoides	Florida mayten	—	T	Coastal hammocks and dunes	L
Melanthera parvifolia	Small-leaved melanthera	—	T	Old coral reefs, limestone, pine forests	H-P
Mesadenus lucayana	Florida Keys ladies'-tresses	—	E	Dry calcareous hardwood hammocks and coastal middens	L
Microgramma heterophylla	Climbing vine fern	—	E	Hardwood hammocks, limestone outcrops in hardwood hammocks	L
Myrcianthes fragrans	Simpson stopper	—	T	Coastal hammocks; rarely, inland hardwood hammocks	L
Nephrolepis biserrata	Giant sword fern	—	T	Swamps and wet hardwood hammocks	L
Ocimum campechianum	Wild basil	—	E	Disturbed sites	M
Odontosoria clavata	Wedgelet fern	—	E	Rock pinelands and rockland hammocks, often on limestone	L
Oncidium floridanum	Florida dancinglady orchid	—	E	Pine rocklands, rockland hammocks, mangroves, and cypress swamps	L
Oncidium undulatum	Muleear orchid	—	E	Mangrove swamps, cypress swamps, and hardwood hammocks	L
Ophioglossum palmatum	Hand fern	—	E	Wet hammocks, epiphytic on sabal palmetto	L
Opuntia stricta	Erect pricklypear	—	T	Shell middens, dunes, and coastal hammocks	L
Paspalidium chapmanii	Coral paspalum	—	E	Hardwood hammocks, prairies, and disturbed sites	M
Passiflora pallens	Pineland passionflower	—	E	Rockland hammocks, coastal berms, and strand swamps	L
Passiflora sexflora	Everglades Key passion-flower	—	E	Hardwood hammocks	L
Pavonia paludicola	Mangrove mallow	—	E	Hardwood hammocks	L-M
Peperomia humilis	Low peperomia	—	E	Shell mounds and limestone outcrops in mesic hardwood hammocks, coastal berms, and cypress swamps	L
Peperomia obtusifolia	Blunt-leaved peperomia	—	E	Rockland hammocks, wet hardwood hammocks, and strand swamps	L
Phyla stoechadifolia	Southern frog-fruit	—	E	Wet pinelands and glades	L
Picramnia pentandra	Bitter bush	—	E	Hammocks	L-M§
Pithecellobium keyense	Black bead	—	T	Coastal hammocks and strands	L
Poinsettia pinetorum	Pineland spurge	—	E	Pine rocklands	L-M§
Polygala smallii	Tiny polygala	E	E	Pine rocklands, scrub, sandhills, and open coastal spoil piles	L
Polystachya concreta	Greater yellowspice orchid	—	E	Cypress swamps, hardwood hammocks, and mangroves	L
Ponthieva brittoniae	Britton's shadow-witch	—	E	Rock pinelands and rockland hammocks	L
Prosthechea boothiana var. *erythronioides*	Dollar orchid	—	E	Hardwood hammocks and mangroves	L
Prosthechea cochleata var. *triandra*	Clamshell orchid	—	E	Swamps, mangroves, and hardwood hammocks	L
Prunus myrtifolia	West Indian cherry	—	T	Rock pinelands and rockland hammocks	L
Psidium longipes	Mangrove berry	—	T	Pine rocklands and rockland hammocks	L-M§
Psychotria ligustrifolia	Bahama wild coffee	—	E	Pine rocklands and rockland hammocks	L

EXHIBIT 21

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 5 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Pteris bahamensis	Bahama brake	—	T	Pine rocklands and edges of rockland hammocks	H-P
Pteroglossaspis ecristata	Giant orchid	—	T	Sandhills, scrubs, pine flatwoods, and pine rocklands	L
Reynosia septentrionalis	Darlingplum	—	T	Hardwood hammocks and margins of mangroves	L
Rhipsalis baccifera	Mistletoe cactus	—	E	Rockland hammocks and mangroves	L
Rhynchosia parviflora	Small-leaf snoutbean	—	T	Pinelands and beaches	L
Roystonea elata	Florida royal palm	—	E	Wet hardwood hammocks, swamps, and cypress sloughs	L
Sachsia polycephala	Bahama sachsia	—	T	Rock pinelands	L
Sacoila lanceolata var. *paludicola*	Fahkahatchee ladies'-tresses	—	T	Wet hardwood hammocks, cypress swamps, and middens	L
Savia bahamensis	Bahama maidenbush	—	E	Coastal thickets, pine rocklands, and rockland hammocks	L
Schaefferia frutescens	Florida boxwood	—	E	Rockland hammocks	L
Scleria lithosperma	Florida Keys nutrush	—	E	Pine rocklands and rockland hammocks	L
Scutellaria havanensis	Havana skullcap	—	E	Rock pinelands	L
Selaginella eatonii	Eaton's spikemoss	—	E	Moist limestone outcrops in rock pinelands and rockland hammocks	L
Senna mexicana var. *chapmanii*	Bahama senna	—	T	Rock pinelands, rockland hammocks, and dunes	L
Smilax havanensis	Everglades greenbrier	—	T	Rock pinelands and rockland hammocks	L
Solanum donianum	Mulle in nightshade	—	T	Coastal hammocks and dunes, marl prairies, edges or roads in mangroves	H-P
Spiranthes laciniata	Lacelip ladies-tresses	—	T	Hypericum-sedge wetlands, marshes, open cypress swamp	L
Spiranthes longilabris	Longlip ladies'-tresses	—	T	Wet prairies and pine rocklands	L
Spiranthes torta	Southern ladies'-tresses	—	E	Pine rocklands and marl prairies	L
Stylosanthes calcicola	Pineland pencil flower	—	E	Pine rocklands, marl prairies, and transitional areas between them	L
Swietenia mahagoni	West Indies mahogany	—	T	Coastal strands, rockland hammocks, and hammocks also naturalized in disturbed areas from cultivated trees	L
Tectaria fimbriata	Least halberd fern	—	E	Limestone outcrops in rockland hammocks	L
Tectaria heracleifolia	Broad halberd fern	—	T	Limestone outcrops in rockland hammocks	L
Tephrosia angustissima var. angustissima	Devil's shoestring	—	E	Pine rocklands	L
Tephrosia angustissima var. *corallicola*	Rockland hoary-pea	—	E	Pine rocklands	L
Tephrosia angustissima var. *curtisii*	Coastal hoary-pea	—	E	Coastal strands	L
Tetrazygia bicolor	Florida clover ash	—	T	Rock pinelands and rockland hammocks	L
Thelypteris augescens	Abrupt tip maiden fern	—	T	Rockland hammocks	H-P
Thelypteris patens	Grid-scale maiden fern	—	E	Rockland hammocks	L
Thelypteris reptans	Creeping maiden fern	—	E	Limestone sinks in rockland hammocks	L
Thelypteris reticulata	Lattice-vein fern	—	E	Wet hardwood hammocks and cypress swamps	L

TABLE E9.3.7-4.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE EAST PREFERRED CORRIDOR
(Continued, Page 6 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridor‡
Thelypteris sclerophylla	Stiff-leaved maiden fern	—	E	Rockland hammocks	L
Thelypteris serrata	Toothed maiden fern	—	E	Cypress swamps and slough floodplains	L
Thrinax morrisii	Brittle thatch palm	—	E	Rockland hammocks and rock pinelands	L
Thrinax radiata	Florida thatch palm	—	E	Coastal thickets on limestone	L-M§
Tillandsia balbisiana	Twisted wildpine	—	T	Hammocks	M
Tillandsia fasciculata var. *densispica*	Cardinal airplant	—	E	Cypress swamps and hardwood hammocks	L
Tillandsia flexuosa	Banded wildpine	—	T	Cypress swamps and hardwood hammocks	L
Tillandsia utriculata	Giant wildpine	—	E	Hardwood hammocks, pinelands, and scrub	M
Tillandsia variabilis	Leatherleaf airplant	—	T	Cypress swamps and hardwood hammocks	L
Tournefortia hirsutissima	Chiggery grapes	—	E	Hammocks	L
Tragia saxicola	Pineland noseburn	—	T	Rock pinelands	L-M§
Trema lamarckianum	Lamarck's trema	—	E	Hardwood hammocks and shell middens	H-P
Trichomanes krausii	Kraus' bristle fern	—	E	Rockland hammocks	L
Trichomanes punctatum ssp. *floridanum*	Florida filmy fern	—	E	Rockland hammocks, shell middens, limestone sinks, and limestone boulders	L
Tripsacum floridanum	Florida gama grass	—	T	Rock pinelands	L-M§
Vallesia antillana	Tearshrub	—	E	Rockland hammocks	L
Vanilla barbellata	Worm-vine orchid	—	E	Mangroves, coastal hardwood hammocks, pine rocklands, rockland hammocks, and road banks	L
Vanilla inodora	Mexican vanilla	—	E	Wet rockland hammocks	L
Vanilla phaeantha	Leafy vanilla	—	E	Cypress swamps and moist hammocks	L
Zanthoxylem coriaceum	Biscayne pricklash	—	E	Coastal hammocks	L
Zephyranthes simpsonii	Simpson's zephyrlily	—	T	Wet flatwoods and prairies	H§

*Listing by USFWS. E = endangered. T = threatened. C = candidate for listing.
†Listing by FDACS. E = endangered. T = threatened.
‡L = low. M = medium. H = high. P = present in corridor. PE = possibly extinct.
§Species rated L, M, or H for occurrence due to presence within 1,500 ft of the corridor. L-M indicates optimal habitat lacking or limited; H indicates abundant optimal habitat is present.

Sources: USFWS, http://ecos.fws.gov/tess_public//pub/stateListing.jsp?state=FL&status=listed, 2009.
FDACS Regulated Plants: Section 5B-40.0055, F.A.C.

endangered: *Brickellia mosieri*, *Picramnia peltandra*, *Licaria triandra*, *Linum carteri* var. *carteri*, *Linum carteri* var. *smallii*, *Poinsettia pinetorum*, *Thrinax radiate*, *Lantana depressa* var. *floridana*, *Chamaesyce garberi*, *Eugenia confusa*, *Ipomoea microdactyla*, and *Ipomoea tenuissima*. Six are listed as threatened: *Coccothrinax argentata*, *Jacquemontia curtissii*, *Psidium longipes*, *Zephyranthes simpsonii*, *Tripsacum floridanum*, and *Tragia saxicola*. Figure E9.1.0-4 (Map Sheets 1 through 20) depicts the locations of FNAI-listed plant species occurrences within 1,500 ft of the East Preferred Corridor.

Wildlife Species

State- or federally listed wildlife species, potentially occurring in Miami-Dade County, are depicted in Table E9.3.7-5. Also shown in Table E9.3.7-5 are the species' current status and their likelihood for occurrence in the East Preferred Corridor.

Amphibians

Gopher Frog (*Rana capito*)—The gopher frog is a species of special concern as identified by FWC. This amphibian is typically considered a commensal species to the gopher tortoise. Therefore, habitat requirements tend to be xeric upland habitats that support gopher tortoise populations. Therefore, along the East Preferred Corridor, there is a low likelihood this species may be present due to a general lack of suitable habitats for gopher tortoises.

Reptiles

American Alligator (*Alligator mississippiensis*)—The alligator is listed by USFWS as threatened due to similarity of appearance to the American crocodile and a species of special concern by FWC. This reptile will be present in wetlands and water bodies along the East Preferred Corridor.

American Crocodile (*Crocodylus acutus*)—This federally threatened/state-endangered species successfully inhabits the canals and berms located within the existing Turkey Point cooling canals of the industrial wastewater facility. This canal system is part of the federally designated critical habitat for the crocodile. The East Preferred Corridor does not cross the primary crocodile habitat areas of the Turkey Point plant property.

Florida Pine Snake (*Pituophis melanoleucus mugitus*)—The Florida pine snake prefers well-drained sandy soils associated with upland pine areas. Its likelihood of occurrence is considered low because of the lack of suitable habitat.

EXHIBIT 21

TABLE E9.3.7-5
STATE OR FEDERALLY LISTED WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE EAST PREFERRED CORRIDOR

(Page 1 of 2)

Common Name	Scientific Name	Designated Status USFWS	 FWC	Likelihood of Occurrence within East Preferred Corridor
Amphibians				
Gopher frog	*Rana capito*	—	SSC	Low, and only in areas where gopher tortoise burrows may be found
Reptiles				
American alligator	*Alligator mississippiensis*	T(S/A)	SSC	Likely in wetlands all along the corridor
American crocodile	*Crocodylus acutus*	T	E	Present on the Turkey Point plant property, existing Turkey Point cooling canals of the industrial wastewater facility
Florida pine snake	*Pituophis melanoleucus mugitus*	—	SSC	Low, primarily along coastal areas with well-drained soils
Rim rock crowned snake	*Tantilla oolitic us*	—	T	Moderate, could be found in sandy or rocky upland habitats found along the corridor
Eastern indigo snake	*Drymarchon corais couperi*	T	T	High in suitable habitats; FNAI records indicate observations near the corridor north of Turkey Point
Gopher tortoise	*Gopherus polyphemus*	—	T	Low due to range and minimal habitats present
Birds				
Bald eagle	*Haliaeetus leucocephalus*	—	—*	Moderate likelihood of foraging in suitable habitats along the southern portion of the East Preferred Corridor; no known nests near the East Preferred Corridor, but has been observed near the Site
Snail kite	*Rostrhamus sociabilis plumbeus*	E	E	Low because of the lack of habitat
Southeastern American kestrel	*Falco sparverius paulus*	—	T	Low because of known range in Florida
Florida burrowing owl	*Speotyto cunicularia floridana*	—	SSC	Moderate in open lands along corridor; FNAI (2009) reports historical observation near Dadeland Mall east of corridor
White-crowned pigeon	*Patagioenas leucocephala*	—	T	Present, found in hammocks with fruit trees; has been observed on the Turkey Point plant property
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E	E	Unlikely, found in certain marshes near Shark Slough in the lower ENP
Florida sandhill crane	*Grus canadensis pratensis*	—	T	Low, most suitable habitat is west of corridor
Limpkin	*Aramus guarauna*	—	SSC	Low; suitable habitat is minimal
Little blue heron	*Egretta caerulea*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property
Peregrine falcon	*Falco peregrinus*	—	E	Low, but possible near open water
Snowy egret	*Egretta thula*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property

EXHIBIT 21

TABLE E9.3.7-5
STATE OR FEDERALLY LISTED WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE EAST CORRIDOR

(Page 2 of 2)

		Designated Status		
Common Name	**Scientific Name**	**USFWS**	**FWC**	**Likelihood of Occurrence within East Preferred Corridor**
Tricolored heron	*Egretta tricolor*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property
White ibis	*Eudocimus albus*	—	SSC	Likely in suitable wetlands along the corridor; observed on the plant property
Wood stork	*Mycteria americana*	E	E	Likely foraging in suitable wetlands along corridor; observed on the plant property; closest known colonies are more than 13 miles to the west in the ENP
Piping plover	*Charadrius melodus*	T	T	Low, sandy beaches along coast
Reddish egret	*Egretta rufescens*	—	SSC	Low, normally along coast and mangrove islands
American oystercatcher	*Haematopus palliatus*	—	SSC	Low, found on beaches and coastal sandbars
Brown pelican	*Pelecanus occidentalis carolinensis*	—	SSC	Low for most of the corridor, perhaps flying over canals nearer the plant property; observed on the plant property
Roseate spoonbill	*Platalea ajaja*	—	SSC	Low to moderate, could be found foraging in wetlands along the corridor
Black skimmer	*Rhynchops niger*	—	SSC	Low, found on the coast
Least tern	*Sterna antillarum*	—	T	Low, found on sandy or gravel habitats along the coast; they have been recorded from the existing Turkey Point industrial wastewater facility cooling canal berms south of the corridor (FNAI, 2009)
<u>Mammals</u>				
Florida bonneted (mastiff) bat	*Eumops glaucinus floridanus*	—	E	Moderate; could be found roosting in trees or buildings along the corridor
Florida manatee	*Trichechus manatus latirostris*	E	E	Low, primarily found along the coast and some of the canals north of the Turkey Point plant property; reported by FNAI (2009) to formerly have congregated in Coral Gables Canal
Florida mouse	*Podomys floridanus*	—	SSC	Unlikely, found in more central/northern Florida in dry sandy habitats; usually associated with gopher tortoise burrows
Everglades mink	*Mustela vison evergladensis*	—	T	Unlikely due to known range
Florida black bear	*Ursus americanus floridanus*	—	T	Unlikely along corridor; more likely found west of the Study Area
Florida panther	*Puma concolor coryi*	E	E	Unlikely along the corridor

Note: E = endangered. T = threatened.
SSC = species of special concern. T(S/A) = threatened due to similarity in appearance to a federally listed species.

*The eagle has recently been delisted by FWC with the adoption of the Bald Eagle Management Guidelines found in Section 68A-16.002, F.A.C. It is included here due to the regulatory protection still afforded it.

Sources: FWC, 2008.
FNAI, 2009.

Rim Rock Crowned Snake (*Tantilla oolitics*)—This snake occupies a wide variety of habitats in southern Florida and, therefore, is considered to have a moderate likelihood of occurrence. Some of the pine rockland habitats found along the corridor could serve as potential habitats. An old record of occurrence exists for the corridor north of U.S. 1 along SW 27th Avenue (FNAI, 2009).

Eastern Indigo Snake (*Drymarchon corais couperi*)—This distinctive large, bluish-black snake can occur in suitable habitats throughout Florida. It has a wide range of habitat preferences and prey species. Often considered as a gopher tortoise commensal, it can be found in xeric habitats, but uses more mesic habitats as well. It has a moderate likelihood to occur along the East Preferred Corridor within these habitat types. FNAI (2009) lists a record of this individual less than 1 mile from the East Preferred Corridor. The indigo is listed as a threatened species by both USFWS and FWC.

Gopher Tortoise (*Gopherus polyphemus*)—The gopher tortoise's range in Florida extends into northern Miami-Dade County. The gopher tortoise is currently listed as a threatened species by FWC, but its likelihood along the East Preferred Corridor is considered low.

Birds

Bald Eagle (*Haliaeetus leucocephalus*)—The bald eagle was delisted by USFWS and FWC within the past year. It is still included here because of special rules protecting it (Section 68A-16.002, F.A.C.). The eagle is making a comeback in population numbers in the United States, and eagle nests are becoming more common in Florida. No known nests exist near the East Preferred Corridor, but it is possible the bird could be found foraging along the southern half of the corridor. An individual bald eagle was observed along the northwest corner of the industrial wastewater facility just west of the East Preferred Corridor.

Snail Kite (*Rostrhamus sociabilis plumbeus*)—Often called the Everglades snail kite, this bird is listed as endangered by USFWS and FWC. Its habitat requirements are also specific. It prefers freshwater marsh systems with distinct vegetation profiles. Since its primary food source is the apple snail (*Pomacea paludosa*), hydrological regime is critical to both the food source and nesting of this bird. It may occur in some of the marsh systems along the southern portion of the corridor, but, overall, its likelihood of occurrence is considered low.

EXHIBIT 21

Southeastern American Kestrel (*Falco sparverius paulus*)—This subspecies of the American kestrel is a common resident of open land habitats throughout Florida south to the Lake Okeechobee area. It has been documented in Miami-Dade County and is state-listed as threatened by FWC. The more northern subspecies migrates here in the winter months, but the southeastern kestrel breeds here in summer. Since it prefers open habitats for foraging, it is commonly seen alongside road and transmission line rights-of-way. However, due to its known range and relative few documented occurrences in the county, its likelihood of occurrence is considered low.

Florida Burrowing Owl (*Speotyto cunicularia*)—The small Florida burrowing owl is listed as a species of special concern by FWC. It is most common in central Florida and lives in burrows in sandy soils associated with cattle pastures, prairies, and sandhills. It has a moderate likelihood of occurrence in open, drier habitats along the East Preferred Corridor. FNAI (2009) reports one historic observation near the corridor in the vicinity of the Dadeland Mall.

White-Crowned Pigeon (*Patagioenas leucocephala*)—This state-listed threatened bird forages in fruit-bearing trees in hardwood hammocks in southern Florida. It has been observed at the Turkey Point plant property; therefore, its presence is likely in other suitable habitats along the East Preferred Corridor.

Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*)—This endangered, ecologically isolated bird is restricted to the marl prairies of Big Cypress National Preserve and the ENP. Therefore, it is unlikely to occur in the East Preferred Corridor.

Florida Sandhill Crane (*Grus canadensis pratensis*)—This large bird is state-listed as threatened by FWC. It commingles with the greater sandhill crane, which migrates to Florida. Sandhills prefer shallow marshes for nesting and wet prairies and pastures for foraging. It would more likely be found farther west in the county, so its likelihood of occurrence is considered low for most of the East Preferred Corridor.

Limpkin (*Aramus guarauna*)—The secretive limpkin is listed as a species of special concern and is found in suitable habitats throughout most of the state. It prefers large, slow-moving watercourses, such as the Everglades. Therefore, its likelihood of occurrence is low in the East Preferred Corridor.

Little Blue Heron (*Egretta caerula*)—This wading bird is listed as a species of special concern by FWC and is found in suitable wetlands throughout Florida. They prefer freshwater habitats for foraging. This heron is likely to be found in suitable habitats along the East Preferred Corridor and has been observed near the Site.

Peregrine Falcon (*Falco peregrinus*)—This state-listed endangered migratory bird winters in Florida. It is often seen over coastlines or large water bodies, where it hunts waterfowl. Since these habitats are generally absent from the East Preferred Corridor, the peregrine falcon’s likelihood of occurrence in much of the corridor is low, but it could be observed near the Turkey Point plant property.

Snowy Egret (*Egretta thula*)—Snowy egrets, like the other wading birds discussed, are listed as a species of special concern by FWC. This bird is widely distributed in Florida in both fresh and saltwater systems. It is likely to occur in wetlands along the East Preferred Corridor. It was observed near the Site.

Tricolored Heron (*Egretta tricolor*)—The tricolored heron (formerly called Louisiana heron) is a species of special concern as listed by FWC. It likes estuarine habitats, but can be found foraging in almost any wetland system. It is likely to be found along the East Preferred Corridor. It was observed near the Site.

White Ibis (*Eudocimus albus*)—The white ibis is one of the most common wading birds in Florida, but it is listed as a species of special concern by FWC. Large flocks of this bird are often seen foraging in shallow marshes or wet pastures. The white ibis is likely to occur along the East Preferred Corridor. It was observed near the Site.

Wood Stork (*Mycteria americana*)—The wood stork is an endangered species listed by both USFWS and FWC. This large bird prefers nesting in cypress swamps, and some of the largest nesting areas in Florida occur in the Corkscrew Swamp Sanctuary well west of the study area. The closest known wood stork colonies occur within the ENP approximately 13 miles west of the East Preferred Corridor. Certainly the wood stork could be found foraging in suitable habitats along the East Preferred Corridor. They were observed foraging near the Site.

Piping Plover (*Charadrius melodus*)—This federal- and state-listed threatened bird occurs on sandy beaches along the Atlantic Coast. Therefore, its likelihood of occurrence in the East Preferred Corridor is considered low.

Reddish Egret (*Egretta rufescens*)—This state-listed bird is a species of special concern, more coastal than the other egrets, and, while it could be occasionally observed along the southern portion of the East Preferred Corridor near the Site, its likelihood of occurrence is considered low.

American Oystercatcher (*Haematopus palliatus*)—This state-listed coastal bird is a species of special concern and may be found around the Turkey Point plant property, but its likelihood of occurrence along the remainder of the East Preferred Corridor is considered low.

Brown Pelican (*Pelecanus occidentalis carolinensis*)—This state-listed coastal bird is a species of special concern and may be found flying over or near the Turkey Point plant property, but its likelihood of occurrence for the East Preferred Corridor is considered low.

Roseate Spoonbill (*Platalea ajaja*)—This state-listed species of special concern forages and nests in estuarine systems of South Florida. It may be found occasionally foraging inland along the East Preferred Corridor.

Black Skimmer (*Rhynchops niger*)—This state-listed species of special concern is primarily found along undisturbed coastlines of Florida. There is a low likelihood of its occurrence along the corridor.

Least Tern (*Sterna antillarum*)—The least tern is state-listed as threatened and is usually found near the coast where they nest on sandy or gravel surfaces. While they have been previously recorded on the berms of the existing Turkey Point cooling canals within the industrial wastewater facility, their likelihood of occurrence in the corridor is low.

Mammals

Florida Bonneted (Mastiff) Bat (*Eumops glaucinus floridanus*)—This state-listed endangered bat typically roosts in trees or buildings. It is known to occur in Miai-Dade County, so there is a moderate likelihood it could be found along the East Preferred Corridor.

Florida Manatee (*Trichechus manatus latirostris*)—This endangered mammal occurs along the coast and perhaps in some of the canals connecting to the coast. USFWS designates much of coastal Miami-Dade County as federal critical habitat for this animal. FNAI (2009) reports a former manatee congregation area in the Coral Gables Canal, which crosses the East Preferred Corridor. However, its likelihood of occurrence in or near the transmission corridor is generally considered low. In any event, transmission lines will span waterbodies likely to support manatees.

Florida Mouse (*Podomys floridanus*)—This state-listed species of special concern is likely only to be found in northern Miami-Dade County in sandy, well-drained soils. Along the East Preferred Corridor, its likelihood of occurrence is considered unlikely.

Everglades Mink (*Mustela vison evergladensis*)—This threatened species is a subspecies of the southeastern mink. It is found in a variety of wetlands in and around the Everglades. Its likelihood of occurrence is therefore considered unlikely in the East Preferred Corridor.

Florida Black Bear (*Ursus americanus floridanus*)—The Florida black bear is currently listed as threatened by FWC. This large mammal is known to occur west of the study area and prefers large swamps and dense thickets. It is unlikely this animal occurs along the East Preferred Corridor because of the lack of large swamp systems and presence of high-density development.

Florida Panther (*Puma concolor coryi*)—The panther is listed by USFWS and FWC as endangered. This large cat prefers most natural vegetation communities of south Florida. Its primary range includes southwest Florida and the western Everglades. The panther's range in this area makes it unlikely to occur along the East Preferred Corridor.

E9.3.7.4 Other Environmental Features

There are no other environmental features to address that have not been addressed in the previous sections.

E9.4 Effects of Right-of-Way Preparation and Transmission Line Construction

E9.4.1 Construction Techniques

Construction phases will typically consist of right-of-way clearing (where required), access road and structure pad construction (where necessary), line construction, and right-of-way restoration. The fol-

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Acoelorraphe wrightii	Paurotis palm	—	T	Swamps, everglades, and hammocks	L
Acrostichum aureum	Golden leather fern	—	T	Mangrove swamps, saltmarshes, and limestone sinks	L
Actinostachys pennula	Ray fern	—	E	Swamps	L
Adiantum melanoleucum	Fragrant maidenhair fern	—	E	Limestone sinks in rockland hammocks	L
Adiantum tenerum	Brittle maidenhair fern	—	E	Limestone sinks in rockland hammocks	L-M
Aeschynomene pratensis	Meadow jointvetch	—	E	Marl prairies, cypress domes, and swales	H-P
Aletris bracteata	Bracted colic-root	—	E	Rocky pine savannahs	L
Alvaradoa amorphoides	Everglades leaf lace	—	E	Pine rocklands, transition zone between pine rocklands and rockland hammock	L
Amorpha herbacea var. *crenulata*	Crenulate lead-plant	E	E	Rockland hammocks and pine rocklands	L-M
Anemia wrightii	Wright's pineland fern	—	E	Limestone outcrops in moist hammocks, pine rocklands, and prairies	L
Angadenia berteroi	Pineland golden trumpet	—	T	Pinelands	H-P
Argythamnia blodgettii	Blodgett's wild-mercury	C	E	Open gaps in pine rocklands, rockland hammocks, and coastal berms	L
Asplenium dentatum	American toothed spleenwort	—	E	Limestone outcrops in moist hammocks	L
Asplenium serratum	American bird's nest fern	—	E	Cypress swamps and moist hardwood hammocks	L
Asplenium verecundum	Modest spleenwort	—	E	Limestone outcrops in rockland hammocks	L
Basiphyllaea corallicola	Rockland orchid	—	E	Openings in pine rocklands, leaf litter, and in moist hardwood hammocks	L
Beloglottis costaricensis	Costa Rican ladies'-tresses	—	E	Hardwood hammocks	L
Bletia purpurea	Pine pink	—	T	Pine rocklands; stumps and tree bases and cypress swamps	H-P
Bourreria cassinifolia	Smooth strongbark	—	E	Pine rocklands	L
Bourreria succulenta	Bahama strongbark	—	E	Hardwood hammocks	L
Brickellia mosieri	Florida brickell-bush	C	E	Pinelands	H-P
Byrsonima lucida	Locustberry	—	T	Pine rocklands, hardwood hammocks	H-P
Calyptranthes pallens	Spicewood	—	T	Hardwood hammocks	L
Calyptranthes zuzygium	Myrtle-of-the-river	—	E	Rockland hammocks - coastal strand	L
Catopsis berteroniana	Powdery catopsis	—	E	Hardwood hammocks, mangroves, and hardwood trees in pinelands	L
Catopsis floribunda	Many-flowered catopsis	—	E	Hardwood hammocks	L
Chamaesyce deltoidea ssp. *adhaerens*	Hairy deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *deltoidea*	Deltoid spurge	E	E	Pine rocklands	L
Chamaesyce deltoidea ssp. *pinetorum*	Pinelands spurge	C	E	Pine rocklands	H-P
Chamaesyce garberi	Garber's spurge	T	E	Pinelands and dunes	L
Chamaesyce pergamena	Southern Florida sandmat	—	T	Pine rocklands	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 2 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Chamaesyce porteriana	Porter’s broad-leaved spurge	—	E	Pine rocklands, rockland hammocks, coastal rock barrens, and marl prairies	L-M
Chaptalia albicans	Sunbonnets	—	T	Pinelands	H-P
Chrysophyllum oliviforme	Satinleaf	—	T	Hardwood hammocks and pinelands	L
Coccothrinax argentata	Silver palm	—	T	Pine rocklands and dunes	H-P
Colubrina cubensis var. floridana	Cuban snake-bark	—	E	Pine rocklands, rockland hammocks on Miami rock ridges, and Everglades Keys	L-M
Colubrina elliptica	Soldierwood	—	E	Hardwood hammocks	L
Crossopetalum ilicifolium	Christmas berry	—	T	Pinelands	H-P
Crossopetalum rhacoma	Maidenberry	—	T	Pinelands, hardwood hammocks	L
Croton humilis	Pepperbush	—	E	Hardwood hammocks	L
Ctenitis sloanei	Florida tree fern	—	E	Hardwood hammocks, often on limestone outcrops	L
Ctenitis submarginalis	Brown-hair comb-fern	—	E	Swamps and wet hardwood hammocks	L
Cynanchum blodgettii	Blodgett's swallowwort	—	T	Hardwood hammocks	H-P
Cyperus filiformis	Wiry flatsedge	—	E	Dry, sandy open areas, shell ridges	L
Cyrtopodium punctatum	Cowhorn orchid	—	E	Cypress swamps, scrub cypress strands, coastal hammocks, rarely terrestrial in rock pinelands, and marl prairies	L
Dalbergia brownei	Browne's Indian rosewood	—	E	Margins of hardwood hammocks and mangroves	L
Dalea carthagenensis var. *floridana*	Florida prairie clover	C	E	Pine rocklands and rockland hammocks, coastal uplands, and marl prairies	L
Digitaria filiformis var. *dolichophylla*	Caribbean crabgrass	—	T	Rock pinelands	L-M
Digitaria pauciflora	Few-flowered fingergrass	C	E	Rock pinelands	L-M
Drypetes lateriflora	Guiana plum	—	T	Hardwood hammocks	L
Eltroplectris calcarata	Spurred neottia	—	E	Mesic hardwood hammocks and rockland hammocks	L-M
Epidendrum amphistomum	Dingy flowered star orchid	—	E	Swamps	L
Epidendrum floridensis	Florida star orchid	—	E	Cypress and hardwood swamps	L
Epidendrum nocturnum	Night-scented orchid	—	E	Cypress swamps, moist hardwood hammocks, and mangroves	L
Epidendrum rigidum	Stiff flower star orchid	—	E	Swamps and moist hammocks	L
Erithalis fruticosa	Black torch	—	T	Coastal hammocks and dunes	L
Ernodea cokeri	Coker’s beach creeper	—	E	Pine rocklands, dunes	L-M
Eugenia confusa	Tropical ironwood	—	E	Hardwood hammock	L
Eugenia rhombea	Red stopper	—	E	Rockland hammocks	L
Evolvulus convolvuloides	Bindweed dwarf morning-glory	—	E	Pine rocklands	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 3 of 6)

Scientific Name	**Common Name**	**Federal Status***	**State Status†**	**Habitat Preference**	**Likelihood of Species Occurrence within Corridors‡**
Exostema caribaeum	Princewood	—	E	Pine rocklands and rockland hammocks	L
Galactia smallii	Small’s milk pea	E	E	Pine rocklands	L
Galeandra bicarinata	Two-keeled helmet orchid	—	E	Hardwood hammocks	L
Glandularia maritima	Coastal vervain	—	E	Dunes, coastal pinelands	L
Gossypium hirsutum	Wild cotton	—	E	Coastal hammocks, beaches, disturbed sites, and shellmound spoil piles	L
Govenia floridana	Florida govenia	—	E	Hardwood hammocks	L
Guzmania monostachia	Fakahatchee guzmania	—	E	Swamps and wet hardwood hammocks	L
Habenaria nivea	Snowy platanthera	—	T	Wet pinelands, prairies, and wet ditches	L
Harrisia simpsonii	Simpson’s prickly apple	—	E	Shell mounds, xeric coastal hammocks, and scrubby flatwoods	L
Hibiscus poeppigiii	Poeppig's rosemallow	—	E	Hardwood hammocks	L
Hippomane mancinella	Manchineel	—	E	Coastal berms and hammocks	L
Hypelate trifoliata	White ironwood	—	E	Pine rocklands and rocklands	L
Ilex krugiana	Krug’s holly	—	T	Pinelands and hardwood hammocks	H-P
Ionopsis utricularioide	Delicate violet orchid	—	E	Cypress swamps and citrus groves	L
Ipomoea microdactyla	Wild potato morning glory	—	E	Pine rocklands	L-M
Ipomoea tenuissima	Rocklands morning glory	—	E	Pine rocklands	H-P
Jacquemontia curtisii	Pineland jacquemontia	—	T	Pinelands	H-P
Jacquemontia pentanthos	Skyblue clustervine	—	E	Pine rocklands and disturbed edges, areas of rockland hammocks, and coastal rock barrens	L
Jacquinia keyensis	Joewood	—	T	Coastal hammocks	L
Koanophyllum villosum	Villose fennel	—	E	Hammocks and pinelands	H-P
Lantana canescens	Small-headed lantana	—	E	Transition zones between rockland hammocks and pine rocklands	L
Lantana depressa var. *depressa*	Florida lantana	—	E	Rock pinelands	H-P
Lantana depressa var. *floridana*	Atlantic Coast Florida lantana	—	E	Dry, open dunes and sandy ridges, primarily along coasts	L
Leiphaimos parasitica	Ghost plant	—	E	Hardwood hammocks	L
Licaria triandra	Gulf licaria	C	E	Hardwood hammocks	L-M
Linum arenicola	Sand flax	C	E	Pine rocklands, marl prairires, and adjacent disturbed areas	M-H
Linum carteri var. carteri	Carter’s small-flowered flax	C	E	Pine rocklands	L-M
Linum carteri var. smallii	Carter’s large-flowered flax	—	E	Pine flatwoods, pine rocklands, and adjacent disturbed areas	M
Lomariopsis kunzeana	Holly vine fern	—	E	Wet hardwood hammocks, limestone outcrops in wet hardwood hammocks	L
Manilkara jaimiqui ssp. *emarginata*	Wild dilly	—	T	Hardwood hammocks	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 4 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Maytenus phyllanthoides	Florida mayten	—	T	Coastal hammocks and dunes	L
Melanthera parvifolia	Small-leaved melanthera	—	T	Old coral reefs, limestones, pine forests	H-P
Mesadenus lucayana	Florida Keys ladies’-tresses	—	E	Dry calcareous hardwood hammocks and coastal middens	L
Microgramma heterophylla	Climbing vine fern	—	E	Hardwood hammocks, limestone outcrops in hardwood hammocks	L
Myrcianthes fragrans	Simpson stopper	—	T	Coastal hammocks; rarely, inland hardwood hammocks	L
Nephrolepis biserrata	Giant sword fern	—	T	Swamps and wet hardwood hammocks	L
Ocimum campechianum	Wild basil	—	E	Disturbed sites	L-M
Odontosoria clavata	Wedgelet fern	—	E	Rock pinelands and rockland hammocks, often on limestones	L
Oncidium floridanum	Florida dancinglady orchid	—	E	Pine rocklands, rockland hammocks, mangroves, and cypress swamps	L
Oncidium undulatum	Muleear orchid	—	E	Mangrove swamps, cypress swamps, and hardwood hammocks	L
Ophioglossum palmatum	Hand fern	—	E	Wet hammocks, epiphytic on sabal palmetto	L
Opuntia stricta	Erect pricklypear	—	T	Shell middens, dunes, and coastal hammocks	L
Paspalidium chapmanii	Coral paspalum	—	E	Hardwood hammocks, prairies, and disturbed sites	M
Passiflora pallens	Pineland passionflower	—	E	Rockland hammocks, coastal berms, and strand swamps	L
Passiflora sexflora	Everglades Key passion-flower	—	E	Hardwood hammocks	L
Pavonia paludicola	Mangrove mallow	—	E	Hardwood hammocks	L
Peperomia humilis	Low peperomia	—	E	Shell mounds and limestone outcrops in mesic hardwood hammocks, coastal berms, and cypress swamps	L
Peperomia obtusifolia	Blunt-leaved peperomia	—	E	Rockland hammocks, wet hardwood hammocks, and strand swamps	L
Phyla stoechadifolia	Southern frog-fruit	—	E	Wet pinelands and glades	H-P
Picramnia pentandra	Bitter bush	—	E	Hammocks	L
Pithecellobium keyense	Black bead	—	T	Coastal hammocks and strands	L
Poinsettia pinetorum	Pineland spurge	—	E	Pine rocklands	H-P
Polygala smallii	Tiny polygala	E	E	Pine rocklands, scrubs, sandhills, and open coastal spoil piles	L
Polystachya concreta	Greater yellowspice orchid	—	E	Cypress swamps, hardwood hammocks, and mangroves	L
Ponthieva brittoniae	Britton’s shadow-witch	—	E	Rock pinelands and rockland hammocks	L
Prosthechea boothiana var. *erythronioides*	Dollar orchid	—	E	Hardwood hammocks and mangroves	L
Prosthechea cochleata var. *triandra*	Clamshell orchid	—	E	Swamps, mangroves, and hardwood hammocks	L
Prunus myrtifolia	West Indian cherry	—	T	Rock pinelands and rockland hammocks	L
Psidium longipes	Mangrove berry	—	T	Pine rocklands and rockland hammocks	L
Psychotria ligustrifolia	Bahama wild coffee	—	E	Pine rocklands and rockland hammocks	L
Pteris bahamensis	Bahama brake	—	T	Pine rocklands and edges of rockland hammocks	H-P

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 5 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Pteroglossaspis ecristata	Giant orchid	—	T	Sandhills, scrubs, pine flatwoods, and pine rocklands	L
Reynosia septentrionalis	Darlingplum	—	T	Hardwood hammocks and margins of mangroves	L
Rhipsalis baccifera	Mistletoe cactus	—	E	Rockland hammocks and mangroves	L
Rhynchosia parviflora	Small-leaf snoutbean	—	T	Pinelands and beaches	H-P
Roystonea elata	Florida royal palm	—	E	Wet hardwood hammocks, swamps, and cypress sloughs	L
Sachsia polycephala	Bahama sachsia	—	T	Rock pinelands	H-P
Sacoila lanceolata var. *paludicola*	Fahkahatchee ladies'-tresses	—	T	Wet hardwood hammocks, cypress swamps, and middens	L
Savia bahamensis	Bahama maidenbush	—	E	Coastal thickets, pine rocklands, and rockland hammocks	L
Schaefferia frutescens	Florida boxwood	—	E	Rockland hammocks	L
Scleria lithosperma	Florida Keys nutrush	—	E	Pine rocklands and rockland hammocks	L
Scutellaria havanensis	Havana skullcap	—	E	Rock pinelands	L-M
Selaginella eatonii	Eaton's spikemoss	—	E	Moist limestone outcrops in rock pinelands and rockland hammocks	L
Senna mexicana var. *chapmanii*	Bahama senna	—	T	Rock pinelands, rockland hammocks, and dunes	L
Smilax havanensis	Everglades greenbrier	—	T	Rock pinelands and rockland hammocks	L
Solanum donianum	Mulle in nightshade	—	T	Coastal hammocks and dunes, marl prairies, edges or roads in mangroves	H-P
Spermacoce terminalis	Everglades Keys false button-weed	—	T	Pine rocklands	H-P
Spiranthes laciniata	Lacelip ladies-tresses	—	T	Hypericum-sedge, marshes, and open cypress swamps	L
Spiranthes longilabris	Longlip ladies'-tresses	—	T	Wet prairies and pine rocklands	L
Spiranthes torta	Southern ladies'-tresses	—	E	Pine rocklands and marl prairies	M
Stylosanthes calcicola	Pineland pencil flower	—	E	Pine rocklands, marl prairies, and transitional areas between them	H-P
Swietenia mahagoni	West Indies mahogany	—	T	Coastal strands, rockland hammocks, and hammocks also naturalized in disturbed areas from cultivated trees	L
Tectaria fimbriata	Least halberd fern	—	E	Limestone outcrops in rockland hammocks	L
Tectaria heracleifolia	Broad halberd fern	—	T	Limestone outcrops in rockland hammocks	L
Tephrosia angustissima var. angustissima	Devil's shoestring	—	E	Pine rocklands	L
Tephrosia angustissima var. *corallicola*	Rockland hoary-pea	—	E	Pine rocklands	L
Tephrosia angustissima var. *curtisii*	Coastal hoary-pea	—	E	Coastal strands	L
Tetrazygia bicolor	Florida clover ash	—	T	Rock pinelands and rockland hammocks	H-P
Thelypteris augescens	Abrupt tip maiden fern	—	T	Rockland hammocks	H-P
Thelypteris patens	Grid-scale maiden fern	—	E	Rockland hammocks	L
Thelypteris reptans	Creeping maiden fern	—	E	Limestone sinks in rockland hammocks	L
Thelypteris reticulata	Lattice-vein fern	—	E	Wet hardwood hammocks and cypress swamps	L

EXHIBIT 21

TABLE W9.3.7-5.
COMPREHENSIVE LIST OF RARE, THREATENED, OR ENDANGERED PLANT TAXA FOUND IN MIAMI-DADE COUNTY AND THEIR POTENTIAL TO OCCUR WITHIN 1,500 FT OF THE WEST PREFERRED/SECONDARY CORRIDORS
(Continued, Page 6 of 6)

Scientific Name	Common Name	Federal Status*	State Status†	Habitat Preference	Likelihood of Species Occurrence within Corridors‡
Thelypteris sclerophylla	Stiff-leaved maiden fern	—	E	Rockland hammocks	L
Thelypteris serrata	Toothed maiden fern	—	E	Cypress swamps and slough floodplains	L
Thrinax morrisii	Brittle thatch palm	—	E	Rockland hammocks and rock pinelands	L
Thrinax radiata	Florida thatch palm	—	E	Coastal thickets on limestone	L
Tillandsia balbisiana	Twisted wildpine	—	T	Hammocks	M
Tillandsia fasciculata var. *densispica*	Cardinal airplant	—	E	Cypress swamps and hardwood hammocks	L
Tillandsia flexuosa	Banded wildpine	—	T	Cypress swamps and hardwood hammocks	L
Tillandsia utriculata	Giant wildpine	—	E	Hardwood hammocks, pineland, and scrubs	M
Tillandsia variabilis	Leatherleaf airplant	—	T	Cypress swamps and hardwood hammocks	L
Tournefortia hirsutissima	Chiggery grapes	—	E	Rockland hammocks, cypress swamps	L
Tragia saxicola	Pineland noseburn	—	T	Rock pinelands	H-P
Trema lamarckianum	Lamarck's trema	—	E	Hardwood hammocks and shell middens	H-P
Trichomanes krausii	Kraus' bristle fern	—	E	Rockland hammocks	L
Trichomanes punctatum ssp. *floridanum*	Florida filmy fern	—	E	Rockland hammocks, shell middens, limestone sinks, and limestone boulders	L
Tripsacum floridanum	Florida gama grass	—	T	Rock pinelands, hammock edges	H-P
Vallesia antillana	Tearshrub	—	E	Rockland hammocks	L
Vanilla barbellata	Worm-vine orchid	—	E	Mangroves, coastal hardwood hammocks, pine rocklands, rockland hammocks, and road banks	L
Vanilla inodora	Mexican vanilla	—	E	Wet rockland hammocks	L
Vanilla phaeantha	Leafy vanilla	—	E	Cypress swamps and moist hammocks	L
Zanthoxylem coriaceum	Biscayne pricklash	—	E	Coastal hammocks	L
Zephyranthes simpsonii	Simpson's zephyrlily	—	T	Wet flatwoods and prairie	H

*Listing by USFWS. E = endangered. T = threatened. C = candidate for listing.
†Listing by FDACS. E = endangered. T = threatened.
‡L = low. M = medium. H = high. P = present in corridor. PE = possibly extinct.

Sources: USFWS, http://ecos.fws.gov/tess_public//pub/stateListing.jsp?state=FL&status=listed, 2009.
FDACS Regulated Plants: Section 5B-40.0055, F.A.C.

P9.3 Corridor

P9.3.1 Corridor Selection

The corridor for the reclaimed water pipelines was selected to utilize, to the greatest extent practicable, existing infrastructure in order to minimize environmental impacts. Because of the location of the South District Wastewater Treatment Plant, the majority of the corridor is within an existing FPL-owned transmission right-of-way and other FPL-owned property, with about 6.5 miles or about 70 percent in FPL fee ownership.

The north portion of the corridor allows several alternate routes for the reclaimed water pipelines from the South District Wastewater Treatment Plant to the existing FPL transmission right-of-way and includes areas where the pipelines could be located within existing roadways (e.g., SW 97th Avenue, SW 102nd Avenue, SW 248th Street/Coconut Palm Drive). Within the FPL transmission right-of-way, the pipelines would lie along an existing patrol road in the transmission right-of-way. At SW 344th Street/Palm Drive, the reclaimed water pipeline corridor will follow the existing FPL Turkey Point Plant access road.

P9.3.2 Corridor Description

The reclaimed water pipeline corridor varies in width from 500 ft to one mile. The first 2.5 miles of the reclaimed pipeline corridor extends from the South District Wastewater Treatment Plant to the existing FPL-owned transmission right-of-way. Figure P9.0.0-3 shows five potential alternate routes under consideration within the one-mile-wide reclaimed water pipeline corridor from the South District Wastewater Treatment Plant to the FPL transmission right-of-way. There are two canal crossings along these routes [i.e., the Black Creek Canal (C-1) and the Goulds Canal].

From the existing FPL transmission right-of-way, the reclaimed water pipeline corridor narrows to 500 ft and continues south for approximately 4.5 miles, collocated with the existing FPL transmission right-of-way and adjacent road and canal rights-of-way, until just south of SW 328th Street/North Canal Drive. Along this segment, the corridor crosses the Princeton (C-102), Military, unnamed, Mowry (C-103), and Homestead (North) Canals.

South of SW 328th Street/North Canal Drive, the 500 ft corridor extends about two miles, south and then generally southeast, to the FPL reclaimed water treatment facility. This segment of the corridor follows L-31E Canal to SW 344th Street/Palm Drive, where it crosses the L-31E Canal. The corridor

EXHIBIT 22

U.S. Fish and Wildlife Service

Florida Panther

Recovery Plan

Photo by Mark Lotz, Florida Fish and Wildlife Conservation Commission

3rd Revision

EXHIBIT 22

FLORIDA PANTHER RECOVERY PLAN

(*Puma concolor coryi*)

THIRD REVISION

Original Approval: December 17, 1981
First Revision Approved: June 22, 1987
Second Revision Approved: March 13, 1995

Prepared by

The Florida Panther Recovery Team

and

South Florida Ecological Services Office
U.S. Fish and Wildlife Service

for

U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia

Approved: Sam D. Hamilton
Regional Director, U.S. Fish and Wildlife Service

Date: November 1, 2008

EXHIBIT 22

DISCLAIMER

Recovery plans delineate actions which the best available science indicates are required to recover and protect listed species. Plans are published by the U.S. Fish and Wildlife Service (FWS), sometimes prepared with the assistance of recovery teams, contractors, State agencies, and others. Objectives will be attained and any necessary funds made available subject to budgetary and other constraints affecting the parties involved, as well as the need to address other priorities. Nothing in this plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. 1341, or any other law or regulation. Recovery plans do not necessarily represent the views or the official positions or approval of any individuals or agencies involved in the plan formulation, other than the FWS. They represent the official position of the FWS only after they have been signed by the Regional Director. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery actions.

LITERATURE CITATION SHOULD READ AS FOLLOWS:

U.S. Fish and Wildlife Service. 2008. Florida Panther Recovery Plan (*Puma concolor coryi*), Third Revision. U.S. Fish and Wildlife Service. Atlanta, Georgia. 217pp.

ADDITIONAL COPIES MAY BE OBTAINED FROM:

U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960
772-562-3909

EXHIBIT 22

RECOVERY TEAM MEMBERS

Buddy Baker	South Carolina Department of Natural Resources
Sonny Bass	National Park Service/Everglades National Park
Chris Belden[*]	U.S. Fish and Wildlife Service
Skip Bergmann	U.S. Army Corps of Engineers
Debbie Blanco*	Sarasota County Natural Resources
Dana Bryan*	Florida Department of Environmental Protection
Mary Bryant	The Nature Conservancy
Jimmy Bullock	International Paper Company
Barbara Cintron	U.S. Army Corps of Engineers
Joe Clark*	U.S. Geological Survey, Biological Resources Division
Mark Cunningham*	Florida Fish and Wildlife Conservation Commission
Don Cuozzo	National Association of Home Builders
Kipp Frohlich*	Florida Fish and Wildlife Conservation Commission
Skip Griep*	U.S. Forest Service
Karen Gustin	National Park Service/Big Cypress National Preserve
Dennis Hardin*	Florida Division of Forestry
Deborah Jansen*	National Park Service/Big Cypress National Preserve
Tom Jones	Barron Collier Partnership
F. K. Jones	Miccosukee Tribe of Indians of Florida
Nick Kapustin*	Jacksonville Zoo
Robert Lacy	Chicago Zoological Society

---

[*] Current members, alternates, and U.S. Fish and Wildlife Service participants who actively contributed by attending meetings.

EXHIBIT 22

Darrell Land*	Florida Fish and Wildlife Conservation Commission
Dwight LeBlanc	U.S. Department of Agriculture, APHIS, Wildlife Services
Gary Lester	Louisiana Department of Wildlife and Fisheries
Laurie Macdonald*	Defenders of Wildlife
Dave Maehr	University of Kentucky
Frank Mazzotti	University of Florida
Roy McBride*	Livestock Protection Company
Brian Murphy	Quality Deer Management Association
Erin Myers*	Natural Resources Conservation Service
Stephen O’Brien	National Cancer Institute
Tim O’Meara*	Florida Fish and Wildlife Conservation Commission
Jim Ozier	Georgia Wildlife Resources Division
Pedro Ramos	National Park Service/Big Cypress National Preserve
Richard Rummel	Mississippi Department of Wildlife, Fisheries & Parks
Mark Sasser	Alabama Division of Wildlife and Freshwater Fisheries
David Shindle*	Conservancy of Southwest Florida
Mel Sunquist	University of Florida
David Thompson	White Oak Conservation Center
Steve Williams*	Florida Panther Society
Ed Woods*	Seminole Tribe of Florida
Wesley Woolf*	National Wildlife Federation

Recovery Team Member Alternates:

EXHIBIT 22

Phillip Brouse*	Sarasota County Natural Resources
Monika Dey*	U.S. Army Corps of Engineers
Elizabeth Fleming*	Defenders of Wildlife
Margaret Trani (Griep)*	U.S. Forest Service
Sarah Grubs*	Seminole Tribe of Florida
Laura Hartt*	National Wildlife Federation
Karen Hill*	Florida Panther Society
Jon Moulding*	U.S. Army Corps of Engineers
Cynthia Ovdenk*	U.S. Army Corps of Engineers
Mike Owen	Florida Department of Environmental Protection
Nancy Payton	Florida Wildlife Federation

U.S. Fish and Wildlife Service Participants:

Paula Halupa*	South Florida Ecological Services Field Office
Layne Hamilton	Florida Panther National Wildlife Refuge
Larry Richardson*	Florida Panther National Wildlife Refuge
Cindy Schulz*	South Florida Ecological Services Field Office
Paul Souza*	South Florida Ecological Services Field Office

Meeting Facilitators – Florida Conflict Resolution Consortium:

Chris Pedersen	Orlando
Tom Taylor	Tallahassee

EXHIBIT 22

Previous Recovery Team members that attended meetings were Lincoln Bormann (The Nature Conservancy), Pete David (South Florida Water Management District), Thomas Eason (Florida Fish and Wildlife Conservation Commission), John Kasbohm (U.S. Fish and Wildlife Service), Jeff Norment (Natural Resources Conservation Service), and Jora Young (The Nature Conservancy).

ACKNOWLEDGMENTS

The initial work (2001 - 2004) on this third revision of the Florida Panther Recovery Plan was led by John Kasbohm with the assistance of Dawn Jennings (U.S. Fish and Wildlife Service). Jora Young guided the Team through the threats analysis process and produced the Threats Analysis tables. Building upon that early work, Chris Belden and Cindy Schulz led the team through to completion of this revision.

Many people contributed to this revision, and some spent countless hours working on specific sections. The Overview and much of the Background Sections were initially written by John Kasbohm. Parts of the Background Section were updated and added to by Chris Belden, Mark Cunningham, Elizabeth Fleming, Paula Halupa, Laura Hartt, Karen Hill, Nick Kapustin, Darrell Land, Laurie Macdonald, Roy McBride, Tim O'Meara, Cindy Schulz, and Wes Woolf. The Recovery Strategy was drafted by Laura Hartt and Karen Hill with assistance from Larry Richardson, Wes Woolf, and Steve Williams. The Recovery Action Outline and Narrative Section and Implementation Schedule were a Team effort, but specific parts were provided by Kipp Frohlich, Margaret Trani (Griep), Tim O'Meara, and Karen Hill. Karen Hill provided the majority of the Public Awareness and Education parts of these sections.

EXHIBIT 22

The major editing for this revision was done by Cindy Schulz, Chris Belden, and Paula Halupa. Editorial suggestions were also provided by Laura Hartt, Deborah Jansen, Elizabeth Fleming, Karen Hill, Tim O’Meara, Joe Clark, Dana Bryan, Laurie Macdonald, and Mark Cunningham. We want to thank Chris Pederson and Tom Taylor for keeping us focused by facilitating our meetings.

EXHIBIT 22

EXECUTIVE SUMMARY

Current Species Status

The Florida panther is the last subspecies of *Puma* still surviving in the eastern United States. Historically occurring throughout the southeastern United States, today the panther is restricted to less than 5% of its historic range in one breeding population located in south Florida. The panther population has increased from an estimated 12-20 (excluding kittens) in the early 1970s to an estimated 100 - 120 in 2007. However, the panther continues to face numerous threats due to an increasing human population and development in panther habitat negatively impacts recovery. The panther is federally listed as endangered (see Appendix A for definitions) under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) and is on the State endangered lists for Florida, Georgia, Louisiana, and Mississippi. The panther has a recovery priority number of 6c.

Habitat Requirements and Limiting Factors

Panthers are wide ranging, secretive, and occur at low densities. They require large contiguous areas to meet their social, reproductive, and energetic needs. Panther habitat selection is related to prey availability (i.e., habitats that make prey vulnerable to stalking and capturing are selected). Dense understory vegetation provides some of the most important feeding, resting, and denning cover for panthers. Telemetry monitoring and ground tracking indicate that panthers select forested habitat types interspersed with other habitat types that are used in proportion to their availability.

EXHIBIT 22

Limiting factors for the Florida panther are habitat availability, prey availability, and lack of human tolerance. Habitat loss, degradation, and fragmentation is the greatest threat to panther survival, while lack of human tolerance threatens panther recovery. Panther mortality due to collisions with vehicles threatens potential population expansion. Potential panther habitat throughout the Southeast continues to be affected by urbanization, residential development, road construction, conversion to agriculture, mining and mineral exploration, and lack of land use planning that recognizes panther needs. Public support is critical to attainment of recovery goals and reintroduction efforts. Political and social issues will be the most difficult aspects of panther recovery and must be addressed before reintroduction efforts are initiated.

Recovery Strategy

The recovery strategy for the Florida panther is to maintain, restore, and expand the panther population and its habitat in south Florida, expand this population into south-central Florida, reintroduce at least two additional viable populations within the historic range outside of south and south-central Florida, and facilitate panther recovery through public awareness and education. The panther depends upon habitat of sufficient quantity, quality, and spatial configuration for long-term persistence, therefore the plan is built upon habitat conservation and reducing habitat-related threats. Range expansion and reintroduction of additional populations are recognized as essential for recovery. Similarly, fostering greater public understanding and support is necessary to achieve panther conservation and recovery.

EXHIBIT 22

Recovery Goal

The goal of this recovery plan is to achieve long-term viability of the Florida panther to a point where it can be reclassified from endangered to threatened, and then removed from the Federal List of endangered and threatened species.

Recovery Objectives

1. To maintain, restore, and expand the panther population and its habitat in south Florida and expand the breeding portion of the population in south Florida to areas north of the Caloosahatchee River.

2. To identify, secure, maintain, and restore panther habitat in potential reintroduction areas within the historic range, and to establish viable populations of the panther outside south and south-central Florida.

3. To facilitate panther recovery through public awareness and education.

Recovery Criteria

Reclassification will be considered when:

1. Two viable populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years (two panther generations; one panther generation is six years [Seal and Lacy 1989]).

EXHIBIT 22

2. Sufficient habitat quality, quantity, and spatial configuration to support these populations is retained / protected or secured for the long-term.

A viable population, for purposes of Florida panther recovery, has been defined as one in which there is a 95% probability of persistence for 100 years. This population may be distributed in a metapopulation structure composed of subpopulations that total 240 individuals. There must be exchange of individuals and gene flow among subpopulations. For reclassification, exchange of individuals and gene flow can be either natural or through management. If managed, a commitment to such management must be formally documented and funded. Habitat should be in relatively unfragmented blocks that provide for food, shelter, and characteristic movements (e.g., hunting, breeding, dispersal, and territorial behavior) and support each metapopulation at a minimum density of 2 to 5 animals per 100 square miles (259 square kilometers) (Seidensticker et al. 1973, Logan et al. 1986, Maehr et al. 1991a, Ross and Jalkotzy 1992, Spreadbury et al. 1996, Logan and Sweanor 2001, Kautz et al. 2006), resulting in a minimum of 4,800 – 12,000 square miles (12,432 – 31,080 square kilometers) per metapopulation of 240 panthers. The amount of area needed to support each metapopulation will depend upon the quality of available habitat and the density of panthers it can support.

Delisting will be considered when:

1. Three viable, self-sustaining populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years.

EXHIBIT 22

2. Sufficient habitat quality, quantity, and spatial configuration to support these populations is retained / protected or secured for the long-term.

For delisting, exchange of individuals and gene flow among subpopulations must be natural (i.e., not manipulated or managed).

Interim Recovery Goal

Due to the challenging nature of attaining the recovery criteria, an interim recovery goal has been established to assist in determining progress towards the ultimate goals of reclassification and delisting.

This interim goal is to achieve and maintain a minimum of 80 individuals (adults and subadults) in each of two reintroduction areas within the historic range and to maintain, restore, and expand the south / south-central Florida subpopulation.

The interim goal will be met when:

1. The south / south-central Florida panther subpopulation has been maintained, restored, and expanded beyond 80 to 100 individuals (adults and subadults).

2. Two subpopulations with a minimum of 80 individuals each have been established and maintained within the historic range.

3. Sufficient habitat quality, quantity, and spatial configuration to support these three subpopulations is retained / protected or secured for the long-term.

EXHIBIT 22

There must be exchange of individuals and gene flow among these subpopulations. This exchange of individuals and gene flow can be either natural or through management.

Actions Needed

1. Maintain, restore, and expand the panther population and its habitat in south Florida.
2. Expand the breeding portion of the population in south Florida to areas north of the Caloosahatchee River.
3. Identify potential reintroduction areas within the historic range of the panther.
4. Reestablish viable panther populations outside of south and south-central Florida within the historic range.
5. Secure, maintain, and restore habitat in reintroduction areas.
6. Facilitate panther conservation and recovery through public awareness and education.

Total Estimated Cost of Recovery

Cost estimates reflect costs for specific actions needed to achieve Florida panther recovery. Estimates do not include costs that agencies or other entities normally incur as part of their

EXHIBIT 22

mission or normal operating expenses. The following table provides cost estimates for five years for recovery actions listed in the Implementation Schedule of this document. These costs reflect an estimate of funding that could come from FWS and / or its many partners listed in the Implementation Schedule. Costs for some recovery actions were not determinable; therefore, the total cost for recovery during this period is higher than this estimate.

Estimated Cost of Recovery for Five Years by Recovery Action Priority (Dollars x 1,000):

Year	Priority 1 Action	Priority 2 Actions	Priority 3 Actions	Total
1	875	1,981	1,713.5	4,569.5
2	875	1,696	1,506.5	4,077.5
3	835	1,561	1,231.5	3,627.5
4	835	921	981.5	2,737.5
5	835	921	981.5	2,737.5
Total	4,255	7,080	6,414.5	17,750

Date of Recovery

If all actions are fully funded and implemented as outlined, including full cooperation of all partners needed to achieve recovery, criteria for reclassification from endangered to threatened could be accomplished within 30 years; criteria for delisting could be accomplished within 45 years following reclassification. However, due to the challenging nature of panther recovery these are estimates that will be reevaluated as recovery actions are implemented.

EXHIBIT 22

TABLE OF CONTENTS

EXHIBIT 22

EXHIBIT 22

I. BACKGROUND

The Florida panther (*Puma concolor coryi*) was listed as endangered throughout its range in 1967 (32 FR 4001) and received Federal protection under the passage of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA). Because it is listed pursuant to the ESA, the panther and its habitat are protected by the ESA.

The ESA establishes policies and procedures for identifying, listing, and protecting species of plants, fish, and wildlife that are endangered or threatened with extinction. The purposes of the ESA are "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species…." The ESA defines an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range." A "threatened species" is defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under the definition of "species" in the ESA, the U.S. Fish and Wildlife Service (FWS) can apply the protections of the ESA to any species or subspecies of fish, wildlife, or plants, or any distinct population segment of any species of vertebrate fish or wildlife that meets the definition of endangered or threatened.

The Secretary of the Department of the Interior is responsible for administering the ESA's provisions as they apply to the Florida panther. Day-to-day management authority for endangered and threatened species under the Department's jurisdiction has been delegated to the U.S. Fish and Wildlife Service (FWS). To help identify and guide species recovery needs,

EXHIBIT 22

section 4(f) of the ESA directs the Secretary to develop and implement recovery plans for listed species. Such plans are to include: (1) a description of site-specific management actions necessary to conserve the species; (2) objective, measurable criteria which, when met, will allow the species or populations to be removed from the endangered and threatened species list; and (3) estimates of the time and funding required to achieve the plan's goals and intermediate steps. Section 4 of the ESA and regulations (50 CFR Part 424) promulgated to implement its listing provisions also set forth the procedures for reclassifying and delisting species on the Federal lists. A species can be delisted if the Secretary of the Interior determines that the species no longer meets the endangered or threatened status based upon the five factors listed in section 4(a)(1) of the ESA: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors affecting its continued existence.

Further, a species may be delisted, according to 50 CFR Part 424.11(d), if the best scientific and commercial data available substantiate that the species or population is neither endangered nor threatened for one of the following reasons: (1) extinction, (2) recovery, or (3) original data for classification of the species were in error.

The FWS has lead responsibility for recovery of the Florida panther, and all Federal agencies including FWS are responsible for contributing to panther conservation pursuant to section 7(a)(1) of the ESA. In 1981, FWS issued the initial recovery plan, and the plan was revisited in the mid-1980s culminating in the first major revision in 1987. A minor revision to incorporate a

EXHIBIT 22

task to address genetic restoration and management was approved in 1995. In 1999, the FWS approved the South Florida Multi-species Recovery Plan (MSRP) (FWS 1999) that identified recovery needs of 68 threatened and endangered species in south Florida. The MSRP included recovery actions for the panther, but only for the portion of its range in south Florida. The FWS acknowledges that portions of the MSRP are now outdated and the habitat descriptions need to be clarified to more accurately describe panther habitat.

In 2001, the FWS initiated the process to revise the overall recovery plan for a third time. A new Florida Panther Recovery Team, consisting of representatives of the public, agencies, and groups that have an interest in panther recovery and / or could be affected by proposed actions, was established to assist with this revision.

Since approval of the original recovery plan in 1981 (FWS 1981), significant research has been conducted and important conservation and recovery activities have been accomplished primarily by the Florida Game and Freshwater Fish Commission (now the Florida Fish and Wildlife Conservation Commission [FWC]). This third revision of the recovery plan reflects many of those accomplishments, addresses current threats and needs, addresses the planning requirements of the ESA, and supersedes previous recovery plans including the Florida panther component of the MSRP.

A. Overview

The Florida panther, is the last subspecies of *Puma* (also known as mountain lion, cougar, puma, painter, or catamount) still surviving in the eastern U.S (throughout this document the Florida

EXHIBIT 22

panther will be referred to as “panther” and “puma” will be used for all other subspecies). Historically occurring throughout the southeastern U.S., today the remaining 100 - 120 panthers are restricted to less than 5% of their historic range (Figure 1). The breeding component of this population is located on approximately 3,548 square miles (mi^2) (9,189 square kilometers [km^2]) (Kautz et al. 2006) south of the Caloosahatchee River in southern Florida. The population density ranges from approximately 2.0 to 2.8 animals per 100 mi^2 (0.8 to 1.1 per 100 km^2) (Maehr et al. 1991a; Kautz et al. 2006; R. McBride, Livestock Protection Company, pers. comm. 2006)

Attempts to eradicate panthers in the past and prey decline resulted in a population threatened with extinction. Prior to 1949, panthers could be killed in Florida at any time of the year. In 1950, FWC declared the panther a regulated game species due to concerns over declining numbers. The FWC removed panthers from the game animal list in 1958 and gave them complete legal protection. On March 11, 1967, the FWS listed the panther as endangered (32 FR 4001) throughout its historic range. The Florida Panther Act (State Statute 372.671), a 1978 Florida State law, made killing a panther a felony. The States of Florida, Georgia, Louisiana, and Mississippi list the Florida panther as endangered.

FWS uses recovery priority numbers, ranging from a high of 1C to a low of 18, to assign recovery priorities to listed species. The criteria on which the recovery priority number is based are degree of threat, recovery potential, taxonomic distinctiveness, and presence of an actual or imminent conflict between the species and development activities. The FWS has assigned the panther a recovery priority number of 6C. This priority number identifies the panther as a

EXHIBIT 22

subspecies with a high degree of threat of extinction, but low recovery potential because recovery is in conflict with construction, other development projects, or other forms of economic activity (48 FR 43098).

Habitat loss and fragmentation continue to threaten the panther's existence. Survival and recovery of the Florida panther are dependent upon maintaining, restoring, and expanding the panther population and its habitat in south Florida and facilitating panther conservation and recovery through public awareness and education. In addition, recovery requires expanding the breeding portion of the population into south-central Florida (Figure 2), identifying potential reintroduction areas within the historic range, and establishing and maintaining at least two additional viable populations with associated habitats outside of south and south-central Florida.

B. Description

An adult Florida panther is unspotted and typically rusty reddish-brown on the back, tawny on the sides, and pale gray underneath. There has never been a melanistic (black) puma documented in North America (Tinsley 1970, 1987). Adult males can reach a length of seven feet (ft) (2.1 meters [m]) from their nose to the tip of their tail and may exceed 161 pounds (lbs) (73 kilograms [kg]) in weight; but, typically adult males average around 116 lbs (52.6 kg) and stand approximately 24 - 28 inches (in) (60 - 70 centimeters [cm]) at the shoulder (Roelke 1990). Female panthers are smaller with an average weight of 75 lbs (34 kg) and length of 6 ft (1.8 m) (Roelke 1990). The skull of the Florida panther is unique in that it has a broad, flat, frontal region, and broad, high-arched or upward-expanded nasal bones (Young and Goldman 1946).

EXHIBIT 22

Florida panther kittens are gray with dark brown or blackish spots and five bands around the tail. The spots gradually fade as the kittens grow older and are almost unnoticeable by the time they are six months old. At this age, their bright blue eyes slowly turn to the light-brown straw color of the adult (Belden 1988).

Three external characters—a right angle crook at the terminal end of the tail, a whorl of hair or cowlick in the middle of the back, and irregular, white flecking on the head, nape, and shoulders—not found in combination in other subspecies of *Puma* (Belden 1986), were commonly observed in Florida panthers through the mid-1990s. The kinked tail and cowlicks were considered manifestations of inbreeding (Seal 1994a), whereas the white flecking was thought to be a result of scarring from tick bites (Maehr 1992, Wilkins et al. 1997). Four other abnormalities prevalent in the panther population prior to the mid-1990s included cryptorchidism (one or two undescended testicles), low sperm quality, atrial septal defects (the opening between two atria fails to close normally during fetal development), and immune deficiencies and were also suspected to be the result of low genetic variability (Roelke et al. 1993a).

A plan for genetic restoration and management of the Florida panther was developed in September 1994 (Seal 1994a) and eight non-pregnant adult female Texas pumas (*Puma concolor stanleyana*) were released in five areas of south Florida from March to July 1995. Since this introgression, rates of genetic defects, including crooked tails and cowlicks, have dramatically decreased (Land et al. 2004). In addition, to date neither atrial septal defects nor cryptorchidism have been found in introgressed panthers (M. Cunningham, FWC, pers. comm. 2005). The effects of genetic restoration on color and cranial and dental measures have not been evaluated.

EXHIBIT 22

C. Taxonomy

Since the first classification of felids by Linnaeus (1758), there have been a number of reclassifications. A brief review of cat species classification history is presented by Werdelin (1996) and shows a record of extremes in both “splitting” and “lumping” (Nowell and Jackson (1996). The most recent evaluation of the felid family is Wozencraft’s (1993) classification (Werdelin 1996). A considerable amount of work is still required before consensus can be reached regarding felid systematics and the consensus must involve both morphological and molecular work (Werdelin 1996). A consensus molecular, morphological, and ethological classification scheme would provide a framework for conservation programs and will become increasingly important as wild populations become smaller and increasingly isolated (O’Brien 1996a).

Although there is general agreement among felid taxonomists regarding recognition of cat species, there is considerable confusion with regards to subspecies, debate on subspecies definition, and debate on whether or not the traditional taxonomic concept is valid in the light of contemporary knowledge of population biology and genetics (Nowell and Jackson 1996). There is general agreement that too many subspecies of cats have been described in the past on the basis of slim evidence (Nowell and Jackson 1996). Mayr (1940, 1963, 1970) defined a subspecies as “a geographically defined aggregate of local populations which differ taxonomically from other subdivisions of the species” (cited in O’Brien 1996b). O’Brien and Mayr (1991) and O’Brien (1996b) provide criteria for subspecies classification. Following their criteria, a subspecies includes members that share a unique geographic range or habitat, a group

EXHIBIT 22

of phylogenetically concordant phenotypic characters, and a unique natural history relative to other subdivisions of the species.

The Florida panther was first described by Charles B. Cory in 1896 as *Felis concolor floridana* (Cory 1896). The type specimen was collected in Sebastian, Florida. Bangs (1899) believed that the Florida panther was restricted to peninsular Florida and could not intergrade with other *Felis* spp. Therefore, he assigned it full specific status and named it *Felis coryi* since *Felis floridana* had been used previously for the bobcat (*Lynx rufus*).

The taxonomic classification of the *Felis concolor* group was revised and described by Nelson and Goldman (1929) and Young and Goldman (1946). These authors differentiated 30 subspecies using geographic and morphometric (measurement of forms) criteria and reassigned the Florida panther to subspecific status as *Felis concolor coryi*. This designation also incorporated *F. arundivaga* which had been classified by Hollister (1911) from specimens collected in Louisiana into *F. c. coryi*.

The puma was originally named *Felis concolor* by Linneaus in 1771, but in 1834 Jardine renamed the genus *Puma* (Wozencraft 1993). Later taxonomists lumped most of the smaller cat species, including the puma, into subgenera under the genus *Felis* (Nowak and Paradiso 1983). Wozencraft (1993) promoted the subgenera of the old genus *Felis* to full generic status and placed a number of former *Felis* species, including the puma, in monotypic genera (Nowell and Jackson 1996). The taxonomic classification of the puma is now considered to be *Puma concolor* (Wozencraft 1993), making the accepted name for the Florida panther *P. c. coryi*.

EXHIBIT 22

A comprehensive molecular genetic analysis of pumas in southern Florida using mitochondrial DNA and nuclear markers reported by O'Brien et al. (1990) indicated the existence of two distinct genetic stocks with concordant morphological phenotypes. The close phylogenetic proximity of the southwest Florida population segment with representatives of other North American subspecies indicated this population segment was descended from historic *P. c. coryi*. The population segment in southeastern Florida, however, appeared to have evolved in South or Central America. This was accounted for by the release of seven captive animals (including three females) into Everglades National Park (ENP) between 1957 and 1967 (unpublished archives, ENP, National Park Service [NPS], Washington, D.C., cited in O'Brien et al. 1990). The subpopulation in ENP became effectively extirpated with the death of three resident females in June and July 1991 (Bass and Maehr 1991).

As people exterminated puma in eastern North America, the only population that remained was in peninsular Florida and they became isolated from other puma populations, eliminating gene flow. As the Florida panther was reduced to a small breeding population in southern Florida, the lack of gene flow and small population size fostered a high rate of inbreeding as seen in reduced allozyme variation relative to other puma subspecies (Roelke et al. 1993a) and eight fixed loci (Culver et al. 2000). The inbreeding condition and reduction of genetic diversity appeared to have occurred during the 20th century as Culver et al. (2000) found museum samples from the Florida population dating to the turn of the 19th century that had higher heterozygosity levels. The consequences of inbreeding included spermatozoal defects, cryptorchidism, cardiac abnormalities, and reduced immunity to infectious diseases (Roelke et al. 1993a).

EXHIBIT 22

Through the late 1980s and early 1990s, the frequency of individuals exhibiting physiological abnormalities increased. Approximately 90% of males born after 1990 had one or both testicles undescended (Pimm et al. 2006a). The FWS (1994a) became concerned that the overall genetic health of the Florida panther was at a point where the panther's continued existence was doubtful without a proactive genetic restoration program. A plan for genetic restoration and management was developed (Seal 1994a). The level of introgression required to reverse the effects of inbreeding and genetic loss required the release of eight Texas puma into areas occupied by Florida panther (Seal 1994a). These eight female Texas puma were released in 1995, five of which produced a total of 20 offspring (Land et al. 2004). The desired 20% introgression level was achieved (Land and Lacy 2000) and the genetic rescue of the Florida panther was determined to be successful (Pimm et al. 2006a). Three times as many introgressed kittens appear to reach adulthood as do uncrossed Florida panthers and introgressed adult females have lower mortality rates (Pimm et al. 2006a).

Subspecies can interbreed as a natural process whenever they are in contact (O'Brien and Mayr 1991) and this was the basis for choosing Texas pumas (the closest extant adjacent subspecies) for genetic restoration of the Florida panther (FWS 1994a). Prior to making the decision to conduct genetic augmentation to facilitate the recovery of the Florida panther, FWS made the determination that any resulting offspring would receive the full protections of the ESA. This determination was the result of a rigorous policy and legal review at the highest levels of the agency (FWS 1994b).

EXHIBIT 22

Culver et al. (2000) speculated that the moderate level of genetic variability found in North American puma was due to their extirpation during Pleistocene glaciations and then recolonization some 10,000 years ago. Modern puma eventually covered practically the entire North American continent (excluding the most northern latitudes) and had the largest range of any native mammal species in the Western Hemisphere (Hall and Kelson 1959). Within this extensive range, geographic variation was present and involved subtle differences in body measurements, pelage characteristics, and skeletal features. When puma subspecies were first described, it was this geographic variation that was used to delineate each subspecies. Characters previously used to describe *P. c. coryi* were quantified and re-evaluated using statistical methods by Wilkins et al. (1997). All historic and recent specimens from the southeastern U.S. (n = 79) were examined for pelage color, cranial profile and proportions, and other morphological traits. These specimens were compared to a sample of North and South American specimens. The characters measured provide a basis from which to describe the Florida population and discriminate between it and other populations (Wilkins et al. 1997).

Recent molecular genetic analyses have found that pumas in North America are very similar to each other (Culver et al. 2000, Sinclair et al. 2001, Anderson et al. 2004). Culver et al. (2000) examined subspecies of puma by using three mitochondrial genes and ten microsatellite loci in biological samples collected from 315 pumas from throughout their range. They could not confirm the previous classification of 32 subspecies and, based on the subspecific criteria suggested by O'Brien and Mayr (1991), could only recognize six subspecies of *Puma*. Culver et al. (2000) suggested all North American pumas be reclassified as a single subspecies (*P. c. couguar*) due to lack of genetic structure. However, Culver et al. (2000) determined that the

EXHIBIT 22

Florida panther was one of several smaller populations that had unique features, the number of polymorphic microsatellite loci and amount of variation were lower, and it was highly inbred (eight fixed loci).

The degree to which the scientific community has accepted the use of genetics in puma taxonomy is not resolved at this time. The existing Florida panther population represents the last remaining population of *Puma* in the eastern United States, and is therefore important to the genetic representation of pumas in North America. Additional research is needed to understand genetic and morphological similarities and differences of puma across North America. The Florida panther is listed under the ESA and any change in its listing status based on best available science would require completing the formal rulemaking process pursuant to the ESA. The panther and its habitat continue to receive ESA protections.

D. Population Trends and Distribution

The Florida panther once ranged throughout the southeastern U.S. from Arkansas and Louisiana eastward across Mississippi, Alabama, Georgia, Florida, and parts of South Carolina and Tennessee (Young and Goldman 1946) (Figure 1). Historically, the panther intergraded to the north with *P. c. cougar*, to the west with *P. c. stanleyana*, and to the northwest with *P. c. hippolestes* (Young and Goldman 1946).

EXHIBIT 22

Although generally considered unreliable, sightings of panthers regularly occur throughout the Southeast. However, no reproducing populations of panthers have been found outside of south Florida for at least 30 years despite intensive searches to document them (Belden et al. 1991, McBride et al. 1993, Clark et al. 2002). Survey reports and more than 70,000 locations of radio-collared panthers recorded between 1981 and 2004 clearly define the panther's current breeding range (Figure 1). Reproduction is known only in the Big Cypress Swamp / Everglades physiographic region in Collier, Lee, Hendry, Miami-Dade, and Monroe Counties south of the Caloosahatchee River (Belden et al. 1991). Although confirmed panther sign, male radio-collared panthers, and uncollared males killed by vehicles have been recorded outside of south Florida, no female panthers have been documented north of the Caloosahatchee River since 1973 (Nowak and McBride 1974, Belden et al. 1991, Land and Taylor 1998, Land et al. 1999, Shindle et al. 2000, McBride 2002, Belden and McBride 2006).

Puma are wide ranging, secretive, and occur at low densities. However, their tracks, urine markers, and scats are readily found by trained observers, and resident populations are easily located. Van Dyke et al. (1986a) determined that all resident puma, 78% of transient puma, and 57% of kittens could be detected by track searches in Utah. During two month-long investigations – one late in 1972 / early 1973 and another in 1974 – funded by the World Wildlife Fund to determine if panthers still existed in Florida, McBride searched for signs of panthers in portions of south Florida. In 1972, McBride authenticated a road-killed male panther in Glades County and a female captured and released from a bobcat trap in Collier County (R. McBride, pers. comm. 2005). In 1973, McBride captured one female in Glades County (Nowak and McBride 1974). Based on this preliminary evidence, Nowak and McBride (1974) estimated

EXHIBIT 22

the “population from the Lake Okeechobee area southward to be about 20 or 30 individuals.” In 1974, McBride found evidence of two additional panthers in the Fakahatchee Strand and suggested that there could be as few as ten panthers in the area around Lake Okeechobee and southward in the state (Nowak and McBride 1975). This initial survey documented that panthers still existed in Florida and delineated areas where a more exhaustive search was warranted. After this initial investigation, comprehensive surveys on both public and private lands were completed (Reeves 1978; Belden and McBride 1983a, b; Belden et al. 1991). Thirty panthers were identified during a wide-ranging survey in 1985 in south Florida (McBride 1985).

Maehr et al. (1991a) provides the only published estimate of population density based on a substantial body of field data (Beier et al. 2003). Maehr et al. (1991a) estimated a density of 1 panther / 43 mi^2 (110 (km^2) based on 17 concurrently radiocollared and four uncollared panthers. They extrapolated this density to the area occupied (1,946 mi^2 [5,040 km^2]) by radio-collared panthers during the period 1985 - 1990 to achieve a population estimate of 46 adult panthers for southwest Florida (excluding ENP, eastern Big Cypress National Preserve [BCNP], and Glades and Highlands Counties). Beier et al. (2003), however, argued that this estimate of density, although “reasonably rigorous,” could not be extrapolated to other areas because it was not known whether densities were comparable in those areas.

McBride (2000, 2001, 2002, 2003) documented panther counts (i.e., number known alive) based on panthers treed with hounds, physical evidence (e.g., tracks where radio-collared panthers were not known to occur), documentation by trail-camera photos, and sightings of uncollared panthers by a biologist or pilot from a monitoring plane or via ground telemetry. He counted 62, 78, 80,

EXHIBIT 22

and 87 panthers (which include adult and subadult panthers but not kittens at the den) in 2000, 2001, 2002, and 2003, respectively. The number of documented panthers was 78, 82, and 97 in 2004, 2005, and 2006 (R. McBride, pers. comm. 2007).

McBride (pers. comm. 2007) documented an increase in the number of uncollared panthers captured each year between 2000 and 2006 relative to 1981 through 1999, while FWC (2006) reported data showing an apparent increase in the number of panthers killed by vehicles and number of known den sites since 1999. These data, along with an increase in the number of male panthers dispersing north of the Caloosahatchee River (Belden and McBride 2006), indicate an increasing trend in the panther population.

Although the breeding segment of the panther population occurs in south Florida, panthers were documented north of the Caloosahatchee River over 125 times between February 1972 and May 2004. This has been confirmed through field sign (e.g., tracks, scrapes, scats), camera-trap photographs, seven highway mortalities, four radio-collared animals, two captured animals (one of which was radiocollared), and one skeleton. From 1972 through 2004, panthers have been confirmed in 11 counties (Flagler, Glades, Highlands, Hillsborough, Indian River, Okeechobee, Orange, Osceola, Polk, Sarasota, Volusia) north of the river (Belden et al. 1991, Belden and McBride 2006). However, no evidence of a female or reproduction has been documented north of the Caloosahatchee River in over 30 years (Belden and McBride 2006).

EXHIBIT 22

E. Life History / Ecology

Reproduction--Male Florida panthers are polygynous, maintaining large, overlapping home ranges containing several adult females and their dependent offspring. The first sexual encounters for males normally occur at about three years based on 26 radio-collared panthers of both sexes (Maehr et al. 1991a). Based on genetics work, some males may become breeders as early as 17 months (W. Johnson, National Cancer Institute, pers. comm. 2005). Breeding activity peaks from December to March (Shindle et al. 2003). Litters (n = 82) are produced throughout the year, with 56 - 60% of births occurring between March and June (Jansen et al. 2005, Lotz et al. 2005). The greatest number of births occurs in May and June (Jansen et al. 2005, Lotz et al. 2005). Female panthers have bred as young as 18 months (Maehr et al. 1989a) and successful reproduction has occurred up to 11 years old. Mean age of denning females is 4.6 ± 2.1 (standard deviation [sd]) years (Lotz et al. 2005). Age at first reproduction for 19 known-aged female panthers averaged 2.2 ± 0.246 (sd) years and ranged from 1.8 - 3.2 years. Average litter size is 2.4 ± 0.91 (sd) kittens. Seventy percent of litters are comprised of either two or three kittens. Mean birth intervals (elapsed time between successive litters) are 19.8 ± 9.0 (sd) months for female panthers (n = 56) (range 4.1 - 36.5 months) (Lotz et al. 2005). Females that lose their litters generally produce another more quickly; five of seven females whose kittens were brought into captivity (see Captive Breeding section of F. Conservation Efforts) successfully produced another litter an average of 10.4 months after the removal of the initial litter (Land 1994).

Den sites are usually located in dense, understory vegetation, typically saw palmetto (*Serenoa repens*) (Maehr 1990a, Shindle et al. 2003). Den sites are used for up to two months by female

EXHIBIT 22

panthers and their litters from birth to weaning. Independence and dispersal of young typically occurs at 18 months, but may occur as early as one year (Maehr 1992).

Survivorship and Causes of Mortality--Intraspecific aggression accounts for 42% of all mortalities among radio-collared panthers (Jansen et al. 2005, Lotz et al. 2005). Unknown causes and collisions with vehicles account for 24 and 19% of mortalities, respectively. From 1990 to 2004, mean annual survivorship of radio-collared adult panthers was greater for females (0.894 ± 0.099 sd) than males (0.779 ± 0.125 sd) (Lotz et al. 2005). Most intraspecific aggression occurs between male panthers; but, aggressive encounters between males and females, resulting in the death of the female, have occurred. Defense of kittens and / or a kill is suspected in half (5 of 10) of the known instances through 2003 (Shindle et al. 2003).

Female panthers are considered adult residents if they are older than 18 months, have established home ranges, and bred (Maehr et al. 1991a). Land et al. (2004) reported that all 24 female panthers radiocollared when still dependent juveniles greater than six months of age survived to become residents and 19 (79.2%) produced litters. Male panthers are considered adult residents if they are older than three years and have established a home range that overlaps with females. Thirty-one male panthers were captured as kittens and 12 (38.7%) of these cats survived to become residents (Jansen et al. 2005, Lotz et al. 2005). “Successful male recruitment appears to depend on the death or home-range shift of a resident adult male” (Maehr et al. 1991a). Turnover in the breeding population is low with documented mortality in radio-collared panthers being greatest in subadults and non-resident males (Maehr et al. 1991a, Shindle et al. 2003).

EXHIBIT 22

One hundred thirty-two female panther den sites have been documented since 1985 (FWC 2006). For 38 of these litters, Land et al. (2004) estimated Florida and introgressed panther kitten survival to six months to be 52 and 72%, respectively. Pimm et al. (2006a, 2006b) reported a better than twofold advantage for introgressed kitten survival (P = 0.01). Survival of kittens greater than six months old was determined by following the fates of 55 radio-collared dependent-aged kittens, including 17 introgressed panthers from 1985 - 2004. Only one of these 55 kittens died before reaching independence, resulting in a 98.2% survival rate (Land et al. 2004). The FWC and NPS are continuing to compile and analyze existing reproductive and kitten data.

Dispersal--Panther dispersal begins after a juvenile becomes independent from its mother and continues until it establishes a home range. Dispersal distances are greater for males (n = 18) than females (n = 9) (42.5 mi [68.4 km] vs. 12.6 mi [20.3 km], respectively) and the maximum dispersal distance recorded for a young male Florida panther was 139.2 mi (224.1 km) over a seven-month period followed by a secondary dispersal of 145 mi (233 km) (Maehr et al. 2002a). Male Florida panthers disperse an average distance of 25 mi (40 km); females typically remain in or disperse short distances from their natal ranges (Comiskey et al. 2002). Female dispersers are considered philopatric because they usually establish home ranges less than one average home range width from their natal range (Maehr et al. 2002a). Maehr et al. (2002a) reported that all female dispersers (n = 9) were successful at establishing a home range whereas only 63% of males (n = 18) were successful. Young panthers become independent at 14 months on average for both sexes, but male dispersals are longer in duration than for females (9.6 months and 7.0 months, respectively) (Maehr et al. 2002a). Dispersing males usually go through a period as

EXHIBIT 22

transient (non-resident) subadults, moving through the fringes of the resident population and often occupying suboptimal habitat until an established range becomes vacant (Maehr 1997a).

Most panther dispersal occurs south of the Caloosahatchee River with only four radio-collared panthers crossing the river and continuing north since 1981 (Land and Taylor 1998, Land et al. 1999, Shindle et al. 2000, Maehr et al. 2002a, Belden and McBride 2006). Western subspecies of *Puma* have been documented crossing wide, swift-flowing rivers up to a mile in width (Seidensticker et al. 1973, Anderson 1983). The Caloosahatchee River, a narrow (295 - 328 ft [90 - 100 m]), channelized river, probably is not a significant barrier to panther movements, but the combination of the river, State Route (SR) 80, and land uses along the river seems to have restricted panther dispersal northward (Maehr et al. 2002a). Documented physical evidence of at least 15 uncollared male panthers have been confirmed north of the river since 1972, but no female panthers nor reproduction have been documented in this area since 1973 (Belden and McBride 2006).

Home Range Dynamics and Movements--Panthers require large areas to meet their needs. Numerous factors influence panther home range size including habitat quality, prey density, and landscape configuration (Belden 1988, Comiskey et al. 2002). Home range sizes of 26 radio-collared panthers monitored between 1985 and 1990 averaged 200 mi^2 (519 km^2) for resident adult males and 75 mi^2 (193 km^2) for resident adult females; transient males had a home range of 240 mi^2 (623 km^2) (Maehr et al. 1991a). Comiskey et al. (2002) examined the home range size for 50 adult panthers (residents greater than 1.5 years old) monitored in south Florida from 1981 - 2000 and found resident males had a mean home range of 251 mi^2 (650 km^2) and females had a mean home range of 153 mi^2 (396 km^2). Beier et al. (2003) found home range size estimates for panthers reported by Maehr et al. (1991a) and Comiskey et al. (2002) to be reliable.

Annual minimum convex polygon home range sizes of 52 adult radio-collared panthers monitored between 1998 and 2002 ranged from 24 - 459 mi^2 (63 - 1,188 km^2), averaging 140 mi^2 (362 km^2) for 20 resident adult males and 69 mi^2 (179 km^2) for 32 resident adult females (Land et al. 1999; Shindle et al. 2000, 2001; Land et al. 2002). Home ranges of resident adults tend to be stable unless influenced by the death of other residents; however, several males have shown significant home range shifts that may be related to aging (D. Jansen, NPS, pers. comm. 2005). Home-range overlap is extensive among resident females and limited among resident males (Maehr et al. 1991a).

Activity levels for Florida panthers are greatest at night with peaks around sunrise and after sunset (Maehr et al. 1990a). The lowest activity levels occur during the middle of the day. Female panthers at natal dens follow a similar pattern with less difference between high and low activity periods.

Telemetry data indicate that panthers typically do not return to the same resting site day after day, with the exception of females with dens or panthers remaining near kill sites for several days. The presence of physical evidence such as tracks, scats, and urine markers confirm that panthers move extensively within home ranges, visiting all parts of the range regularly in the course of hunting, breeding, and other activities (Maehr 1997a, Comiskey et al. 2002). Males travel widely throughout their home ranges to maintain exclusive breeding rights to females.

EXHIBIT 22

Females without kittens also move extensively within their ranges (Maehr 1997a). Panthers are capable of moving large distances in short periods of time. Nightly panther movements of 12 mi (20 km) are not uncommon (Maehr et al. 1990a).

Intraspecific Interactions--Interactions between panthers occur indirectly through urine markers or directly through contact. Urine markers are made by piling ground litter using a backwards-pushing motion with the hind feet. This pile is then scent-marked with urine and occasionally feces. Both sexes make urine markers, apparently males use them as a way to mark their territory and announce presence while females advertise their reproductive condition.

Adult females and their kittens interact more frequently than any other group of panthers. Interactions between adult male and female panthers last from one to seven days and usually result in pregnancy (Maehr et al. 1991a). Aggressive interactions between males often result in serious injury or death. Independent subadult males have been known to associate with each other for several days and these interactions do not appear to be aggressive in nature. Aggression between males is the most common cause of male mortality and an important determinant of male spatial and recruitment patterns based on radio-collared panthers (Maehr et al. 1991a, Shindle et al. 2003). Aggressive encounters between radio-collared males and females also have been documented (Shindle et al. 2003, Jansen et al. 2005).

Food Habits--Primary panther prey are white-tailed deer (*Odocoileus virginianus*) and feral hog (*Sus scrofa*) (Maehr et al. 1990b, Dalrymple and Bass 1996). Generally, feral hogs constitute the greatest biomass consumed by panthers north of the Alligator Alley section of Interstate 75 (I-

EXHIBIT 22

75) while white-tailed deer are the greatest biomass consumed to the south (Maehr et al. 1990b). Secondary prey includes raccoons (*Procyon lotor*), nine-banded armadillos (*Dasypus novemcinctus*), marsh rabbits (*Sylvilagus palustris*) (Maehr et al. 1990b) and alligators (*Alligator mississippiensis*) (Dalrymple and Bass 1996). No seasonal variation in diet has been detected. A resident adult male puma generally consumes one deer-sized prey every 8 - 11 days; this frequency is 14 - 17 days for a resident female; and 3.3 days for a female with three 13-month-old kittens (Ackerman et al. 1986). Maehr et al. (1990b) documented domestic livestock infrequently in scats or kills, although cattle were readily available on their study area.

Infectious Diseases, Parasites, and Environmental Contaminants--

Viral Diseases--Feline leukemia virus (FeLV) is common in domestic cats (*Felis catus*), but is quite rare in non-domestic felids. Routine testing for FeLV antigen (indicating active infection) in captured and necropsied panthers had been negative since testing began in 1978. However, between November 2002 and February 2003, two panthers tested FeLV antigen positive (Cunningham 2005). The following year, three more cases were diagnosed. All infected panthers had overlapping home ranges in the Okaloacoochee Slough ecosystem. Three of the panthers died due to suspected FeLV-related diseases (opportunistic bacterial infections and anemia) and the two others died from intraspecific aggression. Testing of serum samples collected from 1990 - 2005 for antibodies (indicating exposure) to FeLV indicated increasing exposure to FeLV beginning in the late 1990s and concentrated north of I-75. There was apparently minimal exposure to FeLV during this period south of I-75. Positive antibody titers in different areas at different times may indicate that multiple introductions of the virus into the panther population may have occurred. These smaller epizootics were apparently self-limiting

EXHIBIT 22

and did not result in any known mortalities. Positive antibody titers, in the absence of an active infection (antigen positive), indicate that panthers can be exposed and overcome the infection (Cunningham 2005). Management of the disease includes vaccination as well as removal of infected panthers to captivity for quarantine and supportive care. As of June 1, 2005, approximately one-third of the population had received at least one vaccination against FeLV (FWC and NPS, unpublished data). No new positive cases have been diagnosed since July 2004.

Pseudorabies virus (PRV) (Aujeszky's disease) causes respiratory and reproductive disorders in adult hogs and mortality in neonates, but is a rapidly fatal neurologic disease in carnivores. At least one panther died from PRV infection presumably through consumption of an infected feral hog (Glass et al. 1994). At least one panther has also died of rabies (Taylor et al. 2002). This panther was radiocollared but not vaccinated against the disease.

Feline immunodeficiency virus (FIV) is a retrovirus of felids that is endemic in the panther population. Approximately 28% of panthers were positive for antibodies to the puma lentivirus strain of FIV (Olmstead et al. 1992); however, the prevalence may be increasing. Between November 2004 and April 2005, 13 of 17 (76%) were positive (M. Cunningham, FWC, unpublished data). The cause of this increase is unknown but warrants continued monitoring and investigation. There is also evidence of exposure to Feline panleukopenia virus (PLV) in adult panthers (Roelke et al. 1993b) although no PLV-related mortalities are known to have occurred.

Serological evidence of other viral diseases in the panther population includes feline calicivirus, feline herpes virus, and West Nile virus (WNV). However these diseases are not believed to

EXHIBIT 22

cause significant morbidity or mortality in the population. All panthers found dead due to unknown causes are tested for alphaviruses, flaviviruses (including WNV), and canine distemper virus. These viruses have not been detected in panthers by viral culture or polymerase chain reaction (FWC, unpublished data).

Other Infectious Diseases--Bacteria have played a role in free-ranging panther morbidity and mortality as opportunistic pathogens, taking advantage of pre-existing trauma or FeLV infections (FWC, unpublished data). Dermatophytosis (ringworm infection) has been diagnosed in several panthers and resulted in severe generalized infection in at least one (Rotstein et al. 1999). Severe infections may reflect an underlying immunocompromise, possibly resulting from inbreeding depression or immunosuppressive viral infections.

Parasites--The hookworm, *Ancylostoma pluridentatum,* is highly prevalent in the panther population. Hookworm infections in domestic kittens can cause significant morbidity and mortality resulting from blood loss. Hookworm infection in one panther kitten taken into captivity was believed to have resulted in anemia and poor body condition; improvement in hematological parameters and condition followed anthelmintic treatment (Dunbar et al. 1994). The impact of this parasite on panther kittens in the wild is unknown.

Other parasites identified from live-captured or necropsied panthers include eight arthropod species, eight nematode species, three cestode species, two trematode species, and three protozoa species (Forrester et al. 1985, Forrester 1992, Wehinger et al. 1995, Rotstein et al. 1999, Land et

EXHIBIT 22

al. 2002). Of these, only an arthropod (*Notoedres felis)* caused significant morbidity in at least one panther (Maehr et al. 1995).

Environmental Contaminants--Overall, mercury in south Florida biota has decreased over the last several years (Frederick et al. 2002). However, high mercury concentrations are still found in some panthers. At least one panther is thought to have died of mercury toxicosis and mercury has been implicated in the death of two other panthers in ENP (Roelke 1991). One individual panther had concentrations of 150 parts per million (ppm) mercury in its hair (Land et al. 2004). Elevated levels of p, p'– DDE (a breakdown product of DDT, an organochlorine pesticide) and polychlorinated biphenyls were also detected in fat from that panther. The role of mercury and / or p, p'– DDE in this panther's death is unknown and cause of death was undetermined despite extensive diagnostic testing. Elevated mercury concentrations have also been found in panthers from Florida Panther National Wildlife Refuge (FPNWR). Two sibling neonatal kittens from this area had hair mercury concentrations of 35 and 40 ppm and did not survive to leave their natal den. Although other factors were believed to have been responsible for the kitten mortalities, neonates may be more susceptible to the toxic effects of mercury (Berglund and Berlin 1969). Consistently high hair mercury values in ENP and FPNWR and the finding of elevated values in some portions of BCNP warrant continued monitoring (Land et al. 2004). Other environmental contaminants found in panthers include polychlorinated biphenyls (e.g., Aroclor 1260) (Dunbar 1995, Land et al. 2004).

EXHIBIT 22

F. Habitat Characteristics / Ecosystem

Landscape Composition--Noss and Cooperrider (1994) considered the landscape implications of maintaining viable panther populations. Assuming a male home range size of 215 mi^2 (558 km^2) (Maehr 1990a), an adult sex ratio of 50:50 (Anderson 1983), and some margin of safety, they determined that a reserve network as large as 15,625 – 23,438 mi^2 (40,469 - 60,703 km^2) would be needed to support an effective population size of 50 individuals (equating to an actual adult population of 100 - 200 panthers [Ballou et al. 1989]). However, to provide for long-term persistence based on an effective population size of 500 individuals (equating to 1,000 - 2,000 adult panthers [Ballou et al. 1989]), could require as much as 156,251 - 234,376 mi^2 (404,687 - 607,031 km^2). This latter acreage corresponds to roughly 60 - 70% of the Florida panther’s historical range. Although it is uncertain whether this much land is needed for panther recovery, it does provide some qualitative insight into the importance of habitat conservation across large landscapes for achieving a viable panther population (Noss and Cooperrider 1994).

The FWS created the Multi-species/Ecosystem Recovery Implementation Team (MERIT) to assist with implementation of the MSRP after it was signed in 1999. The Florida Panther Subteam of MERIT developed a landscape-level strategy for the conservation of the panther population in south Florida, which was not finalized. Many of the Panther Subteam members refined the methodology, further analyzed the data, and better defined the results of this landscape-level strategy (Kautz et al. 2006). Data from radio-collared panthers collected from 1981 through 2000 were used to delineate home ranges, which were geo-referenced with land cover and other relevant data.

EXHIBIT 22

Compositional analysis was performed to evaluate the relative frequency of occurrence of various land cover types within panther habitat. A spatially-explicit raster model that identified forest patches potentially suitable for use by panthers as cover was used to refine the outer boundaries of the occupied zone, represented as overlapping minimum convex polygons of panther home ranges, and as a first step to identifying zones of potential use elsewhere. Cover components were combined with a least cost path analysis to delineate a dispersal zone connecting occupied habitat in southern Florida to the Caloosahatchee River.

Three priority zones were identified as important for panther habitat conservation: (1) Primary Zone – lands essential to the long-term viability and persistence of the panther in the wild; (2) Secondary Zone - lands contiguous with the Primary Zone, currently used by few panthers, but which could accommodate expansion of the panther population south of the Caloosahatchee River; and (3) Dispersal Zone - the area which may facilitate future panther expansion north of the Caloosahatchee River (Kautz et al. 2006), (Figure 3). The Primary Zone is currently occupied and supports the breeding population of panthers. Although panthers move through the Secondary and Dispersal Zones, they are not currently occupied by resident panthers. Some areas of the Secondary Zone would require restoration to support panthers.

These zones vary in size, ownership, and land cover composition. The Primary Zone is 3,548 mi^2 (9,189 km^2) in size, 73% of which is publicly owned, and includes portions of the BCNP, ENP, Fakahatchee Strand Preserve State Park (FSPSP), FPNWR, Okaloacoochee Slough State Forest (OSSF), and Picayune Strand State Forest (PSSF). This zone's composition is 45%

EXHIBIT 22

forest, 41% freshwater marsh, 7.6% agriculture lands, 2.6% prairie and shrub lands, and 0.52% urban lands (Kautz et al. 2006).

The Secondary Zone is 1,269 mi^2 (3,287 km^2) in size, 38% of which is public land. This zone's composition is 43% freshwater marsh, 36% agriculture, 11% forest, 6.1% prairie and shrub lands, and 2.3% low-density residential areas and open urban lands (Kautz et al. 2006).

The Dispersal Zone is 44 mi^2 (113 km^2) in size, all of which is privately owned. This zone's composition is 49% agriculture (primarily improved pasture and citrus groves), 29% forest (wetland and upland), 8.8% prairie and shrub land, 7.5% freshwater marsh, and 5.1% barren and urban lands (Kautz et al. 2006).

Habitat Use--Between 1981 and 2007, more than 80,000 locations on more than 148 VHF radio-collared panthers have been collected. The majority of data from VHF radio-collars have been collected during daytime hours (generally 0700 - 1100) for logistical and safety reasons, even though panthers are most active during crepuscular and night time hours. However, recent developments in Global Positioning System (GPS) radio-collar technology is beginning to provide a more thorough analysis of panther habitat use (Land et al. in press).

Radio-collar data and ground tracking indicate that panthers use the mosaic of habitats available to them. Forested cover types, particularly cypress swamp, pinelands, hardwood swamp, and upland hardwood forests are the habitat types most selected by panthers (Belden 1986, Belden et al. 1988, Maehr 1990a, Maehr et al. 1991a, Maehr 1992, Smith and Bass 1994, Kerkhoff et al.

EXHIBIT 22

2000, Comiskey et al. 2002, Cox et al. 2006). Compositional analyses by Kautz et al. (2006) showed that forest patches comprise an important component of panther habitat in south Florida, and that other natural and disturbed cover types are also present. GPS data has shown that panthers (n = 12) use all habitats contained within their home ranges by selecting for forested habitat types and using all others in proportion to availability (Land et al. in press).

Kautz et al. (2006) found that the smallest class of forest patches (i.e., 9 - 26 ac [3.6 - 10.4 ha]) were the highest ranked forest patch sizes within panther home ranges. The diverse woody flora of forest edges probably provides cover suitable for stalking and ambushing prey (Belden et al. 1988, Cox et al. 2006). Also, dense understory vegetation comprised of saw palmetto provides some of the most important resting and denning cover for panthers (Maehr 1990a). Shindle et al. (2003) found that 73% of panther dens were in palmetto thickets.

Prey Habitat Use--Panther habitat selection is related to prey availability (Janis and Clark 1999, Dees et al. 2001) and, consequently, prey habitat use. Duever et al. (1986) calculated a deer population of 1,760 in BCNP, based on Harlow’s (1959) deer density estimates of 1 / 210 ac (85 ha) in pine forest, 1 / 299 ac (121 ha) in swamps, 1 / 1,280 ac (518 ha) in prairie, 1 / 250 ac (101 ha) in marshes, and 1 / 111 ac (45 ha) in hammocks. Schortemeyer et al. (1991) estimated deer densities at 1 / 49 - 247 ac (20 - 100 ha) in three management units of BCNP based on track counts and aerial surveys. Labisky et al. (1995) reported 1 / 49 ac (20 ha) in southeastern BCNP. Using track counts alone, McCown (1994) estimated 1 / 183 - 225 ac (74 - 91 ha) on the FPNWR and 1 / 133 - 200 ac (54 - 81 ha) in the FSPSP.

EXHIBIT 22

Hardwood hammocks and other forest cover types are important habitat for white-tailed deer and other panther prey (Harlow and Jones 1965, Belden et al. 1988, Maehr 1990a, Maehr et al. 1991a, Maehr 1992, Comiskey et al. 1994, Dees et al. 2001). Periodic understory brushfires (Dees et al. 2001) as well as increased amounts of edge (Miller 1993) may enhance deer use of hardwood hammocks, pine, and other forest cover types. Open marshes, dry-prairie/grasslands, and other vegetation types can also support high deer densities. However, the importance of these habitat types to panthers is dependent upon the availability of stalking and ambush cover.

Travel and Dispersal Corridors--In the absence of direct field observations / measurements, Harrison (1992) suggested that landscape corridors for wide-ranging predators should be half the width of an average home range size. Following Harrison's (1992) suggestion, corridor widths for Florida panthers would range 6.1 - 10.9 mi (9.8 - 17.6 km) depending on whether the target animal was an adult female or a transient male. Beier (1995) suggested that corridor widths for transient male puma in California could be as small as 30% of the average home range size of an adult. For Florida panthers, this would translate to a corridor width of 5.5 mi (8.8 km). Without supporting empirical evidence, Noss (1992) suggests that regional corridors connecting larger hubs of habitat should be at least 1.0 mi (1.6 km) wide. Beier (1995) makes specific recommendations for very narrow corridor widths based on short corridor lengths in a California setting of wild lands completely surrounded by urban areas; he recommended that corridors with a length less than 0.5 mi (0.8 km) should be more than 328 ft (100 m) wide, and corridors extending 0.6 - 4 mi (1 - 7 km) should be more than 1,312 ft (400 m) wide. The Dispersal Zone encompasses 44 mi^2 (113 km^2) with a mean width of 3.4 mi (5.4 km). Although it is not

EXHIBIT 22

adequate to support even one panther, the Dispersal Zone is strategically located and expected to function as a critical landscape linkage to south-central Florida (Kautz et al. 2006). Transient male panthers currently utilize this zone as they disperse northward into south-central Florida. Within south-central Florida, corridors have been identified to connect potential panther habitat patches (Thatcher et al. 2006a).

G. Habitat and Prey Management

Land management agencies in south Florida are implementing fire programs that attempt to mimic a natural fire regime through the suppression of human-caused wildfires and the application of prescribed natural fires. Periodic understory brushfires (Dees et al. 2001) as well as increased amounts of edge (Miller 1993) may enhance deer use of hardwood hammocks, pine, and other forest cover types. However, winter fires may increase the probability of endangering neonates (Land 1994).

Eight public land areas within the Primary Zone are managed by five Federal or State agencies and one non-governmental organization (NGO). The annual prescribed fire goals of these public land areas total 166 mi^2 (430 km^2). Two-to-five year fire rotations and burn compartments less than 10 mi^2 (25 km^2) are recommended to increase habitat heterogeneity (Schortemeyer et al. 1991). However, fire prescriptions vary based on fuel conditions, weather conditions, and historic fire frequency. Compartment size will vary based on site conditions, including the use of existing fire breaks or reluctance to establish new fire breaks that would reduce native habitats, fragment native habitats, and serve as vectors for the spread of invasive plants. For example, FPNWR, the only area managed specifically for panthers, uses existing swamp buggy trails and highways as burn compartment boundaries. FPNWR is divided into 54 burn compartments that range in size from 0.47 – 1.72 mi^2 (1.22 – 4.45 km^2). A range of 8 - 12 mi^2 (20 - 32 km^2) is burned annually depending on weather conditions. The fire program at BCNP averages 47 - 62 mi^2 (121 - 162 km^2) burned annually (4 - 5% of the total area) as many habitats are adapted to long fire intervals.

Chemical, biological, and mechanical control of invasive plants is also conducted to maintain and restore native habitat types. Invasive non-native vegetation has the capacity to replace native plant communities and drastically change the landscape both visually and ecologically. The invasive plants of most concern in south Florida are melaleuca (*Melaleuca quinquenervia*), Brazilian pepper (*Schinus terebinthifolius*), old-world climbing fern (*Lygodium microphyllum*), cogongrass (*Imperata cylindrica*), and downy rose-myrtle (*Rhodomytrus tomentosus*). The effect of invasive plants on panther habitat utilization is unknown. However these species may reduce the panther's prey base by disrupting natural processes such as water flow and fire and by significantly reducing available forage. All public lands in south Florida have active invasive plant treatment programs. As of 2002, over 243 mi^2 (630 km^2) of invasive plants had been treated, with an estimated 579 mi^2 (1,500 km^2) yet untreated. No studies have been conducted to determine the effects of invasive plant management on panthers.

Management for panther prey consists of a variety of approaches such as habitat management and regulation of hunting and off-road vehicle (ORV) use. Prey management has been accomplished by regulating harvest using a variety of strategies. ENP, FSPSP, and FPNWR are closed to hunting. Corkscrew Regional Ecosystem Watershed, PSSF, OSSF, and BCNP allow

EXHIBIT 22

hunting. Only BCNP allows ORV use by hunters. It also has the longest deer and hog hunting season (95 days), whereas the other three areas allow hunting for 35 days or less annually. A combination of hunter and vehicle use quotas, restrictions on hunting methods, and harvest limits are used in BCNP to regulate impacts on the panthers' prey base. Over the past 25 years, the annual deer and hog harvest reported at check stations has averaged 210 and 127, respectively, representing a sample of deer and hogs actually harvested. Hunter pressure during that time period has averaged 15,809 "hunter-days" annually (Adams and Bozzo 2002).

H. Response to Management Activities

Few studies have examined the response of panthers to various land / habitat management activities. Dees et al. (2001) investigated panther habitat use in response to prescribed fire and found that panther use of pine habitats was greatest for the first year after the area had been burned and declined thereafter. Prescribed burning is believed to be important to panthers because prey species (e.g., deer and hogs) are attracted to burned habitats to take advantage of changes in vegetation structure and composition, including exploiting hard mast that is exposed and increased quality or quantity of forage (Dees et al. 2001). Responses of puma to logging activities (Van Dyke et al. 1986b) indicate that they generally avoid areas within their home range with intensification of disturbance.

There is the potential for disturbance to panthers from recreational uses on public lands. Maehr (1990a) reported that indirect human disturbance of panthers may include activities associated with hunting and that panther use of Bear Island (part of BCNP) is significantly less during the hunting season. Schortemeyer et al. (1991) examined the effects of deer hunting on panthers at

EXHIBIT 22

BCNP between 1983 and 1990. They concluded that, based on telemetry data, panthers may be altering their use patterns as a result of hunting.

Janis and Clark (2002) compared the behavior of panthers before, during, and after the recreational deer and hog hunting season (October through December) on areas open (BCNP) and closed (FPNWR, FSPSP) to hunting. Variables examined were: (1) activity rates, (2) movement rates, (3) predation success, (4) home range size, (5) home range shifts, (6) proximity to ORV trails, (7) use of areas with concentrated human activity, and (8) habitat selection. Responses to hunting for variables most directly related to panther energy intake or expenditure (i.e., activity rates, movement rates, predation success of females) were not detected. However, panthers reduced their use of Bear Island, an area of concentrated human activity, and were found farther from ORV trails during the hunting season, indicative of a reaction to human disturbance. Whereas the reaction to trails was probably minor and could be related to prey behavior, decreased use of Bear Island most likely reflects a direct reaction to human activity and resulted in increased use of adjacent private lands.

I. Reasons for Listing / Threats Assessment

The Florida panther was listed as endangered throughout its range in 1967 (32 FR 4001), pursuant to the Endangered Species Preservation Act, and received Federal protection under the passage of the ESA in 1973. The 1967 document did not address the five factor threats analysis. However, we address these factors in the summary below.

EXHIBIT 22

Threats Assessment--A detailed threats assessment for the panther was conducted by the Florida Panther Recovery Team using The Nature Conservancy's (TNC) planning approach (TNC 2000) (Appendix B). Using this approach, the stresses (the types of degradation and impairment) for each factor were identified and evaluated in terms of severity and scope; sources of stresses were evaluated in terms of contribution and irreversibility. Separate analyses were conducted for the panther population in south Florida and for reintroduction in the Southeast.

Factor A: The present or threatened destruction, modification, or curtailment of its habitat or range--The panther's current occupied range is significantly reduced from its historic range from Louisiana and Arkansas east to South Carolina and southward through Florida. The breeding portion of the panther population occurs only in south Florida, less than 5% of its historic range (Figure 1). Because of their wide-ranging movements and extensive spatial requirements, panthers are sensitive to habitat fragmentation (Harris 1984).

Land Use Changes in Southeastern States--Based on the current trends of urbanization across the Southeast, it is likely that forested habitats will continue to be permanently altered, and the amount of available forest habitat will decrease in some areas (Wear and Greis 2002). Compared to earlier periods, land use in the Southeast has been fairly stable since 1945, with the most notable exception of Florida, where developed land uses have expanded substantially (Wear and Greis 2002). Two dominant forces strongly influenced recent land use changes: (1) urbanization driven by population and general economic growth and (2) changing economic returns from agriculture relative to timber production; both of these influences are expected to continue (Wear and Greis 2002). As a result of anticipated population and economic growth, rural land will be

EXHIBIT 22

converted to urban uses. Forecasts of land uses indicate that the Southeast could experience a net loss of from 12,500 - 18,750 mi^2 (32,375 - 48,562 km^2) of forest land (roughly 5 - 8%) between 1992 and 2020 (Wear and Greis 2002).

Potential panther habitat throughout the Southeast continues to be affected by urbanization, residential development, conversion to agriculture, mining and mineral exploration, lack of land use planning, and other sources of stress (Appendix B). With human population growth and increased human disturbance, the extent of potentially suitable habitat remaining in the Southeast is expected to decrease. Habitat loss, fragmentation, degradation, and disturbance from human activity throughout the Southeast are expected to remain among the greatest threats to reintroduced panther populations. As development pressure and population growth continue, the opportunity for panther reintroduction in the Southeast diminishes.

Land Use Changes in Florida--Habitat loss, fragmentation, and degradation, and associated human disturbance are the greatest threats to panther survival and among the greatest threats to its recovery. These threats are expected to continue in Florida and throughout the Southeast. Throughout Florida, between 1936 and 1987, cropland and rangeland increased 6,609 mi^2 (17,118 km^2) or 30%, urban areas increased by 6,172 mi^2 (15,985 km^2) or 538%, while herbaceous wetlands declined by 6,063 mi^2 (15,702 km^2) or 56% and forests declined by 6,719 mi^2 (17,402 km^2) or 21% (Kautz et al. 1993, Kautz 1994). Assuming that all of the forest lost was panther habitat, Kautz (1994) estimated that the 21% loss of forests was the equivalent of 35 - 70 male panther home ranges and 100 - 200 female panther home ranges. Between 1985 – 1989 and 2003 an additional 5,019 mi^2 (13,000 km^2) (13%) of natural and semi-natural lands

EXHIBIT 22

(including panther habitat) in the state were converted to urban / developed and agricultural uses (Kautz et al. 2007).

Continued expansion of urban areas on the coasts and the spread of agricultural and urban development in the interior of Florida continue to replace, degrade, and fragment panther habitat, placing the panther at greater risk. Over 83% of the 2,500 mi^2 (6,475 km^2) of agricultural land in southwest Florida has been categorized as rangeland. In southwest Florida between 1986 and 1990, row crop acreage increased by 14 mi^2 (36 km^2) or 21%; sugarcane increased by 25 mi^2 (65 km^2) or 21%; citrus increased by 84 mi^2 (219 km^2) or 75%; and rangeland, much of it suitable for panther occupation, decreased by 250 mi^2 (647 km^2) or 10% (Townsend 1991). Rangeland losses were about evenly divided between agricultural and urban development (Townsend 1991).

The extent of land use conversions for southwest Florida (Collier, Lee, Hendry, Charlotte, and Glades Counties) between 1986 and 1996 was estimated using a change detection analysis performed by Beth Stys (FWC, unpublished data). The area of disturbed lands increased 31% in these five counties between 1986 and 1996, with the greatest increases in disturbed lands occurring in Hendry and Glades Counties. Most (66%) of the land use change over the 10-year period was due to conversion to agricultural uses. Forest cover types accounted for 42% of land use conversions, dry prairies accounted for 37%, freshwater marsh accounted for 9%, and shrub and brush lands accounted for 8%. Randy Kautz (FWC, pers. comm. 2003) estimated panther habitat loss to be 0.8% per year between 1986 and 1996 using a composite of three different methodologies. These included: (1) review of U.S. Forest Service forest data between 1936 and 1995 using loss of forest as an index of the rate of panther habitat loss, (2) analysis to detect

EXHIBIT 22

changes in land cover in five south Florida counties (Charlotte, Collier, Glades, Hendry, Lee) between 1986 and 1996 using classified Landsat imagery, and (3) using the Cox et al. (1994) panther habitat model, and based on 1986 Landsat data, 1996 Landsat landcover data was overlaid and then areas originally mapped as panther habitat and subsequently converted to other uses over the 10-year period were tabulated. Randy Kautz (Breedlove, Dennis, and Associates, pers. comm. 2005) believes the estimated annual habitat loss since 1996 may be 2 to 3 times higher than that calculated for the previous period.

More recently, Stys calculated the extent of semi-natural and natural lands that have been converted to agricultural and urban / developed in Florida between 1985 - 1989 and 2003 (B. Stys, FWC, pers. comm. 2005). Based upon this analysis, approximately 570 mi^2 (1,476 km^2) of natural and semi-natural lands in Glades, Hendry, Lee, Collier, Broward, Monroe, and Miami-Dade Counties were converted during this time period (FWC, unpublished data). Of these, approximately 340 mi^2 (880 km^2) were conversions to agricultural uses and 230 mi^2 (596 km^2) to urban uses.

Rapid development in southwest Florida has compromised the ability of landscapes to support a self-sustaining panther population (Maehr 1990b, 1992). Maehr (1990b) reported that there were approximately 3,401 mi^2 (8,810 km^2) of occupied panther range in south Florida and that approximately 50% is comprised of landscapes under private ownership. In 2005, Kautz found that approximately 22% of the land in the Primary Zone, 60% of the land in the Secondary Zone, and 100% of the land in the Dispersal Zone is in private ownership (R. Kautz, pers. comm. 2005). Maehr (1990b) indicated that development of private lands may limit panther habitat to

EXHIBIT 22

landscapes under public stewardship. Given the panther's reliance on public land, the rising cost of land is an impediment to habitat protection and therefore panther recovery.

Highways in wildlife habitat are known to result in loss and fragmentation of habitat, traffic related mortality, and avoidance of associated human development. As a result, small populations may become isolated, subjecting them to demographic and stochastic factors that reduce their chances for survival and recovery. Two-lane 108 ft (33 m) and four-lane 328 ft (100 m) cleared rights-of-way, respectively, occupy 2.0 and 6.2% of each 640 ac (259 ha) of land through which they pass (Ruediger 1998). Highways can also stimulate land development as far away as 2 mi (3.2 km) on either side (Wolf 1981). Thus, for each 1 mi (1.6 km) a highway is extended, 2,500 ac (1,012 ha) are potentially opened to new development (Wolf 1981).

Belden and Hagedorn (1993) observed that Texas pumas introduced into northern Florida established home ranges in an area with one-half the road density of the region in general, and tended to avoid crossing heavily traveled roads. Female Florida panthers rarely establish home ranges in areas bisected by highways (Maehr 1997b). Because home ranges of resident males typically encompass the ranges of multiple female panthers, males are less likely than females to find sufficiently large areas devoid of major roads. Males tend to cross highways more frequently than females and suffer more vehicle-related injuries and mortalities (see Factor E).

In addition to a direct loss and fragmentation of habitat, constructing new and expanding existing highways may increase traffic volume and impede panther movement within and between frequently used habitat blocks throughout the landscape (Swanson et al. 2005). Increases in

EXHIBIT 22

traffic volume, increasing size of highways (lanes), and habitat alterations adjacent to key road segments may limit the panther's ability to cross highways and may ultimately isolate some areas of panther habitat (Swanson et al. 2005).

Past land use activity, hydrologic alterations, and lack of fire management (Dees et al. 1999) have also affected the quality and quantity of panther habitat. The effect of invasive plants on panther habitat utilization is unknown. As the remaining forested uplands are lost, sloughs containing cypress, marsh, and shrub wetlands comprise a greater percentage of the remaining habitat available relative to habitat historically available to panthers.

Human Population Growth--Insight can be gained into expected rates of habitat loss in the future by reviewing human population growth projections for the south Florida region. Smith and Nogle (2001) developed low, medium, and high population growth projections for all Florida counties from 2000 through 2030. Using their medium projections, which they believe provide the most accurate forecasts, Smith and Nogle (2001) estimate that the human population of the 10 counties in south Florida will increase from 6.09 to 9.52 million residents by 2030, an increase of 56%.

Human population in the southeastern U.S. has increased 10-fold since 1850, expanding from 4.7 million to over 48 million in 2000 (Swanson et al. 2005). In Florida, the population increased from 87,000 to over 17 million (Swanson et al. 2005, U.S. Census Bureau 2004). From 1990 - 2004, the population in Collier County increased from 152,099 to 296,678 (U.S. Census Bureau 2002, 2004). During the same time period, the population in Lee County increased from 335,113 to 514,295 (U.S. Census Bureau 2002, 2004). The population of southwest Florida, particularly Collier and Lee Counties, is projected to increase 21% by 2010 (Swanson et al. 2005).

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes—There are no commercial or recreational uses of panthers. In rare cases where a panther is unable to survive in the wild, it may be captured and used for conservation education purposes. Panthers are routinely captured and monitored for scientific purposes. Risks are associated with capture and monitoring, but the overall threat to the panther is considered low (Appendix B). Capturing and radiocollaring panthers and handling neonate kittens at dens may result in unintentional take relative to three factors.

First, mortality or injury may result from the capture event because of capture-induced trauma or an adverse reaction to immobilizing chemicals. Routine capture activities include the use of trained hounds to pursue and tree panthers and the subsequent anesthetization with remotely-injected immobilizing drugs. These activities may result in hyperthermia, hypothermia, dog bite wounds, drowning, fractures, lacerations, seizures, head and spinal trauma, penetration of the abdomen or thorax with dart, vomiting, aspiration, pneumothorax, respiratory depression or arrest, shock, cardiac arrest, or complications associated with treatment of the above conditions. However, the incidence of these injuries, especially serious injuries and mortalities, has been low over the last 25 years of panther capture work in part because of stringent capture and handling protocols developed and implemented by FWC, NPS, and FWS. Since 1981, the FWC has captured and immobilized 133 panthers over 296 times with only one fatality, two panthers

EXHIBIT 22

suffering broken legs that resulted in their temporary removal to captivity for rehabilitation and the successful return to the wild, and the holding of one other panther for 24 hours to treat an injury involving a needle embedded in bone (D. Land, FWC, pers. comm. 2004). NPS staff in BCNP have been capturing adult panthers and handling kittens at dens since 2003. Between 2003 and 2005, the NPS handled 19 adult or dependent juvenile panthers with no injury or mortality (Jansen et al. 2005).

Second, capture and handling events can result in abandonment of kittens, other disruptions of family structure, or injury to a kitten that requires its removal from the wild for rehabilitation. Further, the injury or death of an adult female with dependent-aged kittens (those less than 1 year of age) could result in the death of the kittens or the need to raise them in captivity. Neonate kittens are handled at den sites when the kittens are older than 2 weeks of age and when the mother is not present. These activities do not require anesthesia of the kittens. Handling activities could result in injury or death to the kitten or the abandonment of one or more of the kittens. From 1986 - 2004, the FWC has captured and radiocollared 59 dependent-aged kittens ranging in age from 4 - 18 months (D. Land, pers. comm. 2004). These captures resulted in the abandonment of two kittens. One was subsequently reared in captivity and released. The other died of an infection in captivity shortly after its capture. Early break-up of family groups may have occurred on a few other occasions. For this reason, dependent-aged kittens less than one year are no longer captured. Between 1992 and 2005, FWS and NPS handled 195 kittens at 82 dens with no injury, mortality, or den abandonment (Jansen et al. 2005, Lotz et al. 2005).

EXHIBIT 22

Third, the loss of contact with or access to young radio-collared panthers whose collars need to be resized to accommodate growth may result in the collar becoming embedded in the panther's neck. If the panther cannot be recaptured to remove (e.g., if a radiocollar prematurely fails) or resize the collar, infection and eventual death could occur. In September 2001, the FWC and NPS began fitting young panthers with break-away radiocollars. This change in protocol has greatly reduced the risks associated with radiocollaring young panthers (D. Land, pers. comm. 2004).

If stringent capture and handling protocols continue to be followed and refined, injury levels are expected to remain low and are not expected to significantly affect important demographic parameters at the population level, including mortality and reproductive rates or recruitment of juveniles. Handling panthers is important for research, management, and monitoring of the population, and overall the risks are low.

Factor C: Disease or Predation--The Florida panther is susceptible to a number of infectious diseases and parasites some of which are of population significance while others are important only to the individual. Some diseases have not been diagnosed in panthers but remain a potential threat. As a single contiguous population, there is potential for an infectious disease to have a catastrophic impact on the panther.

Although FeLV is common in domestic cats, it is quite rare in non-domestic felids. The recent outbreak of this disease in the panther population shows the potential of this disease to be of population significance. Another viral disease potentially of population significance is PRV. PRV causes respiratory and reproductive disorders in adult hogs and mortality in neonates, but is

EXHIBIT 22

a rapidly fatal neurologic disease in carnivores. Approximately 35% of feral hogs are seropositive for PRV in Florida (van der Leek et al. 1993). The virus is actively shed by only a small percentage of infected hogs at any given time; however, stress can increase the percentage that shed the virus (Murphy et al. 1999). Feral hogs are an important prey species for panthers (Maehr et al. 1990b), and there is potential for significant mortality in panthers due to PRV.

Raccoons are a common prey item for panthers (Maehr et al. 1990b) and are the most important reservoir for rabies in the Southeast (Burridge et al. 1986). As panthers are now vaccinated against rabies at capture, only uncollared panthers are at significant risk.

PLV causes significant mortality in domestic kittens. The virus is also carried by raccoons and is quite stable in the environment. However, kittens are at greatest risk of infection and causes of mortality in this cohort are largely unknown. An epizootic of PLV caused significant mortality among radio-collared bobcats in the late 1970s in south-central Florida (Wassmer et al. 1988), suggesting that the panther population may also be at risk.

Hookworm infections in domestic kittens can cause significant morbidity and mortality resulting from blood loss. The impact of this parasite on panther kittens in the wild is unknown.

Some individual panthers have been shown to be at risk from exposure to mercury in the food chain (Newman et al. 2004). Mercury bioaccumulates through the aquatic food chain reaching high concentrations in higher trophic level carnivores such as raccoons and alligators. Panthers

EXHIBIT 22

preying on these species are at risk for accumulating high tissue mercury concentrations. Neonates may be more susceptible to the toxic effects of mercury (Berglund and Berlin 1969).

Disease and parasites have not been documented to be a major mortality factor in the panther population (Maehr et al. 1991b, Taylor et al. 2002). However, this observation is largely based on the captured and vaccinated sample of the population. Disease expression and mortality events for the unmarked and unvaccinated segment of the population, including kittens, may be higher, especially for those diseases included in the vaccination regimen. Further, as the panther population density increases there is an increased risk of diseases transmitted by direct contact. The FeLV outbreak demonstrated the potential impact of infectious diseases on the population. Should a virulent pathogen enter the population, there is no absolute barrier in south Florida that could prevent such a disease from impacting the entire population (Beier et al. 2003). Consequently, until additional populations of panthers can be established elsewhere in their historic range, infectious diseases and parasites remain a threat. Finally, infectious diseases, parasites, and environmental contaminants, even of low pathogenicity, may work synergistically to reduce panther fitness and reproduction.

Factor D: The Inadequacy of Existing Regulatory Mechanisms--The panther is federally listed as endangered and is on the State endangered lists for Florida, Georgia, Louisiana, and Mississippi. The protection provided by Federal (ESA, Clean Water Act [62 Stat. 1155, as amended; 33 U.S.C. 1251-1376] [CWA], National Environmental Policy Act of 1969 [83 Stat. 852, as amended; 42 U.S.C. 4321-4347] [NEPA], Fish and Wildlife Coordination Act [48 Stat.

EXHIBIT 22

401, as amended; 16 U.S.C. 661 et seq.] [FWCA]) and State (Florida protective provisions specified in Rules 68A-27.0011 and 68A-27.003) laws help conserve the panther and its habitat.

Section 7(a)(2) of the ESA requires that all Federal agencies consult with FWS to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. If a project will not jeopardize the continued existence of a species but may result in incidental take of the species, FWS works with the action agency and any applicants to find ways to minimize the effects of the take. Section 7(a)(1) requires all Federal agencies to utilize their authorities in furtherance of the ESA by carrying out programs for the conservation of listed species. Section 4(a)(3) requires the designation of critical habitat for listed species to the maximum extent prudent and determinable. Section 9 prohibits unlawful acts, including unauthorized take.

As discussed in Factor A, development pressure in southwest Florida has been high; for example, data for Collier, Lee, and Hendry Counties, a stronghold for the panther population, indicate that from 1985 through 2003 more than 223 mi^2 (578 km^2) of natural and semi-natural lands were converted to agriculture (FWC, unpublished data). In addition, more than 145 mi^2 (375 km^2) of semi-natural and natural lands in this three-county area have also been lost to development (FWC, unpublished data) (see Factor A). While not all of these habitat losses and conversions involved panther habitat, many projects involved wetland impacts, requiring permit review by the U.S. Army Corps of Engineers (COE) pursuant to section 404 of the CWA and / or coordination among regulatory agencies pursuant to the FWCA. For projects with a Federal

EXHIBIT 22

nexus, consultation pursuant to section 7 of the ESA was needed for actions that may affect the panther. Through compensation for some of these projects, FWS helped secure conservation of 62 mi^2 (161 km^2) in the Primary, Secondary, and Dispersal Zones from September 2003 to June 2008.

Section 10(a)(1) allows for the issuance of permits for scientific or enhancement of survival purposes, provided that certain terms and conditions are met. Section 10(a)(2) allows for the issuance of permits, provided that the taking will be incidental to an otherwise lawful action, adequately minimized and mitigated, appropriately funded, and will not appreciably reduce the likelihood of survival and recovery of the species in the wild. Through 2007, no Habitat Conservation Plans (HCP) have been finalized under section 10(a)(2) of the ESA and no incidental take permits have been issued for the panther. Section 10, however, provides opportunities for large-scale and regional approaches to panther habitat conservation, and can be a valuable tool at the county or regional level.

Florida Statute 373.414 requires that activities permitted in wetlands and surface waters of the state are not contrary to the public interest. If it is determined that an activity will adversely affect panthers or panther habitat, the governing board (Water Management District [WMD]) or the Florida Department of Environmental Protection (FDEP) can consider measures (e.g., on-site mitigation, off-site mitigation, purchase of credits from mitigation banks) that will mitigate the effects of the regulated activity.

In addition to the impacts of individual projects, the FDEP and WMD shall take into account cumulative impacts on water resources (Section 373.414(8), F.S.). Cumulative impacts can be

EXHIBIT 22

considered unacceptable when they provide unacceptable impacts to functions of wetlands, including the utilization of the wetlands by wildlife species (Sections 4.2.8 through 4.2.8.2 of the South Florida Water Management District Basis of Review). In practice, evaluating cumulative impacts of development in southwest Florida on panthers has not been sufficient to prevent significant loss of panther habitat. Since the majority of panther habitat in southwest Florida has significant wetland components, provisions of 373.414 are usually a part of the review of proposed development. The State wetlands permitting authorities can also assess whether a regulated activity will cause adverse secondary impacts to aquatic or wetland dependent species, such as panthers, including where the site does not have a wetland component (Section 4.2.7 of the South Florida Water Management District Basis of Review).

The FWC may exercise the regulatory and executive powers of the State with respect to wild animals, including panthers. The FWC has responsibility for conserving and managing these species and their habitat; however the FWC does not provide regulatory protection for listed species habitat. The FWC provides comments regarding potential impacts to panther habitat to FDEP and WMDs under the authority of Chapter 20.331 Florida Statutes.

Because of the project-specific focus of regulatory programs, statutorily set processing time frames, and other constraints such as high workloads, local, State, and Federal regulatory agencies sometimes find it difficult to complete the cross-government review that would be ideal to thoroughly review and effectively assess all potential impacts to panthers. In addition, local, State, and Federal agencies sometimes have difficulty monitoring permit compliance and tracking the precise impact on species and habitat from authorized actions, as well as tracking the impact from unauthorized actions. Assessing current baseline conditions and accurately predicting future impacts are also challenging because the panther is a wide-ranging species that uses a wide array of habitat types. Furthermore, baseline conditions for the panther are continually changing (e.g., impacts from development, conservation actions). Rigorous assessments and close coordination and scrutiny of project impacts by local, State, and Federal agencies during the planning phase could help maximize conservation benefits for the panther.

Factor E: Other Natural or Manmade Factors Affecting its Continued Existence--

Mortality, Trauma, and Disturbance--Florida panthers were hunted for bounty during the 1800s and for sport until the 1950s. Nine illegal shootings were documented in south Florida between 1978 and 2005, three of which were not fatal. Education, self-policing among hunters, and regulation are the tools by which shootings are minimized. All free-ranging puma in Florida are treated as Endangered because they closely resemble the Florida panther and are therefore protected by a “similarity of appearance” provision pursuant to the ESA.

Records on documented mortality of uncollared panthers have been kept since February 13, 1972. Records on mortality of radio-collared panthers have been kept since February 10, 1981. Eighty-four radio-collared panthers have died since 1981, and intraspecific aggression was the leading cause, accounting for 42% of these mortalities (Lotz et al. 2005). Unknown causes and collisions with vehicles accounted for 24% and 19% of mortalities, respectively. Other factors (7%), infections (5%), and diseases (4%) caused the remaining mortalities (Land et al. 2004).

EXHIBIT 22

One-hundred fifty-three panther mortalities were documented from February 1972 through June 2004, with at least 58 (41%) of known deaths occurring in the last four-year period (Land et al. 2004). Overall, documented mortality (n = 105) of radiocollared and uncollared panthers averaged 3.4 per year through June 2001. However, from July 2001 through June 2004, documented mortality (n = 48) increased with an average of 16.0 per year (Land et al. 2004). This increase in panther mortality (e.g., intraspecific aggression, collisions with vehicles) corresponds with increases in the panther population observed in recent years.

From February 1972 through June 2004, 36 documented panther mortalities were the result of intraspecific aggression (Land et al. 2004). Although most of these encounters are male-male, from July 2001 through June 2004, at least nine females were killed in encounters with males (Land et al. 2004). Defense of kittens and / or a kill is suspected in five of these instances that occurred through 2003 (Shindle et al. 2003).

From February 1972 through June 2004, 27 documented panther mortalities were from unknown causes (Land et al. 2004). While a couple of deaths from unknown causes occur each year, five deaths occurred in various areas in 2000 and six deaths occurred in Seminole game and safari pens in 2003 (Land et al. 2004).

Eighty-six panther-vehicle collisions were documented between 1972 and 2005 of which 80 (52%) resulted in panther deaths (Lotz et al. 2005). Panther-vehicle collisions were identified as the third most important source of mortality among radiocollared panthers (19%) (Land et al. 2004). Fifty-six percent (48) of panther-vehicle collisions have occurred since 2000 with all but

EXHIBIT 22

two being fatal to the panther (Lotz et al. 2005). Approximately 53% of documented panther-vehicle collisions have occurred within the Primary Zone through 2004 (Swanson et al. 2005). Panther-vehicle collisions are a significant source of mortality and pose an on-going threat. In addition, new and existing roads, expansion of highways, and increases in traffic volume and speed contribute to loss of panther habitat and impede movement within and between high use habitat blocks throughout the landscape (Swanson et al. 2005) (see Factor A). New and expanded highways could to increase the threat of panther mortality and injuries due to collisions if they are not accompanied by adequate fencing and crossings.

Wildlife crossings and continuous fencing were required during the conversion of two-lane SR 84 (Alligator Alley) into four-lane I-75. Until August 12, 2007, no panther mortalities had been documented in these protected areas since completion of I-75 in 1992. Similarly, six wildlife crossings and some fencing were required along SR 29 as a prerequisite to the SR 29 / I-75 interchange. All six of these crossings are now complete; however panther-vehicle collisions occur both where the fencing ends and when panthers enter the fenced area and become trapped. In addition, two crossings were required on County Road 858 (Oil Well Road) to offset projected traffic increases from development. In the absence of crossings and fencing, the remaining stretches of SR 29 and I-75 as well as several other roads continue to pose a serious mortality risk to panthers, including U.S. 41 (Tamiami Trail), SR 82, and County Roads 850 (Corkscrew Road), 858, 846 (Immokalee Road), 832, and 833. Through May 2007, 85 of 107 mortalities or injuries from panther-vehicle collisions occurred along these unsecured roads (Swanson et al. 2005, FWC unpublished data).

EXHIBIT 22

Florida's human population has been steadily growing and as a result, urban / suburban areas now interface with panther habitat. Extensive developments planned in Collier County, such as the Ave Maria University and associated town, will expand local road networks and extend the human / panther interface into primary panther habitat (Swanson et al. 2005).

In recent years, there has been an increase in human-panther interactions and hobby livestock depredations that have resulted in management responses. For example, in 2004, aversive conditioning was used on panthers observed near areas of human habitation in the Pinecrest area within BCNP, and a juvenile dependent male panther was subsequently relocated to OSSF. If human-panther interactions and livestock depredations increase, the potential for complaints from the public and, in some cases, the need for subsequent management responses could result in take of panthers in the form of harassment through aversive conditioning in an attempt to teach individuals to avoid humans. However, if the panther's location presents a possible threat to public safety (e.g., a dispersing male panther wanders into an urban neighborhood and can not find its way out) or there is a threat to the survival of the panther (e.g., a panther wanders into an area that contains numerous physical hazards), depending on specific circumstances, the panther may be captured and relocated, or removed to an approved captive facility. If a panther's behavior indicates a threat to human safety, it will be permanently removed from the wild. In extreme circumstances, euthanasia may be necessary. Currently, the FWS, FWC, and NPS are working on a document titled *Interagency Florida Panther Response Plan*. This plan will provide guidance on methods for minimizing the potential for human-panther interactions and help ensure consistency in use of potential management responses.

EXHIBIT 22

There is the potential for disturbance to panthers from recreational uses on public lands. Maehr (1990a) and Schortemeyer et al. (1991) reported that panthers may be altering their use patterns as a result of hunting. Janis and Clark (2002) compared the behavior of panthers before, during, and after the recreational deer and hog hunting season on areas open and closed to hunting. Responses to hunting for variables most directly related to panther energy intake or expenditure were not detected (Janis and Clark 2002). However, panthers reduced their use of an area of concentrated human activity, and were found farther from ORV trails during the hunting season, indicative of a reaction to human disturbance (Janis and Clark 2002). Whereas the reaction to ORVs was probably minor and could indirectly be related to prey behavior, decreased panther use of high human activity areas and increased use of adjacent private lands most likely reflects a direct reaction. Additional habitat loss on those private lands could exacerbate the negative consequences of this pattern of use (Janis and Clark 2002).

Loss of Genetic Diversity--Natural genetic exchange with other panther populations ceased when the Florida panther became geographically isolated over a century ago (Seal 1994a). Isolation, habitat loss, reduced population size, and associated inbreeding resulted in loss of genetic variability and diminished health. Data on polymorphism and heterozygosity, along with records of multiple physiological abnormalities, suggest that the panther population has experienced inbreeding depression (Roelke et al. 1993a, Barone et al. 1994). Measured heterozygosity levels indicate that the Florida panther had lost about 60 - 90% of its genetic diversity (Culver et al. 2000). Genetic problems in the Florida panther included heart murmurs, a high rate of unilateral cryptorchidism, low testicular and semen volumes, diminished sperm motility, and a high percentage of morphologically abnormal sperm.

EXHIBIT 22

To address these threats, a genetic management program was implemented with the release of Texas pumas into south Florida in 1995 (see Conservation Efforts Section). The results of genetic restoration have been successful as indicated by an increasing population, signs of increased genetic health, recolonization of areas in BCNP and ENP recently unoccupied, and increased dispersal (McBride 2000, 2001, 2002; Maehr et al. 2002a). To date, neither atrial septal defects nor cryptorchidism have been found in introgressed panthers (M. Cunningham, pers. comm. 2005). Semen examination of two introgressed panthers indicated that sperm volume, motility, and count were higher than for an uncrossed Florida panther. A preliminary assessment of genetic restoration suggested that the desired 20% introgression level had been achieved, but the contributions were primarily from two of the released females (Land and Lacy 2000). Genetic introgression is also reducing the occurrence of kinked tails and cowlicks in intercross progeny (Land et al. 2004).

Human Dimension--Human intolerance has the potential to be a major challenge to panther recovery. Recently, human-panther interactions have been on the rise in southwest Florida along the interface of urban and wild lands. From December 2003 through June 2007 there was one area of repeated sightings (Pinecrest area within BCNP), two encounters (an unexpected direct meeting between a human and a panther in which the panther displayed a lack of wariness to humans and did not approach, or show signs of curiosity, but retreated), a threat (this was the result of repeated depredations and significant behavioral changes by one panther that was ultimately removed from the wild), and 16 depredations (domestic livestock or pets being attacked or killed by a panther).

EXHIBIT 22

Previous recovery plans have called for the establishment of additional populations within the historic range of the panther (FWS 1981, 1987, 1995). The FWC studied the possibility of establishing additional populations within the historic range (Belden and Hagedorn 1993, Belden and McCown 1996). Between 1988 and 1995, 26 Texas pumas were released near Okefenokee NWR and Osceola National Forest. Study animals, monitored by radiocollars at least three days per week, established large home ranges, killed large prey at expected frequencies, and generally adapted well to their new environment (Belden and McCown 1996). When these studies were terminated, the remaining panthers were captured and removed from the wild.

Experimental releases of Texas pumas indicated that habitat and prey availability in northern Florida and southern Georgia were sufficient to support a panther population (Belden and McCown 1996). However, although there appeared to be support for reintroduction among the general public in Florida, local landowners tended to oppose having panthers on their property. Political and social issues will be the most difficult aspect of panther reintroduction and must be addressed (Belden and Hagedorn 1993, Belden and McCown 1996).

Habitat assessment studies have been conducted to identify potential sites for reintroduction of the panther in the Southeast (Thatcher et al. 2006b). The purpose of these studies was to identify prospective sites for panther reintroduction within the historic range based on quantitative landscape assessments. Nine potential reintroduction sites of sufficient size to support a panther population were identified including: Ozark National Forest region, Ouachita National Forest region, southwest Arkansas, and Felsenthal NWR region in Arkansas; Kisatchie National Forest

EXHIBIT 22

region in Louisiana; Homochitto National Forest region in Mississippi; southwest Alabama; Apalachicola National Forest region in Florida; and Okefenokee NWR region in Georgia (Thatcher et al. 2006b).

Sociopolitical obstacles to large carnivore reintroduction are often more daunting than biological ones (Clark et al. 2002). A lack of public support and tolerance could prevent the reintroduction of panthers anywhere outside of Florida. Public support is critical to reintroduction efforts and attainment of recovery goals.

Contaminants--Because the panther is a top carnivore, bioaccumulation of environmental contaminants remains a concern (Dunbar 1995, Newman et al. 2004), with the threat of mercury toxicity considered medium (see Appendix B). However, mercury in the Everglades ecosystem has decreased over the last several years (Frederick et al. 2002). Other environmental contaminants found in panthers include polychlorinated biphenyls (Aroclor 1260) and organochlorines (Dunbar 1995, Land et al. 2004). Continued monitoring for contaminants, especially mercury and organochlorines, in panthers, their prey, and sentinel species is warranted (see E. Life History / Ecology).

Prey availability--The size, distribution, and abundance of available prey species are critical factors to the persistence of panthers in south Florida and often determine the extent of panther use of an area. A resident adult male puma generally consumes one deer-sized prey every 8 - 11 days; this frequency is 14 - 17 days for a resident female; and 3.3 days for a female with three 13-month-old kittens (Ackerman et al. 1986).

EXHIBIT 22

Historically, hunting in the Big Cypress physiographic region has been a major traditional activity with many hunt camps throughout the region. With establishment of national and state parks, the numbers of hunt camps were decreased and additional hunting regulations that reduced hunting pressure on deer were implemented. Although deer densities are difficult to determine, the deer population appears to have steadily increased.

Using aerial surveys, Schemnitz (1974) estimated the deer population in the 3,438 mi^2 (8,903 km^2) area south of the Caloosahatchee River and Lake Okeechobee at 20,000 in 1972, and stated that the deer population had decreased in the Water Conservation Areas (WCA) due to deeper water levels and submersion of tree islands. Fleming et al. (1994) compared deer density estimates in WCA 2 and 3 in the 1950s with those from 1985 - 1988 and found a 67% reduction in the deer herd. They surmised that this reduction was due to habitat degradation from impoundment and associated water management. ENP and portions of the WCAs are within the Primary Zone. Smith and Bass (1994), however, stated that fire and water, which drive the Everglades system, appear to have little effect on the long-term dynamics of the ENP deer population.

Few studies have been done on the hog component of the panthers' prey base (e.g., Maehr et al 1989b). However, the mean checked hog harvest of 29 in BCNP for 2003 - 2005 has fallen well below the previous 22-year average of 144, probably due to a combination of factors, including high water events and predation by panthers (D. Jansen, pers. comm. 2005).

EXHIBIT 22

Although the exact status of prey in different portions of the panther's occupied range is not known at this time, assessment of overall panther health and their success in raising young indicate that the prey base is adequate to support the current panther population. Adequate prey elsewhere within the historic range would be needed to establish populations in other areas.

J. Past and Current Conservation Efforts

Habitat Conservation and Protection--Habitat protection has been identified as being one of the most important elements to achieving panther recovery. While substantial efforts have been made to secure a sufficient habitat base (Figure 4), continued action is needed to obtain additions to and inholdings for public lands, assure linkages are maintained, restore degraded and fragmented habitat, and obtain the support of private landowners for maintaining property in a manner that is compatible with panther use. Conservation lands used by panthers are held and managed by a variety of entities including FWS, NPS, Seminole Tribe of Florida, Miccosukee Tribe of Indians of Florida, FWC, FDEP, Florida Division of Forestry (FDOF), WMDs, NGOs, counties, and private landowners.

Public Lands--Public lands in south Florida that benefit the panther are listed below and shown in Figure 4:

- In 1947, ENP was established with 2,356 mi^2 (6,102 km^2) and in 1989 was expanded with the addition of 163 mi^2 (421 km^2).
- In 1974, Congress approved the purchase and formation of BCNP, protecting 891 mi^2 (2,307 km^2); later 228 mi^2 (591 km^2) were added.

EXHIBIT 22

- In 1974, the State of Florida began acquiring land for the FSPSP, which encompasses over 125 mi^2 (324 km^2). Efforts are underway to acquire approximately 26 mi^2 (68 km^2).
- In 1985, acquisition of PSSF and Wildlife Management Area (WMA) began with the complex Golden Gate Estates subdivision buyouts and now comprises over 119 mi^2 (308 km^2). The Southern Golden Gate Estates buyout through State and Federal funds is complete. The South Belle Meade portion of Picayune Strand is about 90% purchased and although the State is no longer purchasing in South Belle Meade, Collier County's Transfer of Development Rights program is helping to secure the inholdings.
- In 1989, FWS' FPNWR was established and now protects 41 mi^2 (107 km^2).
- In 1989, the Corkscrew Regional Ecosystem Watershed Land and Water Trust, a public / private partnership, was established and to date has coordinated the purchase of 42 mi^2 (109 km^2).
- In 1996, the South Florida WMD, purchased the 50 mi^2 (130 km^2) OSSF.
- In 2002 Spirit of the Wild WMA, consisting of over 11 mi^2 (28 km^2), was taken into public ownership by the State of Florida and is managed by FDOF.
- In 2003, Dinner Island Ranch WMA consisting of 34 mi^2 (88 km^2) in southern Hendry County was taken into public ownership by the State of Florida and is managed by FWC.

Tribal Lands--Lands of the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida encompass over 547 mi^2 (1,416 km^2) in south Florida. Of these, 181 mi^2 (469 km^2) are used by panthers, and comprise 5% of the Primary Zone (R. Kautz, pers. comm. 2005). These lands are not specifically managed for the panther and are largely in cultivation.

EXHIBIT 22

Private Lands--A variety of Federal, State, and private incentives programs are available to assist private landowners and other individuals to protect and manage wildlife habitat. Voluntary agreements, estate planning, conservation easements, land exchanges, and mitigation banks are methods that hold untapped potential for conserving private lands. In 1954, the National Audubon Society established the nearly 17 mi^2 (45 km^2) Corkscrew Swamp Sanctuary. However, little additional private land has been protected south of the Caloosahatchee River for panther conservation. A number of properties identified by the State Acquisition and Restoration Council (ARC) for purchase by the Florida Forever Program are used by panthers (e.g., Devil’s Garden, Half Circle F Ranch, Pal Mal, Panther Glades). North of the Caloosahatchee River, Fisheating Creek Conservation Easement, 65 mi^2 (168 km^2) in Glades County is a private holding used by panthers.

Habitat Protection Plans--

The Florida Panther Habitat Preservation Plan, South Florida Population--Released in 1993 by the Florida Panther Interagency Committee (Logan et al. 1993) and drafted to guide habitat acquisition, this document contains useful baseline information about lands that constitute important panther habitat.

FWS MSRP--Released by the FWS in 1999, the panther portion of the MSRP outlines how south Florida contributes to the rangewide recovery objective, but does not replace the approved 1995 recovery plan for the panther. While it provides a comprehensive, general overview of panther biology in south Florida, parts that have become outdated will be replaced by this recovery plan.

EXHIBIT 22

<u>Florida Panther Subteam</u>-- The FWS created MERIT to assist with implementation of the MSRP after it was signed in 1999. In 2000, the FWS formed the Florida Panther Subteam of MERIT to develop a landscape level conservation strategy for the panther in south Florida that could be applied in the planning and regulatory context. The Subteam produced a draft report, "Landscape Conservation Strategy for the Florida Panther in South Florida" (Landscape Conservation Strategy) in December 2002. The document includes a panther habitat map of Primary, Secondary, and Dispersal Zones, and outlines recommendations for protection of these areas. Some portions of the science and findings in the Landscape Conservation Strategy have been challenged. As of 2005, the FWS no longer distributes the document as a result of a Data Quality Act (Section 515 of Public Law 106-554) challenge. Many of the Panther Subteam members refined the methodology, further analyzed the data, better defined, and published the results of the Landscape Conservation Strategy (Kautz et al. 2006).

Regulatory Tools--

<u>COE Panther Key</u>--In 2000, FWS issued to the COE its final interim Standard Local Operating Procedures for Endangered Species (SLOPES) for conducting consultations between the FWS and the COE for permit applications that may affect panthers. The COE and FWS also co-developed a number of conservation measures that may, where appropriate and on a case-by-case basis, be incorporated into project designs to facilitate compliance with the requirements of the ESA. The COE and FWS revised the key in 2007. The COE and FWS plan to revise the SLOPES and other related documentation as needed and appropriate to incorporate new science developed in the future to conserve the panther.

EXHIBIT 22

FWS Panther Habitat Methodology--In 2002, FWS developed a draft Panther Habitat Assessment methodology to help guide the agency in evaluating permit applications for projects that could affect panthers and their habitat. This draft methodology was a way to assess the level of impacts to panthers expected from a given project, and to evaluate the effect of any proposed compensation offered by the project applicant. The draft methodology evolved over time to incorporate new information, and will continue to evolve in the future as new information is attained. FWS did not finalize an assessment methodology document but instead describes the methodology used to evaluate each project in detail in biological opinions. The habitat framework serves one important role in broader conservation efforts to maintain a panther population, and is complemented by activities such as fee-title acquisition, easements, and other local, State, and Federal conservation tools. The benefits from each of these conservation tools can be enhanced through coordination. For example, local, State, and Federal land conservation programs could identify and protect areas adjacent to parcels preserved through regulatory review, thereby increasing the size of connected, high-quality habitat for the panther.

Federal and State Project Planning--Under section 7(a)(2) of the ESA, FWS consults with Federal agencies proposing actions that may affect the panther. In addition, FWC provides comments regarding potential impacts to panther habitat to FDEP and WMDs under the authority of Chapter 20.331 Florida Statutes. Many of the impacts from development have been compensated through habitat protection in recent years. Using the evolving panther habitat methodology described above, FWS helped secure 62 mi^2 (161 km^2) in the Primary, Secondary, and Dispersal Zones from September 2003 to June 2008. In addition to habitat conservation, regulatory review allows other important compensation strategies to be considered and implemented. For example, new roads can be configured to direct traffic away from panther habitat. In addition, to help offset impacts from increases in traffic within panther habitat, project sponsors can construct crossings that allow panthers to pass safely from one side of a road to another, thereby minimizing the likelihood of vehicular collisions. New advances in science such as FWC's report entitled "Use of Least Cost Pathways to Identify Key Highway Segments for Panther Conservation" (Swanson et al. 2005) help identify optimal locations for crossings by depicting where vehicular collisions have occurred in the past. This allows agencies to set priorities and guide project sponsors to offset their impacts by providing crossings in areas with a history of problems.

FWS Panther Conservation Banks--FWS has initiated a conservation banking program in south Florida to address the impact of habitat loss on the Florida panther. Banks are expected to play a role in filling gaps in the current conservation lands network. By selecting optimum sites among willing participants the banking program provides opportunities to maintain traditional land uses, such as ranching, that are compatible with panther conservation while realizing value from protecting lands from future development.

When a development project has an adverse impact to panther habitat, compensation can be put forward to offset this impact. For small projects, land acquisition and restoration is typically difficult to accomplish, and not economically feasible. In addition, small pieces of compensation tend to fragment the conservation landscape making it of less value to the panther. Conservation banks are assigned a number of credits based on the location in the landscape and the habitat value to the panther. This bank of credit can be drawn upon by projects impacting panther habitat through payment to the banker. There is cost certainty in the banking credit value that

EXHIBIT 22

allows potential development projects to evaluate the cost before making expensive development decisions while directing the compensation toward the best available lands for the panther. By protecting the land in perpetuity and restoring ecological function where feasible, the banks allow consolidation of numerous small impacts into more unified and connected conservation lands that provide to best ecological value to the panther.

Advisory Councils and Committees--

Florida Panther Technical Advisory Council--Chapter 38-172, Laws of Florida, established the Florida Panther Technical Advisory Council in 1983. The Council members represent State and Federal agencies and private and professional resource organizations. The Council serves in an advisory capacity to FWC on technical matters of relevance to the panther program, provides a forum for technical review and discussion of the status and development of the panther program, and provides a communications liaison between the technical agencies and organizations represented on the Council.

Florida Panther Interagency Committee (FPIC)--FWS, FWC, NPS, and FDEP established FPIC in May 1986. The FPIC was comprised of the Executive Directors of FWC and FDEP and the Regional Directors of FWS and NPS. The purpose of FPIC was to provide guidance and coordination on panther research and management activities. A Technical Subcommittee, composed of mid-level administrators, was appointed by FPIC to provide proposals and other information to be acted upon. FPIC and the Technical Subcommittee are no longer active.

Transportation Planning and Improvements--

EXHIBIT 22

Regional, Landscape Level Transportation Plans--Recent least-cost pathways analyses (e.g., Swanson et al. 2005) that identify highway segments crossed by panthers have compiled information that can be used to help avoid and reduce injury and mortality to panthers from collisions with vehicles.

The Florida Department of Transportation (FDOT) is developing a method of early proposal review through the Efficient Transportation Decision Making (ETDM) process that can help assure landscape level protection is addressed, maintain habitat and population connectivity, and protect wildlife and human safety. The State's Strategic Intermodal System Plan and Florida Transportation Plan 2025 focus on mobility and economic development yet include strengthened habitat and wildlife protection provisions. Federal, State, and local agency coordination, as well as public involvement, is needed in regional transportation planning so that expansions, extensions, or new roads; mass transit; and ports minimize fragmentation and degradation of panther habitat.

Reducing Vehicle Mortality--
Wildlife Crossings, Underpasses--FDOT's installation of underpasses and accompanying fencing in 1993 along the section of I-75 (Alligator Alley) successfully eliminated panther-vehicle collisions in that area. Incidents of panther-vehicle collisions have also been minimized in four additional areas where crossings and fencing have been installed on SR 29 (two north and two south of I-75). FDOT completed two additional underpasses along SR 29 in 2007.

EXHIBIT 22

Wildlife crossings increase initial road costs and require permanent conservation designation of the lands on both sides of the structure. However, the burgeoning human population with accompanying increases in personal and commercial vehicles necessitates many more road improvements to reduce the number of panther-vehicle collisions, as well as to help achieve greater human safety.

Reduced Speed Limits--Reduced nighttime speed zones have been in effect along many roads since July 1985 to minimize the likelihood of panther-vehicle collisions, however, compliance is a continuing problem. In addition, panther-vehicle collisions have occurred despite drivers following the legal speed limit. An evaluation of the effectiveness of these zones in reducing such collisions could help determine if further adjustments to the speed limits are warranted.

Research, Monitoring, and Management--

Research and Monitoring--The FWC began research on the panther with the development of a Florida Panther Record Clearinghouse in 1976. This was the first step in identifying whether or not this species existed in Florida and where it occurred. A total of 4,620 observations were reported to the Clearinghouse, but only 91 of these were confirmed to be a panther (Belden et al. 1991). The majority of the confirmations came from Collier, Hendry, and Miami-Dade Counties.

Capture and radio-collaring work by FWC began in 1981 and by NPS in 2001. Monitoring of radio-collared panthers has been done by NPS in ENP and BCNP since 1986 and 1988, respectively. The objectives of research and monitoring have been directed toward understanding the basic biology and habitat needs of the species. This research included movements, home range size and habitat use, morphological descriptions, food habits, mortality causes, and reproduction. Panther prey studies, including population dynamics, deer herd health and reproduction, and deer mortality have also been accomplished.

Concurrent with these studies, genetics work was being conducted by Dr. Stephen O'Brien of the National Cancer Institute, and collaborations with the Conservation Breeding Specialists Group were begun. Consultations with these experts on small population dynamics and inbreeding depression yielded a strategy to manage the panther population via genetic restoration. A genetic restoration plan was written in 1994 (Seal 1994a) and implemented in 1995 with the goal of improving the genetic health of the panther population. From 1995 through 2003, most panther capture and monitoring activities were directed towards evaluating genetic restoration. In addition, the goals of the BCNP research and monitoring work include determining the area’s potential to support panthers, evaluating the effects of restoration projects and management strategies on the panther population within BCNP, and the extent of connectivity with the panthers in ENP.

Capture, handling, and biomedical sample collection by FWC and NPS follow established protocols to ensure safety and thoroughness. Radio-collared panthers are typically monitored by fixed-wing aircraft three times per week to determine location, habitat use, movements, interactions, births, and deaths. Several types of GPS collars are being field-tested by both FWC and NPS in order to obtain data on nocturnal movements and habitat use by panthers (Land et al. in press).

EXHIBIT 22

Since 1990, Florida panther research by FWC has been funded through the Florida Panther Research and Management Trust Fund, which receives its monies from the purchase of Florida panther specialty license plates. Through 2004, nearly 1.4 million panther license plates have been issued, generating nearly $40 million. Eighty-five percent of the proceeds from the extra $25.00 per license plate collected annually go into this trust fund. To obtain the money, FWC must submit a budget request each year to the Florida Legislature for approval. The NPS in ENP and BCNP supports its panther work within its annual budgets or special funding requests.

Captive Breeding--In 1984, John Lukas, Director of Conservation and Curator of Gilman Paper Company’s White Oak Plantation, expressed an interest in breeding Florida panthers in captivity. At the time, a male Florida panther was convalescing at the FWC Wildlife Research Laboratory from injuries sustained when he was hit by a vehicle. These events led to the formalization of a plan to captive-breed panthers with the eventual goal of reestablishing them in unoccupied portions of their historic range.

In May 1985, FWC and Gilman Paper Company signed an agreement to breed panthers in captivity and to make suitable animals available for reintroduction. The captive-breeding facilities were constructed at White Oak in 1985 and 1986. The convalescing male panther was the first animal moved to these facilities. Three wild-caught female Texas pumas were brought to Florida in 1986 to be used as surrogates for Florida panthers.

EXHIBIT 22

The Florida Panther Viability Analysis and Species Survival Plan Workshop held in 1989 further defined the need to establish a captive Florida panther population as security against extinction and for the long-term preservation of the remaining gene pool (Seal and Lacy 1989). Establishment of a captive population with minimal impacts on the wild population and maximum genetic representation included the removal of selected kittens and adults from the wild over a three- to six-year period, not to exceed six kittens and two adults per year. The goal was to achieve a total panther population of 500 breeding adults (combination of all wild and captive populations) to retain 90% of the current genetic diversity for 100 years or longer (Seal and Lacy 1989).

After an extensive environmental review process, FWS determined that removal of these animals from the wild was not a major Federal action significantly affecting the quality of the human environment as defined under provisions of NEPA. However, The Fund for Animals, Inc., and Holly Jensen filed a lawsuit against FWS requesting a court injunction to prevent issuance of the subpermits needed to capture and remove panthers from the wild. An out-of-court settlement reached on February 6, 1991, identified a number of specific elements to be addressed in a Supplemental Environmental Assessment (EA). These elements were to explore and evaluate a genetic enrichment (augmentation) alternative; compare environmental, legal, and regulatory impacts of the proposed action and the genetic enrichment (augmentation) alternative; provide a thorough, expanded analysis on the issue of the feasibility and impact of reintroduction of captive-bred Florida panthers to the wild; and provide a thorough, expanded analysis of the impacts posed to the remaining wild population from the removal of Florida panthers (Jordan 1991).

EXHIBIT 22

Once the Supplemental EA had been developed and subpermits issued, six Florida panther kittens were brought into captivity in the spring of 1991 for use in the captive breeding program. Four additional kittens were removed from the wild in 1992. Two of these were taken to Lowry Park Zoological Garden in Tampa and two to Jacksonville Zoological Gardens. The plan was to pair these panthers for maintaining maximum genetic variability and viability when they matured. However, kitten removal from the wild ceased in 1992. The genetic health of the Florida panther population had deteriorated to a point where continued survival was questionable, even with selective breeding within a captive population, and plans were being formulated for genetic restoration by simulating natural gene flow by introducing animals from western puma populations (Seal 1994b). Therefore, captive breeding was not initiated and the captive animals were maintained for conservation education.

Genetic Restoration--A plan for genetic restoration and management of the panther was developed in September 1994 (Seal 1994a). The level of introgression required to reverse the effects of inbreeding and genetic loss required the release of eight female Texas pumas into areas occupied by Florida panthers (Seal 1994a). These eight female Texas pumas were released in 1995, five of which produced a total of 20 offspring (Land et al. 2004). None of the original eight Texas pumas remain in the population today (Land et al. 2004). A preliminary assessment of genetic restoration suggested that the desired 20% introgression level had been achieved, but the contributions were primarily from two of the released females (Land and Lacy 2000). The genetic restoration program appears to have been successful as determined by increased kitten

EXHIBIT 22

and adult female survival, an increasing population, and an expansion in occupied range (Pimm et al. 2006a).

Reestablishment of panther populations in the southeastern U.S.--

Reintroduction Feasibility Studies in North Florida--FWC conducted two studies, from 1988 - 1989 (Belden and Hagedorn 1993) and from 1993 - 1995 (Belden and McCown 1996), to evaluate feasibility of reintroducing panthers into unoccupied areas of their historic range. The studies also identified the need to address social issues surrounding reintroduction.

In 1988, seven pumas captured in west Texas were released in north Florida as surrogates for evaluating the feasibility of translocating Florida panthers. The pumas included three adult males, three adult females, and one yearling female. They were monitored from 1988 - 1989. The pumas established overlapping home ranges, killed large prey at predicted frequencies, and settled into routine movement and feeding patterns before the hunting season. Three pumas died during the study, the cause of death was unknown for one found floating in the Suwannee River, and shooting was suspected or documented for the other two deaths. Results indicated methods for reducing puma-human interactions, such as placing release pens as far as possible from humans and livestock, which occurred most frequently during the immediate post-release period and during subsequent excursions from home ranges (Belden and Hagedorn 1993). Belden and Hagedorn (1993) recommended additional research on the feasibility of panther translocation with a larger initial stocking rate of 10 - 20 pumas to ensure that a social structure can be established if some of the animals do not survive.

In 1993, 19 pumas were released into north Florida, including 11 females and eight vasectomized males. Six of the pumas were born and raised in captivity, 10 were captured in the wild in western Texas and translocated to Florida, and three were captured in the wild in western Texas and held in captivity in Florida for two to eight years prior to release. The study concluded that reintroduction is biologically feasible, that is, pumas can successfully establish territories and sustain themselves when reintroduced. This study showed that home ranges for females in north Florida were approximately half the size of home ranges for female panthers in south Florida, likely due to more productive habitat in north Florida and southern Georgia (Belden and McCown 1996). The Belden and McCown (1996) study also highlights the need for an effective and comprehensive public education and outreach program that occurs well ahead of releasing panthers into reintroduction sites.

Habitat Assessment to Identify Potential Reintroduction Sites in the Southeastern U.S.--Jordan (1994) evaluated 24 sites in the southeastern U.S. based on biological and anthropogenic criteria and concluded that 14 sites should be evaluated further as potential panther reintroduction sites. These were assessed and ranked based on four criteria (area size, forest area, human population density, road density). Jordan (1994) indicated that additional analyses would be needed.

Thatcher et al. (2006b) identified and ranked nine potential reintroduction sites based on models that utilized three landscape and four human-influence variables on the landscape. These variables included 1) percentage of natural land cover, 2) spatial aggregation of natural land-cover patches, 3) habitat patch density, 4) human population density, 5) minor road density, 6) major road density, and 7) percentage of urban land cover. Thatcher et al. (2006b) recommended

EXHIBIT 22

that the top three sites identified should be considered for further evaluation as potential reintroduction sites. They recommend field surveys of local habitat conditions (e.g., assessment of localized prey densities and the availability of understory vegetation or varied topography for stalking and denning cover) and evaluation of sociopolitical information such as public attitudes towards carnivore reintroduction in the chosen reintroduction sites.

Education and Outreach--

Panther Net Website--A multidisciplinary interactive website (www.panther.state.fl.us) was launched and funded by FWC in 1999 with proceeds of the Florida panther license plate. The site includes information for adults and school children on the natural history of the panther, its habitat, threats to its survival, research, management, and conservation efforts.

Northeast Florida Panther Education Program (Cramer 1995)--From September 1994 to November 1995 during the Florida Panther Reintroduction Feasibility Study, FWC sponsored this program that reached approximately 1,000 northeast Florida residents through a pamphlet, slide presentations, a county fair display, and a telephone survey. Results revealed a large base of support (75%) for reintroduction of panthers into the Osceola National Forest region. Results also identified specific community concerns, and made suggestions for addressing these through education and outreach. The results from the program can be applied to develop an effective communications program to address community concerns well in advance of subsequent reintroduction efforts.

EXHIBIT 22

Statewide Survey (Duda and Young 1995)--FWC sponsored a 1995 statewide attitudinal survey about Florida panthers. The survey revealed that 83% of Floridians surveyed support panther reintroduction efforts.

Public Workshops and Acceptability of Florida Panther Reintroduction--Three years after the 1993 - 1995 Florida Panther Reintroduction Feasibility Study ended, FWC sponsored a series of workshops in 1998 to address *Public Acceptability of Florida Panther Reintroduction* (Taylor and Pederson 1998). The study focused on residents in Columbia County because of their experience with earlier reintroduction feasibility studies. The goal was to engage residents in an exploration of concerns and possible ways to address them. However, while the working group was intended to represent a variety of interests, it consisted mostly of local opposition to reintroduction and consensus was not reached. The results demonstrated the need to engage a wider variety of interests in the process.

Recent Panther Outreach Initiatives--A variety of panther outreach initiatives have been undertaken in recent years to assist residents in southwest Florida learn to live safely and responsibly with the Florida panther and other wildlife. FWS coordinates a panther outreach team that collaborates to produce informational materials and hold outreach events about living and recreating safely in panther habitat. FWS, NPS, and FWC have led “Living with Panther” town hall meetings in communities experiencing human-panther interactions. Many members of the outreach team participated in the construction of predator-proof enclosures for livestock and pets to demonstrate proper husbandry for domestic animals while avoiding attracting predators. In recent years, a number of celebrations, field trips, educational talks, and other events have

EXHIBIT 22

been held each March in southwest Florida to coincide with Save the Florida Panther Day (Florida Statute 683.18 designates the third Saturday of March of each year as “Save the Florida Panther Day.”

Conservation Organizations--A number of conservation organizations are working to conserve and recover the panther through education, outreach, and advocacy. These include Defenders of Wildlife (www.defenders.org, www.biodiversitypartners.org), Florida Panther Society (www.panthersociety.org), Friends of the FPNWR (www.floridapanther.org), National Wildlife Federation (www.nwf.org), its state affiliate the Florida Wildlife Federation (www.fwfonline.org), and The Nature Conservancy (www.natureconservancy.org). Programs encompass public education and awareness initiatives, habitat conservation, transportation and land-use planning, compensation for livestock depredation, landowner incentive initiatives, and projects aimed at fostering human-panther coexistence.

Interagency Florida Panther Response Plan--FWC, FWS, and NPS established a Florida Panther Interagency Response Team in June 2004 to manage human-panther interactions while promoting human safety and assuring the continued existence and recovery of the panther. This team, comprised of panther experts and agency representatives, was tasked with developing a panther response plan to provide guidance for the agencies so that human / panther interactions would be dealt with consistently and quickly while addressing the primary objective of public safety and balancing the needs of recovering an endangered species. Additionally, the plan needed to address public education and outreach concerning panther interactions. The draft plan is being finalized.

EXHIBIT 22

Scientific Reviews--

Analysis of Scientific Literature Related to the Florida Panther and Panther Habitat--In 2002, FWC and FWS commissioned an independent Scientific Review Team (SRT) to complete an analysis of scientific literature related to the panther. Completed in 2003, the SRT report (Beier et al. 2003) found that a quarter-century of research strongly supported many published conclusions, including that forests are important as daytime rest sites of panthers, that white-tailed deer and feral hogs are the most important panther prey, that the most important threats to panther persistence include limited habitat area and continued habitat loss and fragmentation, and that recovery of the panther depends most critically on establishing additional populations outside of south Florida. Beier et al. (2003) also found poorly supported inferences regarding panther use of large forest patches, the quality of habitat in ENP and BCNP, and some vital rates used in inflexible population viability analysis (PVA) software.

Information Quality Act Challenge--The scientific process by design continually advances our collective understanding of the species and its needs for recovery. In 2004, an Information Quality Act challenge identified certain inconsistencies and shortcomings in some panther science. In response, FWS completed a series of tasks to clarify the record and collect, incorporate, and clearly describe new scientific information in its analyses. FWS remains committed to maximizing the quality, objectivity, utility, and integrity of the information it disseminates to the public. Furthermore, FWS welcomes input from colleagues to improve the quality of scientific information and optimize the conservation benefits achieved through the agency’s programs.

EXHIBIT 22

K. Population Viability Analysis

Introduction--

PVA estimates the risk of extinction for a given population over a given time period (Shaffer 1981, Gilpin and Soulé 1986, Beissinger and Westphal 1998). In general, PVA models are relatively simple and rarely reflect the exact dynamics of a real population (Fieberg and Ellner 2000). PVA models are dependent upon quality input data (Doak et al. 1994) and how effectively the model itself reflects the life history of the species being modeled. However, PVA models used in conjunction with genetic and other benchmarks may help determine minimum population sizes (Shaffer 1981, Shaffer and Sampson 1985, Morris and Doak 2002) as well as metapopulation structure necessary to offset habitat fragmentation, catastrophes, and other threats (Pulliam et al. 1992, Hanski 2002).

A population is “viable” when it has the “capacity to maintain itself without significant demographic or genetic manipulation for the foreseeable ecological future—usually centuries—with a certain, agreed on, degree of certitude” (Soulé 1987). Shaffer (1981) first defined the “minimum viable population” for a given species in a given habitat as “the smallest isolated population having a 99% chance of remaining extant for 1000 years despite the foreseeable effects of demographic, environmental and genetic stochasticity and natural catastrophes.” As Shaffer, Soulé, and others note, the choice of both the time horizon and the threshold is in fact arbitrary (Shaffer 1981, Soulé 1987, Boyce 1992, Grimm and Wissel 2004). Nonetheless, a literature review of empirically derived PVAs suggests that thresholds set at a 95 or a 99% chance of persistence (corresponding to a 5 or 1% chance of true extinction) over a 100-year time horizon are often used (Hamilton and Moller 1995, Horino and Miura 2000, Kelly and Durant 2000, Parysow and Tazik 2002, Kohlmann et al. 2005).

Even populations that persist beyond the stipulated time period may experience a reduction in population size or genetic variation rendering such populations vulnerable to inbreeding depression and / or genetic drift in subsequent generations. Thus, to offset declining mean population fitness as a result of inbreeding depression, Franklin (1980) and Soulé (1980) recommended effective population sizes (N_e) of 50 or more individuals, and Soulé et al. (1986) argued for a genetic threshold of no more than a 10% loss of heterozygosity over 200 years. To offset the erosion of genetic variability due to genetic drift, however, Franklin (1980) and Soulé (1980) recommended an effective population size of at least 500 individuals (see also Lande and Barrowclough 1987, Ewens 1990, Franklin and Frankham 1998). Based on empirical observations that detrimental mutations outnumbered beneficial and neutral ones, Lande (1995) argued for even larger effective population sizes on the order of 5,000 (but see Franklin and Frankham 1998). Finally, effective population sizes of between 10,000 and 100,000 may be necessary to maintain particularly beneficial traits (e.g., single-locus disease resistance factors) (Lande and Barrowclough 1987, Lande 1988). These varied estimates highlight the species-specific nature of the question.

The effective population size is substantially lower than the actual population size because of spatial structure, variance in family size, unequal sex ratios, and temporal fluctuations in population size (Wright 1969, Falconer 1989, Frankham 1995, Waples 2002). "However, one fairly well-substantiated generality is that for many birds and mammals $N_e / N \approx$ one-half to two-

EXHIBIT 22

thirds, where N is the total population size of *reproductive adults* (Nunney 1993, Nunney and Elam 1994), arguing for a quasi-extinction threshold of at least 100 breeding adults" (Morris and Doak 2002). As Morris and Doak (2002) note, however, "this approach still basically ignores inbreeding problems and will always result in somewhat optimistic answers about population viability." Furthermore, metapopulation substructure is important because the total effective population size is not equal to the sum of the subpopulations and is most likely to be much higher than the sum (Wright 1943, Waples 2002).

Previous Florida Panther PVAs--

There have been at least six PVAs for the Florida panther (Seal and Lacy 1989, Seal and Lacy 1992, Cox et al. 1994, Ellis et al. 1999, Kautz and Cox 2001, Maehr et al. 2002b, Root 2004). The earliest of these, Seal and Lacy (1989) and Seal and Lacy (1992), used the VORTEX program to perform the PVA. The 1989 version predicted that "wholly isolated populations of less than 50 adult panthers (about 80 total adults, subadults, and juveniles) are not demographically stable even if the mean population growth rate, r, is positive." Even assuming that inbreeding has no deleterious effects on viability and reproduction, the predicted probability of extinction within 100 years was more than 14% (Seal and Lacy 1989). If inbreeding depression is assumed, the predicted probability of extinction within 50 years was "virtually certain" (Seal and Lacy 1989). Largely based on this PVA, the International Union for the Conservation of Nature and Natural Resources Captive Breeding Specialist Group recommended a vigorous captive breeding program.

In 1992, Seal and Lacy revised the VORTEX panther PVA, based on newer data for mortality and reproduction. Like the 1989 version, the 1992 version predicted the panther had a significant chance of extinction in 100 years and reduced genetic viability. For example, simulations of a population of 50 adult panthers with a positive mean population growth rate showed up to a 15% chance of extinction within 100 years in the absence of inbreeding and as much as a 35% chance with inbreeding (Seal and Lacy 1992).

Cox et al. (1994) and Kautz and Cox (2001) performed PVAs for 11 wildlife species, including the panther. Their models built on the earlier work of Shaffer (1987) by including catastrophic events. The Cox et al. (1994) PVA followed adult females only and incorporated a range of fecundity and survival values to simulate “favorable,” “moderate,” and “harsh” environmental conditions over 200 years. Under the “favorable” environment scenario (high survival and fecundity), 63 panthers had a 90% chance of persistence for 200 years. Under the “moderate” scenario (medium levels of survival and fecundity) 76 panthers and under the “harsh” scenario (low survival and fecundity) 84 panthers had the same chance of persistence.

Kautz and Cox (2001) added a genetic component to the Cox et al. (1994) PVA by using the technique described in Reed et al. (1988). Kautz and Cox estimated the size of a total population needed to obtain an effective population size of 50. The authors acknowledged that effective populations on the order of 100 - 1,000 times greater than 50 may be needed to ensure genetic variability over the long term; nonetheless, Kautz and Cox (2001) focused on the smallest population sizes likely to persist in the short term. By comparison, Reed et al. (2003) performed PVAs in VORTEX for 102 vertebrate species, including the panther, to estimate minimum viable

EXHIBIT 22

populations (MVPs). Based on a subset (n = 38) of these species, Reed et al. (2003) determined that 5,800 adult animals were needed for a 95% chance of persistence over 40 generations, 4,700 for a 90% chance of persistence, and 550 for a 50% chance of persistence. Ultimately, Reed et al. (2003) concluded that management programs should conserve habitat capable of supporting approximately 7,000 adult vertebrates to ensure long-term persistence. This number was larger than other MVP estimates cited therein (Franklin 1980 [4,500], Newmark 1987 [greater than 3,250], Thomas 1990 [5,500], Schultz and Lynch 1997 [~2,000], Reed and Bryant 2000 [greater than 2,000], Whitlock 2000 [~2,000]).

Kautz and Cox (2001) assumed that as long as the effective population size does not drop below 50, opportunities will arise later for achieving larger populations and avoiding genetics problems through patch recolonization, translocation of individuals, or removal of environmental constraints on a population through management. Based on these assumptions, Kautz and Cox (2001) estimated that a census population of panthers in the range of 100 - 200 individuals is needed to achieve an effective population size of 50. However, this conclusion is based in part upon equating total metapopulation size with effective population size (see Wright 1943, Waples 2002).

Maehr et al. (2002b) used a “consensus” model, whereby five coauthors each provided initial conditions and parameter values for separate runs in VORTEX. These five “wildly divergent models produced divergent estimates of extinction risk” (Beier et al. 2003). If “discrepancies were more than slight, each author was asked to justify the variable in question” (Maehr et al. 2002b). The “agreement among 4 of 5 estimates of extinction risk was due to drastically

EXHIBIT 22

differing, but fortuitously offsetting, assumptions between modelers" (Beier et al. 2003). If "a single view did not prevail, compromise was sought by averaging the five versions of the contentious variable" (Maehr et al. 2002b). This consensus model suggested a 98% chance of persistence for 100 years (Maehr et al. 2002b). According to Beier et al. (2003), this more "optimistic" outcome was due to some combination of 4 factors: (1) kitten mortality was simulated at 20% compared to 50% in earlier PVAs; (2) initial population size was set as 60 compared to 50 in earlier PVAs; (3) they assumed no loss of habitat compared to 1% annually in earlier PVAs; and (4) they assumed population augmentation in the form of two females per decade compared to none in earlier PVAs.

Ellis et al. (1999) reviewed the Seal and Lacy (1989), Seal and Lacy (1992), and Maehr et al. (2002b)[1] PVA models. Their review included a comparison of the parameter inputs for the three models as well as additional sensitivity analyses to explore expansion prospects and the effects of habitat loss on the south Florida population (Ellis et al. 1999). In general, their analysis demonstrated that these PVA models are fairly sensitive to changes in first-year mortality (i.e., kitten survival) (Ellis et al. 1999). For example, with low carrying capacity (100 - 200 individuals) and low first-year mortality (20 - 40%), the PVA models showed positive population growth, low probabilities of extinction (0 - 3%), and moderate losses of genetic diversity (15 - 27%) (Ellis et al. 1999). However, when first-year mortality is increased (50 - 60%), the probability of extinction rises dramatically (48 - 100%), and loss of genetic diversity is further accelerated (28 - 50%, 100% for the extinction scenario) (Ellis et al. 1999).

---

[1] Although Maehr et al. (2002b) was published in 2002, the actual PVA model was first presented in 1999. See Ellis et al. (1999).

EXHIBIT 22

Ellis et al. (1999) also determined that in some circumstances, the south Florida population could remain viable given low levels of emigration from the current population (i.e., 1% per year). However, viable expansion required members of the newly established population immigrating back into the current population as well as low first-year mortality (Ellis et al. 1999). Finally, simulations incorporating cumulative habitat losses of 25% and 50% over 25 years yielded significant probabilities of extinction for all but the lowest value of first-year mortality, ranging from 10% (assuming 30% first-year mortality and 25% habitat loss) to 98% (assuming 50% first-year mortality and 50% habitat loss) (Ellis et al. 1999).

Beier et al. (2003) recommended against the use of “canned programs” (e.g., VORTEX, RAMAS) and urged that future models take into account uncertainty in model parameters and functional relationships via sensitivity analyses. With the exception of Cox et al. (1994) and Kautz and Cox (2001), all of the panther PVA models were based on these canned programs. The PVA by Maehr et al. (2002b) did not include a sensitivity analysis. As Beier et al. (2006) note, understanding the sensitivity of PVA models to parameter changes may be more important than a precise estimate of extinction risk. Beier et al. (2003) also recommended that rigorous estimates of reproduction rates, survival rates, and variation in these rates, be incorporated into future PVAs. Finally, Beier et al. (2003) discouraged against “consensus” approaches (e.g., Maehr et al. 2002b) for inputting values because they lead to a “false sense of reliability.”

Recent Florida Panther PVA --

In 2002, Root constructed a PVA model to determine the minimum population size necessary for long-term persistence (100 years). Root’s PVA model was constructed using RAMAS GIS,

EXHIBIT 22

a spatially-explicit PVA software program. Relying on less optimistic fecundity and survival values from Seal and Lacy (1989), Root's PVA model determined that there was no feasible number of panthers that would produce persistence probabilities greater than 75%, even if the initial population size was more than 1,000 females (or 2,000 total panthers, assuming a sex ratio of 1:1). Using more optimistic fecundity and survival values from Seal and Lacy (1989) corresponding to values needed to produce finite population growth rates much greater than 1.05, Root's PVA model determined that 25 females (50 total panthers) would provide a 95% probability of persistence for the next 100 years. Using input parameter estimates needed to produce finite growth rates near 1.05, the population size needed for long-term persistence increased to 51 females (102 total panthers). When the input parameter estimates were modified to reduce the finite growth rate still further to 1.03, Root's PVA model revealed that a panther population comprised of at least 120 females (240 total panthers) was required for long-term persistence.

Some of the PVA work done by Root in 2002 is now published (Root 2004), but the publication does not discuss specific target population sizes necessary for long-term persistence or include a sensitivity analysis. Similar to Cox et al. (1994) and Kautz and Cox (2001), Root's model only followed females and examined three basic sets of parameters. For the latter, Root (2004) used parameter values similar to those in Seal and Lacy (1989), Seal and Lacy (1992), and Maehr et al. (2002b). Root (2004) ran several variations of each set of parameters, including "different density dependence or none, various levels of habitat loss, intermittent catastrophes or epidemics, or scheduled translocations or reintroductions." In particular, Root (2004) calculated the potential impact on the panther population of a loss of 25% of habitat (1% per year for 25

EXHIBIT 22

years), or roughly the amount of private land within the Primary Zone. After 100 years under a moderate scenario with this habitat loss assumption, Root (2004) estimated a decrease in mean final abundance of 26%, and a 1% increase in the likelihood of extinction. However, even under the optimistic scenario she found the 25% habitat loss variation noted above greatly decreased mean final abundance.

Root (2004) also explored emigration (i.e., annual dispersal of female panthers to empty patches north of the Caloosahatchee River), finding that under the Seal and Lacy (1992) set of parameters, the probability of extinction actually increases over what it would have been without emigration. These preliminary results suggest the importance of carefully considering metapopulation structure not only in terms of subpopulation size, but also in terms of dispersal rates, prior to deriving MVPs (see also Sweanor et al. 2000, Frank 2005, Hellgren et al. 2005, McCarthy et al. 2005).

The FWS believes that Root (2004) represents the most current, reliable, and objective PVA model available today. We recognize that any model is only as good as the data / parameters estimates used. We are also aware of the deficiencies of this model (e.g., use of a “canned program”, lack of sensitivity analysis) and realize that while the model included a variation for habitat loss approximating all private lands in the Primary Zone, several of the assumptions in the basic model (e.g., no change in amount, quality, or configuration of habitat; no difficulty finding mates; no catastrophies; no additional human-induced mortality) may be unrealistic. Recognizing these limitations, we believe the PVA analysis by Root (2004) represents the best available science at this time. Therefore, the Root (2004) PVA was used by the Recovery Team

EXHIBIT 22

and FWS to aid in developing the population numbers for the reclassification and delisting criteria.

Implications--

There is insufficient habitat in south Florida to sustain a viable panther population and population expansion into south-central Florida will be difficult. Therefore, to achieve a viable population of 240 and to reclassify or delist the species, additional populations will have to be reintroduced into other areas within the panther's historical range. Unfortunately, the distances from the occupied range to potential reintroduction sites (Thatcher et al. 2006b) may far exceed the species' capability for demographic and genetic interchange. In the absence of migration between populations, each panther population will remain isolated and therefore vulnerable to environmental, demographic, and genetic stochasticity as well as catastrophic events (Gilpin and Soulé 1986). These isolated populations will be vulnerable to extinction in the short-term. However, the long-term persistence of the panther will depend on multiple populations that are spatially discrete and able to fluctuate independently from one another in response to catastrophic or other environmental perturbations. If each of these reestablished populations had a moderately low probability of extinction, localized environmental perturbations, and population fluctuations remained asynchronous, all other things being equal, it is highly improbable that the extinction of the panther would result from a simultaneous extinction of all populations (Seal and Lacy 1989, Carlson and Edenhamn 2000, Kendall et al. 2000, Reed 2004, Li et al. 2005).

EXHIBIT 22

In some cases, managed translocation among separate populations may be a cost-effective means of achieving multiple, viable populations (Goodman 1987, Lubow 1996). However, biological concerns such as landscape connectivity (Noss 1987, Root 1998, Beier 1993, Swart and Lawes 1996, Carroll et al. 2004, Kramer-Schadt et al. 2005), disease outbreaks (Hedrick et al. 2003), migration rates among populations (Brown and Kodric-Brown 1977, Mills and Allendorf 1996), demographic impacts on the donor populations (Saenz et al. 2002, Root 2004), population bottlenecks (Ralls and Ballou 2004), Allee effects (Mooring et al. 2004), inbreeding depression (Swinnerton et al. 2004), and random genetic drift (Gautschi et al. 2003) must be carefully considered prior to reintroduction. Furthermore, financial (Margan et al. 1998, van Heezik and Ostrowski 2001, Lindsey et al. 2005), socio-political (Musiani and Paquet 2004) and / or other factors may impose additional constraints on the efficacy of reintroducing multiple populations.

II. RECOVERY STRATEGY

The biological constraints that have to be taken into consideration when planning Florida panther conservation and management actions include the need for large, contiguous landscapes, the need for large prey for successful reproduction, very low population density, and low reproductive and colonization rates. The fact that the panther is a large predator requires human social considerations in its conservation and management.

Panthers are large, solitary carnivores and require large ranges to obtain the necessary prey (white-tailed deer and feral hogs) to meet energy needs required for health and reproduction. Their social and reproductive behavior requires access to large contiguous areas of suitable habitat to maintain viable breeding populations. Social intolerance (mutual avoidance), prey

EXHIBIT 22

abundance, and specific habitat features are thought to regulate panther density. Females normally have a litter of kittens every other year. When the kittens are 14 - 24 months of age, the family bond is broken and the kittens leave their mother. Subadult males generally disperse and become somewhat nomadic, whereas subadult females generally set up home ranges very close to their natal ranges. For this reason, it can take a considerable amount of time for a population to colonize new areas.

Panthers are sometimes thought of as a wilderness indicator species, not because they require wilderness to live or cannot live in proximity to people, but because people will not usually tolerate panthers living in close proximity to them. People have historically been fearful of panthers due to concern for their livestock as well as their own lives. As humans encroach in panther habitat the likelihood of human-panther interactions increases. People's perceptions and attitudes about panthers will be a major determining factor in the success of panther recovery.

The recovery strategy for the Florida panther is to maintain, restore, and expand the panther population and its habitat in south Florida, expand this population into south-central Florida, reintroduce at least two additional viable populations within the historic range outside of south and south-central Florida, and facilitate panther recovery through public awareness and education. The panther depends upon habitat of sufficient quantity, quality, and spatial configuration for long-term persistence, therefore the plan is built upon habitat conservation and reducing habitat-related threats, but also addresses other key issues such as genetic viability. Range expansion and reintroduction of additional populations are recognized as essential for

EXHIBIT 22

panther recovery. Similarly, fostering greater public understanding and support is necessary to achieve panther recovery.

Maintain, restore, and expand the panther population and its habitat in south Florida

Before delisting can occur, sufficient habitat quality, quantity, and spatial configuration must be maintained and protected in the long-term to support multiple viable populations. Consequently, habitat conservation will be necessary for recovery. Leading sources of panther mortality (vehicular collisions and intra-specific aggression), impediments to population expansion and subsequent gene flow, and biological constraints on population growth and other life history traits also are habitat-related. Therefore, those actions that maintain, restore, and expand panther habitat generally are critical for conservation and recovery.

The Primary Zone supports the only breeding panther population. To prevent further loss of population viability, habitat conservation efforts should focus on maintaining the total available area, quality, and spatial extent of habitat within the Primary Zone. The continued loss of habitat functionality through fragmentation and loss of spatial extent pose serious threats to the conservation and recovery of the panther. Therefore, conserving lands within the Primary Zone and securing biological corridors are necessary to help alleviate these threats.

The Secondary Zone consists of lands that have the potential to support an expanding panther population. However, these lands contain lower quality habitat comprised of high intensity agriculture, a patchwork of residential subdivisions, and golf course communities. Restoration would need to occur to allow this area to contribute meaningfully to panther recovery. Because

EXHIBIT 22

these lands require extensive restoration in some areas and may not contribute to panther recovery for some time, their conservation is considered a lower priority than conservation of the Primary and Dispersal Zones (Kautz et al. 2006).

Roads are a significant source of panther mortality and habitat fragmentation in south Florida. Therefore, necessary actions include the identification and prioritization of locations needing crossing and fencing installation, as well as collaborative efforts by transportation agencies, landowners, and local communities to ensure that future roads and road expansion projects are designed and constructed with regard to panther conservation. Several highway segments are particularly problematic for panthers because the adjacent lands are privately owned. Installation of highway crossings and fencing along sensitive highway segments will require cooperation with private landowners.

Approximately one-fourth of the Primary Zone, two-thirds of the Secondary Zone, and nearly all of the Dispersal Zone are in private ownership (R. Kautz, pers. comm. 2005). Therefore, conservation and restoration of Primary, Secondary, and Dispersal Zone habitat will require cooperation with private landowners not only as willing sellers, but also as willing participants in conservation easements or other habitat management programs for the panther. Actions that emphasize cooperative efforts and landowner incentives, particularly those designed to discourage conversion of land to less suitable habitat are important.

The majority of the Primary Zone is on public lands, and panther survival will depend upon public land managers to ensure that panthers and their prey are considered in management

EXHIBIT 22

efforts. Important tools for success will include development and implementation of best management practices for panther habitat; formalizing a network of south Florida public land managers; preparation, review, and implementation of State and Federal habitat management plans for public lands; and a tracking system to determine the effects of habitat loss and conversion on panthers.

Although the genetic restoration program initiated in 1995 was successful (Pimm et al. 2006a), the existing population size is not sufficient to offset genetic drift in the long-term. At current population levels, the loss of donor individuals to future expansion and / or reintroduction efforts may pose an added risk to the existing population (Root 2004). Therefore, developing and implementing a genetics management program to determine appropriate protocols for translocating or removing panthers as well as gauging the progress of the restoration effort is important. Related to this effort is the need to continue monitoring physical and physiological characteristics correlated with inbreeding and loss of genetic variability. A PVA model is being developed by FWC that should assist in ensuring that these management actions do not impair the long-term persistence of existing and future panther populations.

The small size and high degree of isolation of the existing panther population also makes it vulnerable to catastrophic events such as disease or parasite outbreaks. Actions that support continued monitoring and determination of the presence, infection rate, mortality rate, and consequences of known and unknown diseases and parasites are important.

Provide for the expansion of the breeding population into south-central Florida

EXHIBIT 22

Dispersing male panthers from the south Florida population have immigrated into south-central Florida, but an absence of females has inhibited expansion of the breeding population into this area (Belden and McBride 2006). The primary considerations to expanding the breeding population of panthers into south-central Florida are to determine whether suitable habitat exists, whether people there will accept panthers, if there are sufficient panther numbers in the age and sex classes necessary for expansion, and methods of expanding the population. Studies by Belden and McBride (2006) and Thatcher et al. (2006a) evaluated habitats in south-central Florida and identified areas that might provide favorable habitat conditions (Figure 5). Even though some suitable panther habitat remains in this region, it occurs in widely scattered and relatively small patches that are fragmented by major highways and agricultural and urban development. It is estimated that these areas could support 20 to 40 panthers (Belden and McBride 2006, Thatcher et al. 2006a). Development pressure and human population growth will decrease the opportunity for panther expansion north of the Caloosahatchee River.

The Dispersal Zone requires protection from development to provide a corridor to facilitate dispersal from south Florida to potentially suitable habitat north of the Caloosahatchee River. Maintaining connectivity is important not only to facilitate dispersal, but to enhance population exchange once female panthers have been reestablished in south-central Florida.

Given the limited dispersal rates of female panthers and the present lack of suitable habitat conditions in the Dispersal Zone, it is likely that human intervention will be required to establish females north of the Caloosahatchee River (Thatcher et al. 2006a). In this case, the feasibility of panther translocation will need to be evaluated, including an EA or Environmental Impact

EXHIBIT 22

Statements (EIS) under the NEPA process if necessary, and a translocation plan developed. This plan should include an evaluation of public acceptance, consideration of the effects on potential reintroductions elsewhere in the historic range, and consideration of the effects on the south Florida breeding population. Any expansion plan should include education and outreach to increase public understanding of panther behavior and recovery needs prior to, during, and after the translocation of panthers.

Establish viable populations of the panther in potential reintroduction areas

The panther has been restricted to less than 5% of its historic range and the current panther population is not considered viable. Recovery will require reintroduction to establish viable populations in other parts of its historic range. The strategy is to utilize existing studies and computer models along with field surveys to confirm potential reintroduction sites. These potential reintroduction sites will be further refined in coordination with agencies and the public in other southeastern states. This will include conducting preliminary public scoping, conducting field surveys, and using the NEPA process to develop and refine the appropriate reintroduction alternatives. Once a site is chosen, protocols will need to be developed to determine the number of panthers from each age and sex class that are needed and which individuals are the best candidates for release, methods of release, and monitoring. Education and outreach efforts will be needed to address social concerns before and after panthers are released.

Identify, secure, maintain, and restore habitat in potential reintroduction areas

EXHIBIT 22

The strategy for conserving habitat in potential reintroduction areas will need to mirror that for conserving habitat in the currently occupied range. The ability of potential reintroduction sites to support panthers will depend on land managers to ensure that the needs of both panther and prey are adequately considered. It will be important to develop and implement best management practices for panther habitat; formalize local networks of land managers; prepare, review, and implement habitat management plans; and develop a tracking system to determine the effects of habitat management on panthers. Those actions that prevent habitat loss, degradation, and fragmentation as well as maximize connectivity and spatial extent in reintroduction areas are important for reintroduction. Actions that involve identification and prioritization of areas for road crossing and fencing installation are essential. Similarly, collaborative transportation planning efforts that ensure future roads and road expansion projects are designed and constructed with regard to panther conservation are high priorities.

Facilitate panther recovery through public awareness and education

Public awareness and support are essential for panther conservation and management activities, as well as for reintroduction efforts. Previous social surveys and biological field research related to panther recovery efforts have identified the importance of public education and outreach programs, including development of a media plan. The strategy is to build support through education and outreach programs that increase public understanding of panther behavior and recovery needs. Social science research will identify public opinion and knowledge levels which are important in developing materials and programs; these will be provided to local planning organizations, decision makers and elected officials, the public, major landowners, residents living in and adjacent to panther habitat, the realtor community, and other audiences. Education

EXHIBIT 22

and outreach efforts will be evaluated, especially to assess human attitude and behavior changes toward panthers.

III. RECOVERY GOAL, OBJECTIVES, AND CRITERIA

Recovery Goal

The goal of this recovery plan is to achieve long-term viability of the Florida panther to a point where it can be reclassified from endangered to threatened, and then removed from the Federal List of endangered and threatened species.

Recovery Objectives

1. To maintain, restore, and expand the panther population and its habitat in south Florida and expand the breeding portion of the population in south Florida to areas north of the Caloosahatchee River.

2. To identify, secure, maintain, and restore panther habitat in potential reintroduction areas within the historic range, and to establish viable populations of the panther outside south and south-central Florida.

3. To facilitate panther recovery through public awareness and education.

EXHIBIT 22

Recovery Criteria

The quantitative criteria for the interim goal, reclassification, and delisting are based upon threats to the panther, PVAs, and the need to address representation, resiliency, and redundancy (Shaffer and Stein 2000 cited in National Marine Fisheries Service 2004). Representation is conserving the breadth of the genetic makeup of the species to conserve its adaptive capabilities. Resiliency is ensuring that each population is sufficiently large to withstand stochastic events. Redundancy is ensuring a sufficient number of populations to provide a margin of safety for the species to withstand catastrophic events.

Kautz et al. (2006) developed population guidelines based on the results of the previous Florida panther PVA (i.e., Root 2004). Following these guidelines, populations of greater than 240 have a high probability of persistence, low probability of extinction over 100 years, are able to retain 90% of their heterozygosity (representation), and can tolerate some habitat loss or mild catastrophes. Populations within the 80 to 100 range are likely stable with a low probability of extinction for 100 years, have slowly declining heterozygosity, and are vulnerable to habitat loss or catastrophes. According to Root (2004), these models indicate that unless we are able to safeguard the current condition, amount, and configuration of the occupied panther habitat, the long-term viability of the panther is not secure. In addition, Kautz et al. (2006) suggests that unavoidable losses in the Primary Zone should be offset by habitat restoration or enhancement of habitat elsewhere in the Primary Zone, thereby increasing the functional value and carrying capacity of the remaining habitat. As a result, it is clear that conservation strategies should be used to maximize protection and restoration, if needed, in the Primary Zone. The south Florida panther population, which documented panther counts suggest is roughly 100 - 120 individuals,

EXHIBIT 22

is obviously the foundation for all efforts to expand and/or reintroduce panthers into other parts of the species' historic range. We have seen the panther population increase since the genetic restoration effort, and protecting and maintaining habitat in the appropriate configuration to support a stable population is a necessary component of recovery efforts in the future.

PVA models are no better than the data upon which they are based, and it cannot be overemphasized that the Root (2004) basic models assume no difficulties in finding mates, no additional human-induced mortality, and no intermittent catastrophic events. In addition, aside from the 25% habitat loss variation that approximates the loss of all privately owned land in the Primary Zone, the Root (2004) models assume that there was no change in amount, quality, or configuration of habitat during 100 years of simulation. Since many of these unrealistic assumptions represent a significant departure from conditions in south Florida and the Southeast, recovery criteria need to include more than one population (resiliency and redundancy) to safeguard against habitat loss (a major threat) and stochastic catastrophic events (e.g., disease outbreaks or major hurricanes). It is difficult to predict the extent to which future catastrophic events will impact the panther. However, two viable populations would be sufficient for reclassification and three viable populations would provide an adequate margin of safety for full recovery. Meeting these criteria would indicate that threats are ameliorated, the panther is sufficiently genetically represented, and its security is achieved through resiliency and redundancy.

A. Reclassification to Threatened

Reclassification will be considered when:

EXHIBIT 22

1. Two viable populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years (two panther generations; one panther generation is six years [Seal and Lacy 1989])..

2. Sufficient habitat quality, quantity, and spatial configuration to support these populations is retained / protected or secured for the long-term.

A viable population, for purposes of Florida panther recovery, has been defined as one in which there is a 95% probability of persistence for 100 years. This population may be distributed in a metapopulation structure composed of subpopulations that total 240 individuals. There must be exchange of individuals and gene flow among subpopulations. For reclassification, exchange of individuals and gene flow can be either natural or through management. If managed, a commitment to such management must be formally documented and funded. Habitat should be in relatively unfragmented blocks that provide for food, shelter, and characteristic movements (e.g., hunting, breeding, dispersal, and territorial behavior) and support each metapopulation at a minimum density of 2 to 5 animals per 100 square miles (259 square kilometers) (Seidensticker et al. 1973, Logan et al. 1986, Maehr et al. 1991a, Ross and Jalkotzy 1992, Spreadbury et al. 1996, Logan and Sweanor 2001, Kautz et al. 2006), resulting in a minimum of 4,800 – 12,000 square miles (12,432 – 31,080 square kilometers) per metapopulation of 240 panthers. The amount of area needed to support each metapopulation will depend upon the quality of available habitat and the density of panthers it can support.

EXHIBIT 22

B. Delisting

Delisting will be considered when:

1. Three viable, self-sustaining populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years.

2. Sufficient habitat quality, quantity, and spatial configuration to support these populations is retained / protected or secured for the long-term.

For delisting, exchange of individuals and gene flow among subpopulations must be natural (i.e., not manipulated or managed).

C. Interim

Due to the challenging nature of attaining the recovery criteria, an interim recovery goal has been established to assist in determining progress towards the ultimate goals of reclassification and delisting.

This interim goal is to achieve and maintain a minimum of 80 individuals (adults and subadults) in each of two reintroduction areas within the historic range and to maintain, restore, and expand the south / south-central Florida subpopulation.

The interim goal will be met when:

1. The south / south-central Florida panther subpopulation has been maintained, restored, and expanded beyond 80 to 100 individuals (adults and subadults).

EXHIBIT 22

2. Two subpopulations with a minimum of 80 individuals each have been established and maintained within the historic range.

3. Sufficient habitat quality, quantity, and spatial configuration to support these three subpopulations is retained / protected or secured for the long-term.

There must be exchange of individuals and gene flow among these subpopulations. This exchange of individuals and gene flow can be either natural or through management.

EXHIBIT 22

IV. RECOVERY ACTION OUTLINE AND NARRATIVE

Existing Population

1. **To maintain, restore, and expand the panther population and its habitat in south Florida and expand the breeding portion of the population in south Florida to areas north of the Caloosahatchee River to maximize the probability of the long-term persistence of this metapopulation.**

South Florida

1.1. **Maintain, restore, and expand the panther population and its habitat in south Florida.**

South Florida Habitat

1.1.1. **Maintain the ability of the Primary, Secondary, and Dispersal Zones, as identified in Kautz et al. (2006), to contribute to a viable population.** Maintain the quantity and quality of habitat in the Primary Zone, maintain the quantity and improve the quality in the Secondary Zone, and increase the quantity of protected acres and enhance the quality of the Dispersal Zone. The Dispersal Zone needs to provide the connection between south and south-central Florida and provide for expansion of the population. This indicates the need for an accounting of habitat in Primary, Secondary, and Dispersal Zones, tracking acres lost and restored over time. This leads to a need for a mechanism to mitigate impacts.

Non-Regulatory Incentive Programs

1.1.1.1. **Use and coordinate all non-regulatory incentive programs to maintain and secure habitat on private lands.**

1.1.1.1.1. **Develop Safe Harbor Agreements** with willing landowners.

1.1.1.1.2. **Focus available incentive programs to restore and enhance habitat.** Coordinate implementation of existing programs (e.g., Farm Bill, Partners for Fish and Wildlife Program, Landowner Incentive Program, Rural Land Stewardship Program, Stewardship America Program) within and among agencies.

1.1.1.1.3. **Explore the creation of new panther conservation incentive programs** that compensate, pay, or otherwise provide economic incentives for landowners to provide for panthers and panther habitat on their lands.

EXHIBIT 22

1.1.1.1.4. **Continue to secure lands**, both fee simple and conservation easements, through existing and / or new land acquisition programs including Federal, State, county, and non-governmental organization programs. Ensure terms of conservation easements address panther needs and are consistent among agencies.

1.1.1.1.4.1. **Revise and implement the preliminary project proposal developed for expansion of FPNWR** incorporating the landscape conservation strategy maps (Kautz et al. 2006) and the results of Collier County's land use planning efforts.

1.1.1.1.4.2. **Modify existing land appraisal procedures** to allow government agencies to offer more than the appraised value for private lands that support panthers. Higher acquisition costs may be justifiable based on quality habitat because of greater long-term costs of both purchase and restoration of degraded habitat.

1.1.1.1.4.3. **Conduct an annual review of Florida Forever projects and rate them with respect to panther conservation values.** This report should be sent to the Governor and Cabinet of the State of Florida.

1.1.1.1.5. **Identify and support local initiatives to protect habitat and purchase development rights.** Encourage, assist, and provide resources to local governments to develop and implement land use plans that complement and advance panther recovery.

Regulatory Programs

1.1.1.2. Appropriately use local, State, and Federal regulatory programs to maximize their ability to maintain the overall quality, quantity, and functionality of habitat.

1.1.1.2.1. **Create a Federal / State working group to coordinate permit review and consultation.** The purpose of this group would be to ensure coordination and cooperation between Federal and State programs that provide biological opinions and recommendations to permitting authorities.

1.1.1.2.2. **Track permits, especially incidental take and compensation received, issued through Federal and State regulatory programs** to determine the impacts on panthers of landscape and land use changes.

1.1.1.2.3. **Develop and implement regulatory procedures and guidance that avoid habitat loss, degradation, and / or fragmentation as a result of federally funded or authorized projects and actions.** If

EXHIBIT 22

incompatible development, conversion of natural habitat types, and / or land use intensification cannot be avoided then such procedures and guidance should ensure that equivalent habitat protection and restoration are provided, especially within the Primary Zone, to compensate for both the quantity and functional value of the lost habitat.

1.1.1.2.3.1. **Ensure that panther conservation and protection of habitat is included in the State Clearinghouse (SAI) reviews of Federal activities** and identify any actions that would be inconsistent with the Federal Coastal Zone Management Plan and NEPA.

1.1.1.2.3.2. **Ensure that the section 7 consultation process is utilized and that the best available science is used in development of biological opinions.**

1.1.1.2.3.3. **Avoid adverse effects to habitat (including prey) attributable to CERP and other water management projects.** Identify and monitor effects of water management projects; adverse effects should be avoided. If that is not possible, they should be minimized and appropriate compensation provided.

1.1.1.2.4. **Develop and implement regulatory procedures and guidance that avoid habitat loss, degradation, and / or fragmentation as a result of State or locally authorized projects that are not a part of a Federal review process.**

1.1.1.2.4.1. **Provide review and recommendations to FDEP, Department of Community Affairs, WMDs, and other State agencies on permit applications that can potentially impact habitat.**

1.1.1.2.4.2. **Work with counties and municipalities to modify and amend Comprehensive Plans to include the goal of no net loss of quantity, quality, or functionality of habitat in Primary, Secondary, and Dispersal Zones.**

1.1.1.2.4.3. **Develop a mechanism for providing compensation for projects that affect small acreages (e.g., single family residences) of habitat.** An effective mechanism will address loss of habitat and also cumulative degradation of habitat and could include panther conservation banks and / or regional off-site mitigation banks.

1.1.1.2.4.4. **Initiate and encourage landscape level HCPs where proposed non-Federal actions or projects will impact panthers or their habitat.** Explore partnering with counties through their growth

EXHIBIT 22

management plans to develop HCPs. Priority for conservation should be directed towards the Primary Zone.

Habitat Fragmentation, Connectivity, and Spatial Extent

1.1.1.3. Prevent habitat fragmentation, promote connectivity, and maintain spatial extent within panther habitat.

1.1.1.3.1. Identify, restore, maintain, and enhance habitat corridors to facilitate movements by resident panthers, promote dispersal, and prevent peripheral areas from becoming further isolated from habitat in the Primary Zone.

1.1.1.3.1.1. Quantitatively assess factors that define dispersal corridors and use least-cost pathways analysis to identify potential habitat corridors.

1.1.1.3.1.2. Restore habitat in potential corridors identified by least-cost pathways analysis.

1.1.1.3.1.3. Maintain and enhance existing habitat corridors.

1.1.1.3.1.3.1. Secure the Dispersal Zone through fee simple acquisition, compensation, or conservation easements.

1.1.1.3.1.3.2. Secure Camp Keais Strand to maintain connectivity from FPNWR to Corkscrew Regional Ecosystem Watershed.

1.1.1.3.1.3.3. Secure a corridor between BCNP and Okaloacoochee Slough to assure this pathway is not degraded or severed.

1.1.1.3.1.3.4. Consider maintenance of habitat corridors for panthers during Everglades restoration to avoid isolation of the ENP subpopulation. High water levels in Shark River Slough may prevent panthers from moving in and out of ENP, thus separating them from the rest of the population.

1.1.1.3.2. Maintain spatial extent and arrangement of habitat. Areas currently used by panthers and habitat conditions within the Primary Zone should be maintained. According to Root (2004), “Unless the current condition, amount, and configuration of the currently occupied panther habitat are safeguarded, the long-term viability of the panther is not secure.” In addition, Kautz et al. (2006) suggests that unavoidable losses in the Primary Zone should be offset by habitat restoration or enhancement of habitat elsewhere in the Primary Zone, thereby increasing the functional value and carrying capacity of the

EXHIBIT 22

remaining habitat. Restoration of the Secondary Zone will help maintain spatial extent.

Negative Impacts of Roads on Panther Habitat – South Florida

1.1.1.4. Prevent and minimize the negative impacts of roads to panther habitat. Least cost path analysis, individual based models, and other modeling tools may be used to predict highway stretches that panthers are likely to cross (Carroll et al. 2004, Wikramanayake et al. 2004, Kramer-Schadt et al. 2005, Swanson et al. 2005). These same models may characterize habitat use adjacent to dangerous stretches of highway. This information should then be combined with field observations, home range data, and panther-vehicle collision data to identify and prioritize locations for wildlife crossings, to cluster habitat restoration and mitigation adjacent to these crossing areas, to identify other adjacent habitat used by panthers that needs added protection, and to connect the crossing areas and adjacent habitat with corridors to safer habitat.

1.1.1.4.1. Ensure that panther habitat needs are incorporated in the planning of new roads and road expansion projects. Examine future land use projections to assess expected effects of habitat fragmentation from roads. Utilize the ETDM process. Ensure early and continued coordination among agencies and local governments for all road projects in panther habitat. Develop Memorandums of Understanding (MOU) and / or refine pre-coordination procedures with State Department of Transportation and local governments for proactive assessment and pre-planning of road projects.

1.1.1.4.2. Identify current and planned roads that could affect panthers, eliminate roads where possible, and retrofit priority areas with crossings and fencing as appropriate to promote connectivity and dispersal. Develop and distribute recommendations on improvements needed for specific road segments.

1.1.1.4.3. Secure habitat adjacent or contiguous to areas of high risk for panther-vehicle collisions.

1.1.1.4.4. Determine the impacts of roads on range expansion and dispersal.

Habitat Restoration in Primary, Secondary, and Dispersal Zones

1.1.2. Restore habitat in the Primary, Secondary, and Dispersal Zones.

1.1.2.1. Identify and prioritize tracts suitable for restoration.

EXHIBIT 22

1.1.2.2. **Provide incentives and mechanisms for restoration of agricultural and range lands.**

1.1.2.3. **Develop / expand funding mechanisms and other incentives for habitat restoration.**

1.1.2.4. **Develop and disseminate information on cost-effective restoration techniques.**

1.1.2.4.1. **Facilitate and conduct habitat restoration research**.

1.1.2.4.2. **Monitor and evaluate restoration projects** and report the reasons for successes and failures.

Habitat Management – South Florida

1.1.3. **Encourage habitat management that provides for the needs of panthers and their prey.**

1.1.3.1. **Develop, disseminate, and implement best management practices for managing habitat.** Develop in coordination with Federal, State, local and private entities.

Public Land Management – South Florida

1.1.3.2. **Ensure that panthers and their prey are adequately considered and provided for in management of public lands.** Management of public lands should include, but is not limited to, restoration and maintenance of natural habitat through prescribed fire, invasive plant control, regulation of ORV use as appropriate, restoration and maintenance of hydrologic quality and quantity, and regulation of recreational hunting to ensure that it does not negatively impact the panthers' prey base.

1.1.3.2.1. **Formalize a network of south Florida public land managers** to encourage exchange of panther information and facilitate the development and implementation of effective land management actions. This group should consider the need for interagency panther habitat management strike teams to capitalize on and share existing resources to implement habitat management priorities on the various public lands in south Florida (e.g., cooperative efforts for prescribed burning and invasive plant control).

1.1.3.2.2. **Prepare, review, and implement habitat management plans for public lands** to ensure that panthers and their prey are adequately considered and provided for. Plans should include active, state-of-the-art management tools including prescribed fire where appropriate.

EXHIBIT 22

1.1.3.2.3. **Track habitat management activities and their effects on panthers** by developing and distributing annual reports that summarize land management accomplishments and effects.

Private Land Management – South Florida

1.1.3.3. Encourage habitat management on private lands to adequately provide for panthers and their prey.

1.1.3.3.1. Provide incentives and assistance to willing landowners (see 1.1.1.1.2 and 1.1.1.1.3) to manage their lands for panthers and their prey using tools such as prescribed fire and invasive plant control. Focus and coordinate existing incentive programs within panther habitat.

1.1.3.3.2. Provide incentives and work with landowners to encourage them not to convert their lands to less suitable habitat.

1.1.3.3.3. Review and comment on county stewardship plans.

Monitoring Habitat – South Florida

1.1.4. Monitor habitat quantity and quality, land use changes, and response of the population to these changes (e.g., distribution, density, dispersal, reproductive success, mortality). Track land protection and habitat restoration with an emphasis on identifying where habitat is lost and restored.

1.1.4.1. Quantify 24-hour habitat use and movement patterns. More data are needed during hours of peak activity. Obtain and analyze data on nocturnal locations of panthers throughout their range to get a complete picture of panther habitat use.

1.1.4.2. Update Kautz et al. (2006) maps every five years to assess trends in habitat quantity and spatial configuration.

South Florida Population

1.1.5. Achieve and maintain the largest possible healthy panther population in south Florida using management practices that are consistent with ecosystem conservation. In addition to habitat conservation measures referenced in other sections of the plan the following measures are appropriate.

Demographics

1.1.5.1. Continue to monitor population viability.

EXHIBIT 22

1.1.5.1.1. Convene a group of agency and independent experts to conduct an appropriate PVA (existing or customized) and corresponding sensitivity analysis. Obtain independent peer-review.

1.1.5.1.2. Continue to determine and monitor demographic variables including age- and sex-specific reproduction and survival rates, litter size, recruitment, age at first reproduction, birth interval, proportion of individuals breeding, age and sex specific causes of mortality (including intraspecific aggression), dispersal, density, and minimum documented population size. Identify, evaluate, and use the least intrusive monitoring techniques or indices as appropriate (e.g., hair / genetics sampling, scats, cameras).

1.1.5.1.3. Develop and implement annual capture and monitoring work plans

Genetic Diversity

1.1.5.2. Maintain and enhance genetic diversity.

1.1.5.2.1. Continue to monitor physical and physiological characteristics correlated with inbreeding and depletion of genetic variability including kinked tails, cowlicks, cryptorchidism, sperm morphology, heart defects, immune function, and reproductive success.

1.1.5.2.2. Develop and implement a genetics management plan. Convene a working group of geneticists, reproductive physiologists, veterinarians, and population biologists to develop a genetics management plan. Use field observations, existing data, and results from the genetic restoration and management project initiated in 1995. The plan might include protocols and triggers (e.g., specific alleles, physical attributes, percent representation, studbook) for translocating, adding, or removing animals; a protocol for managing / preventing overrepresentation by specific lineages; the disposition of animals that may need to be removed; and specific monitoring needs.

1.1.5.2.3. Develop a population model to predict future genetic consequences of management proposals and actions.

Harassment, Injury, and Mortality

1.1.5.3. Monitor and take action to prevent harassment, injury, and mortality.

Harassment

EXHIBIT 22

1.1.5.3.1. **Reduce and eliminate illegal harassment and implement management strategies to prevent future harassment stemming from human activity**. Harass is defined by the FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Harassment is considered a form of "take" as defined in the ESA. This does not include activities permitted by the FWS for panther management. Such permits may be issued by FWS to other Federal land management agencies or State conservation agencies.

1.1.5.3.1.1. **Identify harassment activities.** These could include, but are not limited to, illegal stalking of panthers, chasing panthers with dogs, pursuing panthers with ORVs, destruction of denning sites in an effort to relocate an animal, intentionally drawing a panther into an area (whether by baiting with live prey, illegal feeding, or other means) for photography or other purpose, and excessive noise-making activities.

1.1.5.3.1.2. **Implement active management measures designed to inhibit and / or cease illegal harassment activities on public lands.** Active management measures that can be implemented on public lands may include:

1.1.5.3.1.2.1. **Manage public access to minimize harassment opportunities.**

1.1.5.3.1.2.2. **Develop ORV management plans where ORVs are allowed.** Plans should contain actions that minimize impacts to panthers.

1.1.5.3.1.2.3. **Enforce regulations and statutes regarding discharge of firearms, explosive devices, or other loud noise sources.**

1.1.5.3.1.3. **Increase compliance with existing Federal and State laws and regulations prohibiting harassment.**

1.1.5.3.1.3.1. **Post and maintain regulatory and informational signs.** The effective use of on-site regulatory and informational signs is essential in providing the public with information on prohibited harassment activities (including the legal consequences and fines). This may contribute to better compliance.

1.1.5.3.1.3.2. **Enforce existing laws and regulations to prohibit harassment.**

EXHIBIT 22

Illegal Killing

1.1.5.3.2. Enforce existing Federal and State laws and regulations to minimize and prevent illegal killing.

Road Mortalities

1.1.5.3.3. Minimize and prevent injuries and mortalities by modifying conditions on existing roads and implement appropriate actions to protect panthers during the planning, permitting, and construction of new roads and highway expansion projects.

1.1.5.3.3.1. Identify and address existing and potential panther-vehicle collision areas to develop recommendations on improvements needed for specific road segments.

1.1.5.3.3.1.1. Convene a working group to prioritize and address actions needed in panther-vehicle collision areas.

1.1.5.3.3.1.2. Secure funding for and install wildlife crossings and fencing in high risk areas.

1.1.5.3.3.1.3. Evaluate and implement other mechanisms to prevent mortalities on roads including installing signs, creating wider shoulders, slower speed limits and speed zones, changing road elevations, and reducing traffic volume with no truck zones or adjusting tolls to encourage alternative routes (e.g., removing tolls on I-75 to reduce traffic on U.S. 41).

1.1.5.3.3.2. Build mechanisms into permits for road projects to provide for adaptive management for panther mortality and / or other unforeseen problems. These could include conditions for when the FWS will reinitiate consultation pursuant to section 7 of the ESA or require additional project alterations to avoid impacts.

1.1.5.3.3.3. Develop new strategies to prevent road mortalities or injuries including alternative technologies and new fencing designs that might be more aesthetically acceptable.

1.1.5.3.3.4. Enforce existing speed zones, monitor effectiveness, and modify as needed.

Research Caused Injuries and Mortality

EXHIBIT 22

1.1.5.3.4. Minimize harassment, injury, and mortality that could result from research, management, and monitoring programs. Ensure that research, management, and monitoring are directed at achieving priority needs of the recovery program and are conducted using the least intrusive and risky methods necessary to meet the objectives of the plan. Allow only highly trained and experienced individuals to capture panthers.

1.1.5.3.4.1. Provide adequate resources and facilities for rehabilitation of panthers that might be injured or orphaned during capture and monitoring efforts.

1.1.5.3.4.2. Develop, implement, review, and revise protocols (i.e., research, monitoring, capture, handling) as needed to minimize risks to panthers.

Diseases and Parasites

1.1.5.4. Monitor diseases and parasites and develop and implement appropriate management strategies.

1.1.5.4.1. Devise appropriate biomedical strategies to limit population level disease threats.

1.1.5.4.1.1. Continuously evaluate the value of specific vaccinations and review all vaccination protocols annually.

1.1.5.4.1.2. Revise vaccination protocols as appropriate considering new disease threats as they arise.

1.1.5.4.2. Determine and monitor the presence, infection rate, mortality rates, and consequences of diseases and parasites in the population.

1.1.5.4.2.1. Collect appropriate tissue and blood samples from all panthers handled, both live and dead, and analyze them for the presence of priority diseases and parasites, summarize and report results annually.

1.1.5.4.2.2. Evaluate the disease threats presented by other species including bobcats and domestic cats and identify any needed management intervention.

1.1.5.4.2.3. Implement appropriate management strategies for disease and parasite monitoring and control.

EXHIBIT 22

Environmental Contaminants

1.1.5.5. Identify and minimize the detrimental effects of environmental contaminants.

1.1.5.5.1. Produce a summary report and database of contaminants in panthers and their environment in south Florida. Identify contaminants and sources of concern and determine management implications.

1.1.5.5.2. Continue to monitor contaminants, especially mercury and endocrine disruptors, in panthers and their prey by collecting and analyzing appropriate tissue samples, summarize and report results.

1.1.5.5.3. Implement actions necessary to remediate contaminants in high risk areas.

Prey Base

1.1.5.6. Ensure an ample, healthy, and diverse prey base. Work with managers of public, private, and Tribal lands.

Deer

1.1.5.6.1. Continue active management of white-tailed deer populations.

1.1.5.6.1.1. Assess and monitor the status of deer populations in panther habitat.

1.1.5.6.1.2. Develop deer harvest regulations that do not compromise the panther prey base and take into consideration food requirements of the panther.

1.1.5.6.1.3. Continue to monitor the impacts on panthers of hunting on public and private lands in panther habitat including BCNP and State lands in south Florida.

Hogs

1.1.5.6.2. Encourage management / control of feral hog populations that does not threaten the panther. Develop a long-term strategy for hog management on public lands given potentially conflicting needs of the panther and agency policy to eradicate exotic species. Continue to assess the role of hogs in the panther prey base as this strategy is implemented.

EXHIBIT 22

Prey Diseases

1.1.5.6.3. Monitor prey diseases and attempt to prevent possible spread into south Florida.

1.1.5.6.3.1. Continue statewide monitoring for chronic wasting disease and other emerging wildlife and domestic animal diseases and implement available eradication or control methods.

1.1.5.6.3.2. Identify, map, and appropriately monitor and regulate exotic animal operations that could serve as a source of infection for wild populations.

1.1.5.6.3.3. Coordinate with the southeastern States to review protocols and regulations that require imported ungulates to be disease-free.

Captive Management

1.1.5.7. Address issues related to captive panthers and their potential for positively impacting the wild population.

1.1.5.7.1. Develop guidance for the removal of panthers from the wild. This guidance will address removal of individuals for disease containment and survival (e.g., orphaned or abandoned kittens, injured individuals). Appropriate protocols will be generated for the specific reason for removal (e.g., hand-rearing protocols for kittens).

1.1.5.7.2. Evaluate the need for and establish, if necessary, a captive breeding program. This program would be for the maintenance of a captive population (if indicated) and / or for individuals for reintroduction (see 2.2.1.3.).

1.1.5.7.3. Evaluate the role of alternative breeding strategies including artificial insemination and surrogate mothers that could provide a source of panthers to increase numbers or distribution**.**

1.1.5.7.4. Develop and implement a captive management plan for panthers held in captivity.

1.1.5.7.4.1. Form a captive management working group. This working group should consist of one representative from each institution maintaining or likely to maintain Florida panthers, the panther project veterinarian, and a representative of the FWS, FWC, and

EXHIBIT 22

NPS. Institutional representatives will consist of veterinarians, curators, or other staff involved in panther husbandry.

1.1.5.7.4.2. **Develop a captive management plan.** The captive management team should develop a plan as a guide for the placement and maintenance of panthers held in captivity. This plan should include preventative health, husbandry, reproduction, and captive population management.

1.1.5.7.4.3. **Implement the captive management plan.** Participating institutions will be signators of a MOU relative to adherence to this plan.

1.1.5.7.5. **Establish research priorities for captive panthers which can be applied to management of the free-ranging population.** Investigations could include such topics as vaccination protocols, baseline reproductive physiology, assisted reproduction technologies, and appropriate diseases.

1.1.5.7.6. **Incorporate interpretative education at public facilities where captive panthers are held and prepare public information materials.** See 3.1.3.6. and 3.2.7.

Expansion into South-Central Florida

1.2. **Provide for the expansion of the breeding population of panthers in south Florida into south-central Florida.** The potential for the persistence of the existing population in south Florida can be enhanced by its expansion into south-central Florida.

Feasibility and Habitat Identification

1.2.1. **Continue to evaluate the potential for habitat in south-central Florida to support a breeding population.** Evaluate the quantity and quality of existing panther habitat; likely future habitat trends with respect to human population growth; and patterns of public land ownership, highway expansions, and changing land use practices.

Facilitating Natural Population Expansion

1.2.2. **If there is potential for habitat in south-central Florida to support a breeding population, determine if there are management steps that can be taken to facilitate natural expansion of female panthers into south-central Florida.**

Translocation

EXHIBIT 22

1.2.3. **If natural expansion of female panthers into south-central Florida is not likely, evaluate the feasibility of translocation to establish a breeding population, including an EA or EIS under the NEPA process if necessary.**

1.2.4. **If natural expansion is not likely, develop an expansion plan to guide translocation into south-central Florida.** The plan should include education and outreach (implement actions in Section 3), consider the effects of translocations into south-central Florida on potential reintroductions elsewhere in the historic range, and consider the effects of translocations on the south Florida population.

Suitable Habitat

1.2.5. **Secure, maintain, and restore suitable habitat for panthers that are dispersing into south-central Florida** to support continued dispersal and settlement**.**

1.2.5.1. **Secure a dispersal area north of Caloosahatchee River that maintains connection with habitat south of river.**

1.2.5.2. **Conserve lands buffering the Caloosahatchee River** by fostering compatible land uses and riparian habitat protection directly along the river in order to maintain enough characteristics of panther habitat to allow dispersal northward and genetic exchange should female panthers be successfully established north of the river.

1.2.5.3. **If establishment of a breeding population in south-central Florida is feasible, provide for the conservation and enhancement of other lands necessary for persistence of a population in south-central Florida.**

1.2.6. **Implement appropriate actions in Section 2.**

1.2.6.1. **If the population is expanded into south-central Florida, implement appropriate actions in Section 1.1.**

Reintroduction

2. **Within the historic range, identify, secure, maintain, and restore habitat in potential reintroduction areas and reestablish viable populations of the panther outside of south and south-central Florida.**

Select Reintroduction Sites

2.1. **Select reintroduction areas in cooperation / coordination with the southeastern States within the historic range of the panther.** Use top three sites identified by Thatcher et al. (2006b) as a starting point.

EXHIBIT 22

2.1.1. **In cooperation / coordination with the southeastern States select potential reintroduction areas to be evaluated.**

2.1.2. **Develop and conduct preliminary public scoping to allow effective preplanning of the NEPA process.** This could include the use of focus / stakeholder meetings and opinion and attitude surveys in the Southeast and will build on knowledge gained from previous feasibility studies.

2.1.3. **Identify State and Federal laws, regulations, or policies that could conflict with reintroduction and resolve any potential conflicts** such as predator control policies that conflict with reintroduction.

2.1.4. **Conduct field surveys of selected reintroduction areas.** These evaluations should address habitat quality variables including prey density, available habitat types, distribution, connectivity, topography and understory vegetation for stalking and denning cover, hydroperiods and potential for inundation, future trends in land use, accessibility to humans, and recreational uses.

2.1.5. **Determine if puma are present in selected reintroduction areas** in the Southeast in order to understand any possible conflicts with reintroduction goals. This will be done by checking for sign of existing puma, identifying potential conflicts related to captive puma, and collecting and analyzing genetic samples from suspected wild puma encountered to determine their point-of-origin, if needed.

2.1.6. **Evaluate possible disease and parasite problems in selected reintroduction areas prior to releasing panthers.** Implement actions under 1.1.5.4.

2.1.7. **Consider contaminant issues when evaluating selected reintroduction areas.** Implement actions under 1.1.5.5.

2.1.8. **Use the NEPA process to develop and refine the appropriate reintroduction alternatives and recommend the preferred alternative (e.g., number of sites)**.

2.1.8.1. **Coordinate with the southeastern States, stakeholders, and the public for reintroduction site selection.**

2.1.8.2. **Collect, compare, and analyze sociopolitical data** (including public attitudes / opinions regarding panthers, predators, risks, and support) for identified potential reintroduction areas to help formulate and choose among alternatives.

2.1.8.3. **Using the information obtained in 2.1.8.1 and 2.1.8.2. use the NEPA process to develop and refine appropriate reintroduction alternatives and recommend the preferred alternative**.

EXHIBIT 22

Reintroduce Panthers into Suitable Sites

2.2. Reestablish viable populations outside of south and south-central Florida within the historic range when a suitable reintroduction site is selected.

Source of Panthers for Reintroduction

2.2.1. Determine the number of panthers from each age and sex class that are needed for a reintroduction program.

2.2.2. Evaluate removal of panthers from the wild.

2.2.2.1. Select individual panthers that could be removed for reintroduction without negatively affecting the persistence of the existing population. Removal of individuals cannot jeopardize the panther pursuant to section 7 of the ESA. Create a mechanism to expedite genetic analysis of all panthers genetically sampled to provide data for prudent and timely decision-making. Review of this data should occur annually relative to reintroduction decisions. Use a PVA model to evaluate the affect of translocation on the existing population.

2.2.2.2. Develop a protocol for translocation of panthers from the wild.

2.2.3. Evaluate the need for and establish, if necessary, a captive breeding program. This program would be to produce individuals for reintroduction.

2.2.4. Evaluate the role of alternative breeding strategies and / or source populations, including artificial insemination and surrogate mothers or puma outside of Florida that could provide a source of panthers.

Reintroduction Incentives

2.2.5. Identify and provide incentives and remove disincentives to Federal, State, and local governments and agencies to participate in reintroduction.

2.2.5.1. Identify and provide incentives to Federal, State, and local governments and agencies to participate in reintroduction.

2.2.5.2. Address the legal liability issues for State participation in a reintroduction program. Identify the existing State laws and immunities and obtain a state solicitor's opinion regarding liability, if needed.

2.2.5.3. Provide resources to assist with reintroduction.

EXHIBIT 22

Human Dimensions of Reintroduction

2.2.6. Address human dimensions of reintroduction (including conflicts between stakeholders and panthers) with education, incentives, compensation, and regulatory mechanisms. Social issues include landowner rights, safety for pets and livestock, effects on deer populations, and human safety. Implement actions under Section 3.

2.2.6.1. Develop and implement a protocol and response plan for handling human-panther interactions. Use existing protocols, including the draft Interagency Florida Panther Response Plan being prepared by FWC, NPS, and FWS.

2.2.6.2. Evaluate the need for and, if appropriate, designate experimental populations. Under section 10(j) of the ESA, FWS can designate reintroduced populations established outside the species' current range but within its historical range as "experimental." Designation of a population as experimental increases flexibility and discretion in managing reintroduced listed species.

2.2.6.3. Develop a compensation program for the depredation of livestock in reintroduction areas. An effective compensation program should have two components: proactive measures to prevent or reduce conflict between livestock and panthers, and a method for compensating livestock owners after a confirmed depredation by a panther. Programs established by other States and entities, such as Defenders of Wildlife, could be referenced for guidelines.

2.2.6.3.1. Develop and distribute a landowner, land manager, and lessees panther handbook. The handbook should include recommendations designed to minimize potential problems.

2.2.6.3.2. Provide assistance to landowners, land managers, and lessees to identify and address potential conflicts on their property.

2.2.6.3.3. Develop and implement a compensation program. Minimize procedural requirements for compensation when payment is warranted (once depredation by a panther has been determined and landowner protective efforts have been demonstrated). Partner with stakeholders to determine who receives compensation. Ensure that all individuals are adequately trained in confirming panther depredation.

2.2.6.4. Address concerns of hunters in reintroduction areas.

EXHIBIT 22

2.2.6.4.1. Understand hunting pressure and methods in potential reintroduction areas to identify possible conflicts, including a real or perceived decline in deer populations.

2.2.6.4.2. Partner with hunters and hunting lease holders, including timber companies, to address panther, hunter, and prey issues.

Release of Panthers

2.2.7. Develop a protocol and release panthers into selected reintroduction sites.

Monitoring Reintroduced Panthers

2.2.8. Develop and implement monitoring plans for the selected reintroduction areas.

2.2.9. Minimize and monitor illegal killing.

2.2.9.1. Enforce existing Federal and State laws and regulations regarding illegal killing.

2.2.9.2. Extend ESA "similarity of appearance" protection to puma in applicable portions of the historic range prior to reintroduction. Section 4(e) of the ESA and implementing regulations (50 CFR 17.50–17.52), authorize the treatment of an unlisted species as endangered or threatened if the species so closely resembles in appearance a listed endangered or threatened species that law enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species.

2.2.9.3. Implement a toll free telephone tip number in reintroduction areas as reintroduction is attempted and provide rewards to those that report illegal killing of panthers. Coordinate with existing State programs to avoid duplication.

Actions Once Populations Are Established

2.3. As additional populations are established, implement appropriate actions in Section 1.

Public Awareness and Education

3. Facilitate panther conservation and recovery through public awareness and education. Build support for the recovery effort through education and outreach programs that increase public understanding of panther behavior and recovery needs.

EXHIBIT 22

Design and Develop Materials and Programs

3.1. Design and develop education and outreach materials and programs.

Education Working Group

3.1.1. Form a working group to design and develop education and outreach materials and programs. The group should include social scientists, environmental educators, university academics, conservation organizations, county extension agents, agencies involved in panther recovery, other local groups and community leaders. Organizations can link together in various ways to bring unified, educational, public relations messages to groups of people concerned with panther conservation and recovery.

Social Science Research

3.1.2. Conduct social science research to identify public attitudes, knowledge levels, and concerns about panthers and panther recovery efforts. Draw on expertise of university academics, environmental educators, and social scientists.

3.1.2.1. Identify target audiences, content, strategic messages, and methods of getting the message out using social science research. Existing social science research on panthers and other carnivores such as wolves and bears can also be used. Audiences can include hunt clubs, hunters, outdoor enthusiasts, area landowners, livestock organizations, area leaders, and groups that attract women and minorities (Cramer 1995).

Production of Materials and Programs

3.1.3. Produce necessary materials and programs for public awareness and education.

Natural History, Recovery, and Reduction of Threats to Panthers

3.1.3.1. Produce information on natural history, place in the ecosystem, panther facts, benefits of recovery, and ways to reduce threats to panthers and their habitat. These materials should be produced in English and Spanish**.** This can include concepts such as umbrella species, predator-prey relationships, food web dynamics, cultural importance, only population of pumas remaining in the eastern U.S., historic and current range, attempts at eradication that led to original population declines, timeline of events in panther history, and biology and behavior.

Habitat Conservation and Management

EXHIBIT 22

3.1.3.2. Produce materials and programs regarding panther habitat conservation and management.

3.1.3.2.1. Compile information and produce materials and programs on landowner incentives. See Action 1.1.1.1. for information on incentives and ways to increase economic revenue for private lands.

3.1.3.2.2. Identify ecotourism values and economic incentives related to panthers and develop materials for ecotourism programs.

3.1.3.2.3. Compile information on land management techniques.

3.1.3.2.4. Develop a panther habitat management handbook for public and private land managers based on the best management practices produced under Action 1.1.3.1. Evaluate whether separate handbooks are needed for public and private land managers.

South Florida Population

3.1.3.3. Produce materials and programs regarding the south Florida population and its management.

3.1.3.3.1. Develop materials to inform the public and decision makers about methods for reducing panther-vehicle collisions, including the success of wildlife crossings, crossing design standards, road placement, and speed and volume of traffic. Use existing materials and programs, such as those produced by conservation organizations, wherever appropriate.

Human / Panther Interactions

3.1.3.4. Produce materials and programs regarding human / panther interactions.

3.1.3.4.1. Develop educational material to address human social issues related to panther conservation and recovery. These could include: human safety, safety for pets and livestock, landowner rights, and effects on deer populations. Identify appropriate individuals to distribute information. This can be a mass media campaign including TV, billboards, mailings, and presentations to homeowner groups similar to the FWC Bear Aware education and outreach program.

3.1.3.4.2. Develop a Living With Panthers outreach program. Inform stakeholders about panthers and ways to reduce potential conflicts. Implement this program statewide, especially where panthers live and disperse. Use the media, hunting license sales, pamphlets, signs, and

EXHIBIT 22

other outlets. Model programs on other successful “living with wildlife” efforts such as the FWC Bear Aware program. Address topics such as biology and behavior of panthers, human-panther interactions, factors that affect interactions, how to reduce the likelihood of interactions, protecting pets and livestock, tips for recreation in panther country, and what to do if you encounter a panther.

3.1.3.4.3. **Develop materials and programs to address hunting concerns, such as a real or perceived decline in the deer population.** Draw on organizations experienced with hunting issues, such as the Quality Deer Management Association.

3.1.3.4.4. **Include panther conservation issues in ORV educational materials**. Materials should include regulations and reasons for staying on designated trails. Utilize U.S. Forest Service education and outreach program for ORV use in National Forests.

Population Expansion and Reintroduction

3.1.3.5. **Produce materials and programs regarding population expansion and reintroduction.**

3.1.3.5.1. **Examine sociological information, such as public attitudes in and around reintroduction sites.**

3.1.3.5.2. **Develop a media plan**. This process calls for oversight of logistical, public affairs, and biological aspects of a situation. Public affairs staff will be able to predict what would happen with reintroduction and plan public affairs events, coordinate logistics with other team members, and hold practice sessions of media relations activities. The process also includes regular briefings of staff on key topics and incorporates an assessment of the information needs of mass media news organizations and a media plan for release of panthers (for example see Jacobson 1999:301).

Displays and Programs in Public Environmental Education Centers

3.1.3.6. **Design education displays and programs for public environmental education centers, such as zoos and natural history museums.** Partners can also include the AZA and other affiliated organizations. Use existing programs such as the Panther Glades exhibit at Caribbean Gardens in Naples, Florida, as an example.

Programs and Materials for School Children

EXHIBIT 22

3.1.3.7. Develop education programs and materials for school children. This can include curriculum, participation in panther education and recovery actions, and panther awareness events.

3.1.3.8. Develop materials to promote Florida Panther Day.

Provide Materials and Programs

3.2. Provide materials and programs. Provide information to local planning organizations, decision makers and elected officials, the public, major landowners living in and adjacent to panther habitat, potential new residents and the realtor community, and other audiences as identified by social science research. Include positive proactive programs to keep people interested, involved, and a part of conservation and recovery programs. Programs can be also geared toward achieving voluntary behavior changes as an alternative to restrictions.

Communications Teams

3.2.1. Form communication teams to give presentations to audiences in and adjacent to panther habitat and in selected reintroduction sites.

Media / Public Relations Training for Agency Personnel

3.2.2. Provide media / public relations training for agency personnel who will be on-the-ground and interfacing with the public (including private landowners) and media. This includes staff and law enforcement officers. This can be provided in a workshop and a 5 - 10 page manual.

Distribute Materials and Provide Programs

3.2.3. Distribute materials and information to the public, landowners, and stakeholders.

3.2.3.1. Distribute information on landowner incentives.

3.2.3.2. Provide existing ecotourism facilities and the Visit Florida tourism promotion program with updated information on panthers that they can include in their programs. Ecotourism facilities in south Florida include boat tours, swamp buggy rides, and minibus tours.

3.2.3.3. Distribute information on land management techniques and provide technical assistance to public and private land managers regarding techniques to maintain and increase the value of habitat to panthers and their prey.

EXHIBIT 22

3.2.3.4. Inform the public, landowners, and decision makers about the needs and benefits of invasive species control / management and prescribed fire. Identify and work with existing programs that address invasive species control / management and the value of prescribed fire to panthers and their prey.

3.2.3.5. Distribute information on prey management techniques (including exotic game) on public and private lands.

3.2.3.6. Distribute materials to promote Florida Panther Day. This could include the media, schools, environmental education facilities, and others.

South Florida Population

3.2.4. Provide materials and programs regarding the south Florida panther population and its management.

3.2.4.1. Provide information on genetic restoration. This should be directed at clearing up misinformation about genetic restoration as well as informing the public about the benefits and potential needs for genetic restoration. Include historical information on *Puma* subspecies, how the plan was formulated and implemented, and results of the program.

3.2.4.2. Provide information on panther conservation issues in ORV educational materials.

3.2.4.3. Educate sportsmen groups and the public about the legal consequences of illegal harassment. This includes the need for recognizing harassment activities, the detrimental effects that may result from harassment (physical injury, physiological stress, reduced litter size, morbidity), and the importance of preventing actions that constitute harassment.

3.2.4.4. Provide information on panther management, including monitoring.

Human / Panther Interactions

3.2.5. Provide materials and programs regarding human / panther interactions.

3.2.5.1. Provide education and outreach to residents living in and adjacent to panther habitat. Include the realtor community. Include tips for living in panther habitat.

3.2.5.2. Provide tips for recreating in panther habitat.

3.2.5.3. Provide information on protecting livestock and pets. Outreach efforts need to reassure livestock owners that the chance of their livestock being

EXHIBIT 22

taken by a panther can be minimized, and if it does happen, they may be compensated through a depredation fund.

3.2.5.4. **Provide outreach materials to address hunting concerns.** Include information regarding the effects of panthers on hunted prey species and hunting success. Provide information to hunters and hunt clubs. Use results from social science research.

Population Expansion and Reintroduction

3.2.6. **Provide materials and programs regarding population expansion and reintroduction.**

3.2.6.1. **Engage and provide materials to landowners and the public in south-central Florida to build support for restoring and maintaining habitat and for expansion and reintroduction.**

3.2.6.2. **Target education at reintroduction sites to address social issues in advance of releasing panthers.** Opinion surveys and conservation education should be the cornerstone of reintroduction.

3.2.6.3. **Continue education and outreach efforts after panthers are released into a reintroduction site.** Include regular contacts with area residents / landowners about the program. Continually reinforce and address panther conservation messages, especially as problems arise.

3.2.6.4. **Identify existing ecotourism facilities and State ecotourism boards in or near selected reintroduction sites and provide them with updated panther information.** Information can be provided on an on-going basis in a format that is simple for the facilities to include in their programs.

Displays and Programs in Public Environmental Education Centers

3.2.7. **Identify and work with existing environmental education facilities to provide or enhance panther education displays and programs.** This includes Jacksonville Zoo, Lowry Park Zoo, the Tallahassee Museum, Caribbean Gardens, and Busch Gardens.

Programs and Materials for School Children

3.2.8. **Distribute education programs and materials to school children.**

Evaluation

3.3. **Evaluate outreach and educational materials and programs.** Monitor the programs as they are implemented. Evaluate education and outreach efforts, especially to assess

EXHIBIT 22

changes in human behavior and attitude. A good example of program evaluation is the FWC Bear Aware *Black Bear Public Education Program.* Evaluation data should be compared to preliminary social science research (pre-program measurement) to provide a post-program measurement.

3.4. Revise materials where evaluation indicates a need.

EXHIBIT 22

V. IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows outlines actions and estimated costs for the recovery program for the Florida panther, as set forth in this recovery plan. It is a guide for meeting the recovery goal and criteria outlined in this plan. This schedule indicates action priorities, action numbers, action descriptions, duration of actions, the parties potentially responsible for actions (either funding or carrying out), and estimated costs. Parties believed to have authority or responsibility for implementing a specific recovery action are identified in the Implementation Schedule. When more than one party has been identified, the proposed lead party is indicated by an asterisk (*). The listing of a party in the Implementation Schedule does not require the identified party to implement the action(s) or to secure funding for implementing the action(s).

Priority Number

Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.

Priority 2 - An action that must be taken to prevent a significant decline in species population, habitat quality, or some other significant negative impact short of extinction.

Priority 3 - All other actions necessary to provide for full recovery of the species.

Work on or completion of priority 1, 2, or 3 actions may take place concurrently.

EXHIBIT 22

Participants and Other Parties Referenced in the Implementation Schedule

COE	U.S. Army Corps of Engineers
counties	South Florida counties
DCA	Department of Community Affairs
EPA	Environmental Protection Agency
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOF	Florida Division of Forestry
FDOT	Florida Department of Transportation
FHP	Florida Highway Patrol
FHwA	Federal Highway Administration
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
FWS	U.S. Fish and Wildlife Service
IFAS	Institute of Food and Agricultural Science
local governments	City and county agencies
NGO	Non-governmental organization
NPS	National Park Service
NRCS	Natural Resources Conservation Service
private	Private industry, landowners, etc.
State agencies	State natural resource agencies
Tribes	Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida
universities	Public and private universities
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WMD	Water Management Districts located in south Florida

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
Existing Population										
South Florida Habitat										
Non-Regulatory Incentive Programs										
3	1.1.1.1.1.	Develop Safe Harbor Agreements	Continuous	FWS*, private						Cost included in standard operating budget of Federal agency.
3	1.1.1.1.2.	Focus available incentive programs to restore and enhance habitat	Continuous	FWS*, FWC*, NRCS, NGO, FDOF, IFAS, counties, private	60	60	60	60	60	Cost included in standard operating budgets of agencies.
3	1.1.1.1.3.	Explore the creation of new panther conservation incentive programs	3 years	FDEP, FWC, FWS, NRCS, counties, local governments, NGO, private	10	10	10			
1	1.1.1.1.4.1.	Revise and implement the preliminary project proposal developed for expansion of FPNWR	10 years	FWS*						Cost dependent upon land prices.
3	1.1.1.1.4.2.	Modify existing land appraisal procedures	5 years	Local governments	10	10	10	10	10	
3	1.1.1.1.4.3.	Conduct an annual review of Florida Forever projects and rate them with respect to panther conservation values	Continuous	FWC*, FWS, NPS, NGO	1.5	1.5	1.5	1.5	1.5	
1	1.1.1.1.5.	Identify and support local initiatives to protect habitat and purchase development rights	Continuous	FWS, FWC, counties, local governments	10	10	10	10	10	
Regulatory Programs										
2	1.1.1.2.1.	Create a Federal / State working group to	< 1 year	FWS, FWC, FDEP, COE,						Cost included in standard operating budgets of

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		coordinate permit review and consultation		EPA, NRCS, FDOF, WMD, NPS, FDOT, FHwA, USFS, local governments						agencies.
2	1.1.1.2.2.	Track permits, especially incidental take and compensation received, issued through Federal and State regulatory programs	Continuous	FWS*, FWC, FDEP, COE, EPA, NRCS, FDOF, WMD, NPS, FDOT, FHwA, USFS	5	5	5	5	5	Cost included in standard operating budgets of agencies. Much of the information is available, but needs interagency coordination.
2	1.1.1.2.3.1.	Ensure that panther conservation and protection of habitat is included in the State Clearinghouse (SAI) reviews of Federal activities	Continuous	FWC*, FDEP						Cost included in standard operating budgets of agencies.
1	1.1.1.2.3.2.	Ensure that the section 7 consultation process is utilized and that the best available science is used in development of biological opinions	Continuous	FWS*, COE, EPA, NPS, FHwA, NRCS, USFS						Cost included in standard operating budgets of agencies.
2	1.1.1.2.3.3.	Avoid adverse effects to habitat (including prey) attributable to CERP and other water management projects	10 years	FWS*, COE, FDEP, FWC, NPS, WMD, FDOF	200	200	200	200	200	Cost for identifying effects is included in standard operating budgets of agencies. Additional funds are needed for monitoring.
2	1.1.1.2.4.1.	Provide review and recommendations to FDEP,	Continuous	FWC*, FDEP, WMD						Cost included in standard operating budgets of

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		Department of Community Affairs, WMDs, and other State agencies on permit applications that can potentially impact habitat								agencies.
2	1.1.1.2.4.2.	Work with counties and municipalities to modify and amend Comprehensive Plans to include the goal of no net loss of quantity, quality, or functionality of habitat in Primary, Secondary, and Dispersal Zones	Continuous	FWC*, FDEP, counties, local governments						Cost included in standard operating budgets of agencies.
1	1.1.1.2.4.3.	Develop a mechanism for providing compensation for projects that affect small acreages (e.g., single family residences) of habitat	2 years	FWS*, FWC, COE, local governments	10	10				
2	1.1.1.2.4.4.	Initiate and encourage landscape level HCPs where proposed non-Federal actions or projects will impact panthers or their habitat	Continuous	FWS*, FWC, counties, private, local governments, NGO						Cost included in standard operating budgets of agencies.
	Habitat Fragmentation, Connectivity, and Spatial Extent									
1	1.1.1.3.1.1.	Quantitatively assess factors that define dispersal corridors and use least-cost pathways analysis to identify potential habitat corridors	2-3 years	FWC*, NPS, FWS, USGS, universities	30	30	30			
1	1.1.1.3.1.2.	Restore habitat in potential corridors identified by	Continuous	FWC*, FWS*, FDEP*, NGO,						Cost dependent upon number of willing

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		least-cost pathways analysis		private, FDOF, WMD, local government						landowners.
1	1.1.1.3.1.3.1.	Secure the Dispersal Zone	Continuous	FWC*, FWS, FDEP*, NGO, private, FDOF, WMD, local government						Cost dependent upon number of willing landowners and land prices.
1	1.1.1.3.1.3.2.	Secure Camp Keais Strand	Continuous	FWC*, FWS, FDEP*, NGO, private, FDOF, WMD, local government						Cost dependent upon number of willing landowners and land prices.
1	1.1.1.3.1.3.3.	Secure a corridor between BCNP and Okaloacoochee Slough	Continuous	FWC*, FWS*, FDEP*, NPS, NGO, private, FDOF, WMD, local government						Cost dependent upon number of willing landowners and land prices.
2	1.1.1.3.1.3.4.	Consider maintenance of habitat corridors for panthers during Everglades restoration to avoid isolation of the ENP subpopulation	30 years	FWS*, COE, FDEP, FWC, NPS, WMD	5	5	5	5	5	
1	1.1.1.3.2.	Maintain spatial extent and arrangement	Continuous	FWC*, FWS, NPS, NGO, NRCS, FDEP*, FDOF, WMD, private, counties, local governments						Cost dependent upon land prices.
Negative Impacts of Roads on Panther Habitat – South Florida										
2	1.1.1.4.1.	Ensure that panther habitat	Continuous	FWS, FWC,	10	10	10	10	10	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		needs are incorporated in the planning of new roads and road expansion projects.		FDOT, FHwA, counties, local government, NGO, COE, FDEP, DCA						
1	1.1.1.4.2.	Identify current and planned roads that could affect panthers, eliminate roads where possible, and retrofit priority areas with crossings and fencing as appropriate to promote connectivity and dispersal	Continuous	FWS*, FWC, NPS, FDOT, FHwA, counties, local government, NGO, COE, FDEP, DCA	15	15	15	15	15	Cost to retrofit priority areas will be site-specific.
1	1.1.1.4.3.	Secure habitat adjacent or contiguous to areas of high risk for panther-vehicle collisions	Continuous	FDEP*, FWS, FWC*, NPS, FDOT, FHwA, counties, local government, NGO, COE, DCA						Cost will be site-specific.
3	1.1.1.4.4.	Determine the impacts of roads on range expansion and dispersal	3 years	FWC*, NPS, FWS, universities, USGS	50	50	50			
Habitat Restoration in Primary, Secondary, and Dispersal Zones										
3	1.1.2.1.	Identify and prioritize tracts suitable for restoration	3 years	FWC*, NRCS, USGS, FNAI, universities, FWS	50	50	50			
2	1.1.2.2.	Provide incentives and mechanisms for restoration of agricultural and range lands	Continuous	NRCS, FWC, FWS, FDEP, FDACS	30	30	30			Costs to be determined for remaining years.
2	1.1.2.3.	Develop / expand funding	Continuous	NRCS, FWC,	30	30	10	10	10	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s) FY1	FY2	FY3	FY4	FY5	Comments
		mechanisms and other incentives for habitat restoration		FWS, FDEP, NGO, private						
3	1.1.2.4.1.	Facilitate and conduct habitat restoration research	10 years	FWC*, NRCS, USGS, FWS, universities, NGO	200	200	200	200	200	
3	1.1.2.4.2.	Monitor and evaluate restoration projects	Continuous	FWC, NRCS, USGS, FWS, universities, NGO	30	30	30	30	30	
Habitat Management – South Florida										
2	1.1.3.1.	Develop, disseminate, and implement best management practices for managing habitat	2 years	FWS, FWC, NPS, NRCS, FDEP, FDOF, counties, local governments	25	25				Much of the information needed is available but needs interagency coordination.
Public Land Management – South Florida										
2	1.1.3.2.1.	Formalize a network of south Florida public land managers	< 1 year	FWS*, FWC, NPS, FDEP, FDOF, WMD, counties, local governments						Cost included in standard operating budgets of agencies.
2	1.1.3.2.2.	Prepare, review, and implement habitat management plans for public lands	Continuous	FWS, FWC, NPS, FDEP, FDOF, WMD, counties, local governments	100	100	100	100	100	
2	1.1.3.2.3.	Track habitat management activities and their effects on panthers	Continuous	FWC*, FWS, NPS, FDEP, FDOF, FNAI, WMD, counties, local governments	30	30	30	30	30	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
Private Land Management – South Florida										
2	1.1.3.3.1.	Provide incentives and assistance to willing landowners	Continuous	FWS, FWC, NRCS, FDOF, IFAS, counties, private, NGO	60	60	60	60	60	
1	1.1.3.3.2.	Provide incentives and work with landowners to encourage them not to convert their lands to less suitable habitat	Continuous	FWS, FWC, NRCS, IFAS, FDOF, counties, private, NGO						Costs will be site-specific.
3	1.1.3.3.3.	Review and comment on county stewardship plans	Periodic	FWS*, FWC, NRCS, FDEP counties, private, NGO						Cost included in standard operating budgets of agencies.
Monitoring Habitat – South Florida										
2	1.1.4.1.	Quantify 24-hour habitat use and movement patterns	3 years	FWC*, NPS	450	450	450			
2	1.1.4.2.	Update Kautz et al. (2006) maps every five years	Periodic	FWS, FWC, USGS, universities	60					
South Florida Population										
Demographics										
2	1.1.5.1.1.	Convene a group of agency and independent experts to conduct an appropriate PVA	2 years	FWS*, FWC, NPS, USGS, universities	30	30				
1	1.1.5.1.2.	Continue to determine and monitor demographic variables	Continuous	FWC*, NPS, FWS	750	750	750	750	750	
2	1.1.5.1.3.	Develop and implement annual capture and monitoring work plans	Continuous	FWC*, NPS, FWS						Costs included in item 1.1.6.1.2.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
	Genetic Diversity									
1	1.1.5.2.1.	Continue to monitor physical and physiological characteristics correlated with inbreeding and depletion of genetic variability	Continuous	FWC*, NPS, FWS						Costs included in item 1.1.6.1.2.
1	1.1.5.2.2.	Develop and implement a genetics management plan	Continuous	FWS*, FWC, NPS, universities, private	30	30				Costs for remaining years to be determined.
2	1.1.5.2.3.	Develop a population model to predict future genetic consequences of management proposals and actions	3 years	FWS, FWC, NPS, USGS, universities	50	50	50			
	Harassment, Injury, and Mortality									
2	1.1.5.3.1.1.	Identify harassment activities	Continuous	FWS, FWC, NPS	10	10	10	10	10	
2	1.1.5.3.1.2.1.	Manage public access to minimize harassment opportunities	Continuous	FWS, FWC, NPS, FDEP, WMD, FDOF, counties, local governments	1	1	1	1	1	
3	1.1.5.3.1.2.2.	Develop ORV management plans where ORVs are allowed	Periodic	FWS, FWC, NPS, FDEP, WMD, FDOF, counties, local governments	10	10	10	10	10	
3	1.1.5.3.1.2.3.	Enforce regulations and statutes regarding discharge of firearms, explosive devices, or other loud noise sources	Continuous	FWS, FWC, NPS, FDEP, WMD, FDOF, counties, local governments	1	1	1	1	1	Cost included in standard operating budgets of agencies.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
3	1.1.5.3.1.3.1.	Post and maintain regulatory and informational signs	Continuous	FWS, FWC, NPS, FDEP, WMD, FDOF, counties, local governments	15	15	15	15	15	
2	1.1.5.3.1.3.2.	Enforce existing laws and regulations	Continuous	FWS, FWC, NPS, FDEP, WMD, FDOF, counties, local governments						Cost included in standard operating budgets of agencies.
2	1.1.5.3.2.	Enforce existing Federal and State laws and regulations to minimize and prevent illegal killing	Continuous	FWS, FWC, NPS, FDEP, WMD, FDOF						Cost included in standard operating budgets of agencies.
2	1.1.5.3.3.1.1.	Convene a working group to prioritize and address actions needed in panther-vehicle collision areas	2-3 years	FWS, FWC, NPS, FDOT, counties, NGO, private						Cost included in standard operating budgets of agencies and groups.
2	1.1.5.3.3.1.2.	Secure funding for and install wildlife crossings and fencing in high risk areas	Continuous	FDOT*, FWS, FWC, NPS, counties, NGO, FHwA, private						Costs will be site-specific.
2	1.1.5.3.3.1.3.	Evaluate and implement other mechanisms to prevent mortalities on roads	Continuous	FWC*, FDOT, FWS, NPS, FHwA, counties, NGO, private						Cost depends on mechanism and site.
2	1.1.5.3.3.2.	Build mechanisms into permits for road projects to provide for adaptive management for panther mortality and / or other unforeseen problems	Continuous	FWC*, FWS, FDOT, COE, FHwA						Cost included in standard operating budgets of agencies.
2	1.1.5.3.3.3.	Develop new strategies to	Continuous	FDOT, FWS,						Cost depends upon

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**Estimated Fiscal Year Costs ($000s)**					**Comments**
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
		prevent road mortalities or injuries		FWC, NPS, counties, NGO, private						technology.
3	1.1.5.3.3.4.	Enforce existing speed zones, monitor effectiveness, and modify as needed	Continuous	FHP, counties, FWC, FWS, NPS						Cost included in standard operating budgets of agencies.
3	1.1.5.3.4.1.	Provide adequate resources and facilities for rehabilitation of panthers that might be injured or orphaned during capture and monitoring efforts	Continuous	FWS, FWC, NPS, NGO, private						Cost depends in part upon individual operating costs for each facility.
3	1.1.5.3.4.2.	Develop, implement, review, and revise protocols (i.e., research, monitoring, capture, handling) as needed to minimize risks to panthers	Continuous	FWC*, NPS, FWS						Cost included in standard operating budgets of agencies.
Diseases and Parasites										
3	1.1.5.4.1.1.	Continuously evaluate the value of specific vaccinations and review all vaccination protocols annually	Continuous	FWC*, NPS, FWS						Cost included in standard operating budgets of agencies.
1	1.1.5.4.1.2.	Revise vaccination protocols as appropriate considering new disease threats as they arise	As needed	FWC*, NPS, FWS						Cost depends on threat, included in standard operating budgets of agencies.
1	1.1.5.4.2.1.	Collect appropriate tissue and blood samples from all panthers handled, both live and dead, and analyze them for the presence of priority	Continuous	FWC*, NPS, FWS	60	60	60	60	60	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		diseases and parasites								
2	1.1.5.4.2.2.	Evaluate the disease threats presented by other species including bobcats and domestic cats and identify any needed management intervention	3 years	FWC, NPS, FWS, USGS, universities	60	60	60			
1	1.1.5.4.2.3.	Implement appropriate management strategies for disease and parasite monitoring and control	As needed	FWC, NPS, FWS						Case-specific costs.
Environmental Contaminants										
3	1.1.5.5.1.	Produce a summary report and database of contaminants in panthers and their environment in south Florida	2 years	FWS, FWC, EPA, FDEP, universities	30	30				
2	1.1.5.5.2.	Continue to monitor contaminants, especially mercury and endocrine disruptors, in panthers and their prey	Continuous	FWC, NPS, FWS						Cost included in standard operating budgets of agencies.
2	1.1.5.5.3.	Implement actions necessary to remediate contaminants in high risk areas	As needed	EPA, FDEP, FWS, NPS, COE, FWC, FDACS, FDOF, FDOT, counties, local governments						Cost will be site-specific.
Prey Base										
2	1.1.5.6.1.1.	Assess and monitor the status of deer populations in panther habitat	Continuous	FWC, FWS, NPS, FWS, Tribes, FDOF, FDEP, WMD	70	70	70	70	70	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
3	1.1.5.6.1.2.	Develop deer harvest regulations that do not compromise the panther prey base and take into consideration food requirements of the panther	Continuous	FWC, NPS, FWS, Tribes, FDOF, FDEP, WMD	5	5	5	5	5	
2	1.1.5.6.1.3.	Continue to monitor the impacts on panthers of hunting on public and private lands in panther habitat	Continuous	FWC*, NPS, FWS, Tribes, FDOF, FDEP, WMD	5	5	5	5	5	
2	1.1.5.6.2.	Encourage management / control of feral hog populations that does not threaten the panther	Continuous	FWC, NPS, FWS, Tribes, FDOF, WMD	20	20	20			Costs to be determined for remaining years.
3	1.1.5.6.3.1.	Continue statewide monitoring for chronic wasting disease and other emerging wildlife and domestic animal diseases and implement available eradication or control methods	Continuous	FWC, FWS, NPS, USDA, FDACS	117	117	117	117	117	
3	1.1.5.6.3.2.	Identify, map, and appropriately monitor and regulate exotic animal operations that could serve as a source of infection for wild populations	Continuous	FWC, USDA, FDACS, FWS	75	75	75	75	75	
3	1.1.5.6.3.3.	Coordinate with the southeastern States to review protocols and regulations that require imported ungulates to be	Continuous	FWS, USDA, State agencies	2	2	2	2	2	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		disease-free								
Captive Management										
2	1.1.5.7.1.	Develop guidance for the removal of panthers from the wild	1-2 years	FWC, FWS, NPS, NGO, universities	10	10				
3	1.1.5.7.2.	Evaluate the need for and establish, if necessary, a captive breeding program	As needed / Continuous	FWS, FWC, NPS, private						Costs to be determined.
3	1.1.5.7.3.	Evaluate the role of alternative breeding strategies	As needed / Continuous	FWS, FWC, NPS, private						Cost included in item 1.1.7.7.4.2.
3	1.1.5.7.4.1.	Form a captive management working group	< 1 yr	FWS, FWC, NPS, private						Cost included in standard operating budgets of agencies.
3	1.1.5.7.4.2.	Develop a captive management plan	1-2 years	FWS, FWC, NPS, private	10	10				
3	1.1.5.7.4.3.	Implement the captive management plan	As needed / Continuous	FWS, FWC, NPS, private						Costs to be determined.
3	1.1.5.7.5.	Establish research priorities for captive panthers which can be applied to management of the free-ranging population	1 year	FWS, FWC, NPS, private						Cost included in item 1.1.7.7.4.2.
3	1.1.5.7.6.	Incorporate interpretative education at public facilities where captive panthers are held and prepare public information materials	2 years	NGO*, Private, FWS, FWC, NPS, universities	30	30				
Expansion into South-Central Florida										
Feasibility and Habitat Identification										
2	1.2.1.	Continue to evaluate the potential for habitat in south-central Florida to	1 year	FWS, USGS, universities	50					

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
		support a breeding population								
Facilitating Natural Population Expansion										
2	1.2.2.	If there is potential for habitat in south-central Florida to support a breeding population, determine if there are management steps that can be taken to facilitate natural expansion of female panthers into south-central Florida	1 year	FWC, FWS						Cost included in standard operating budgets of agencies.
Translocation										
3	1.2.3.	If natural expansion of female panthers into south-central Florida is not likely, evaluate the feasibility of translocation to establish a breeding population, including an EA or EIS under the NEPA process if necessary	3-5 years	FWS, FWC, NPS						Cost included in standard operating budgets of agencies.
3	1.2.4.	If natural expansion is not likely, develop an expansion plan to guide translocation into south-central Florida	1 year	FWS, FWC, NPS						Cost included in standard operating budgets of agencies.
Suitable Habitat										
2	1.2.5.1.	Secure a dispersal area north of Caloosahatchee River that maintains connection with habitat south of river	5 years	FWS, FWC, WMD, FDEP, FDOF, counties, private						Costs will be site-specific.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
3	1.2.5.2.	Conserve lands buffering the Caloosahatchee River	Continuous	FWS, FWC, WMD, FDEP, FDOF, NGO, counties, private						Cost included in standard operating budgets of agencies.
3	1.2.5.3.	If establishment of a breeding population in south-central Florida is feasible, provide for the conservation and enhancement of other lands necessary for persistence of a population in south-central Florida	Continuous	FWS, FWC, WMD, FDEP, FDOF, NGO, counties, private						Costs will be site-specific.
3	1.2.6.1.	If the population is expanded into south-central Florida, implement appropriate actions in Section 1.1	Continuous	FWS, FWC, WMD, FDEP, FDOF, counties, private						Costs dependent upon actions needed.
Reintroduction										
Select Reintroduction Sites										
2	2.1.1.	In cooperation / coordination with the southeastern States select potential reintroduction areas to be evaluated	1-2 years	FWS, State agencies, USFS						Cost included in standard operating budgets of agencies.
2	2.1.2.	Develop and conduct preliminary public scoping to allow effective preplanning of the NEPA process	1-2 years	FWS, State agencies, USGS, USFS, universities	50	50				
3	2.1.3.	Identify State and Federal laws, regulations, or policies that could conflict	1-2 years	FWS*, State agencies, USGS, USFS,						Cost included in standard operating budgets of agencies.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**Estimated Fiscal Year Costs ($000s)**					**Comments**
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
		with reintroduction and resolve any potential conflicts		universities						
3	2.1.4.	Conduct field surveys of selected reintroduction areas	3 years	FWS*, State agencies, USGS, USFS, universities	100	100	100			
3	2.1.5.	Determine if puma are present in selected reintroduction areas	1-2 years	FWS*, State agencies, USGS, USFS, universities	40	40				
3	2.1.6.	Evaluate possible disease and parasite problems in selected reintroduction areas prior to releasing panthers	1-2 years	FWS*, State agencies, USGS, USFS, universities	30	30				
3	2.1.7.	Consider contaminant issues when evaluating selected reintroduction areas	1-2 years	FWS*, State agencies, USGS, USFS universities, EPA	30	30				
2	2.1.8.1.	Coordinate with the southeastern States, stakeholders, and the public for reintroduction site selection	2 years	FWS*, state agencies and local governments, USDA, USFS, universities, private, NGO						Cost included in standard operating budgets of agencies.
3	2.1.8.2.	Collect, compare, and analyze sociopolitical data	2 years	FWS*, State agencies and local governments, USGS, USFS, universities,	50	50				

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
				NGO						
3	2.1.8.3.	Using the information obtained in 2.1.8.1 and 2.1.8.2. use the NEPA process to develop and refine appropriate reintroduction alternatives and recommend the preferred alternative	1-2 years	FWS*, State agencies, USFS, NGO						Cost included in standard operating budgets of agencies.
Reintroduce Panthers into Suitable Sites										
Source of Panthers for Reintroduction										
2	2.2.1.	Determine the number of panthers from each age and sex class that are needed for a reintroduction program	1 year	FWS*, FWC, State agencies and local governments, USGS, NPS universities	30					
2	2.2.2.1.	Select individual panthers that could be removed for reintroduction without negatively affecting the persistence of the existing population	1 year	FWS, FWC, NPS, USGS, universities						Cost included in standard operating budgets of agencies.
3	2.2.2.2.	Develop a protocol for translocation of panthers from the wild	1 year	FWS*, FWC, NPS, USGS, universities						Cost included in standard operating budgets of agencies.
3	2.2.3.	Evaluate the need for and establish, if necessary, a captive breeding program	1-2 years	FWS, FWC, NPS, private						Cost for evaluation included in standard operating budgets of agencies. Costs for establishment to be determined.
3	2.2.4.	Evaluate the role of	1 year	FWS, FWC,						Cost included in standard

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
					Estimated Fiscal Year Costs ($000s)					
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**FY1**	**FY2**	**FY3**	**FY4**	**FY5**	**Comments**
		alternative breeding strategies and / or source populations		NPS, private						operating budgets of agencies.
Reintroduction Incentives										
2	2.2.5.1.	Identify and provide incentives to Federal, State, and local governments and agencies to participate in reintroduction	1-2 years	FWS, State agencies, local governments, county, USFS						Cost included in standard operating budgets of agencies.
3	2.2.5.2.	Address the legal liability issues for State participation in a reintroduction program	1 year	FWS, State agencies						Cost dependent on solution.
3	2.2.5.3.	Provide resources to assist with reintroduction	Continuous	FWS, State agencies, NGO, private						State / site-specific costs.
Human Dimensions of Reintroduction										
3	2.2.6.1.	Develop and implement a protocol and response plan for handling human-panther interactions	Continuous	FWS, State agencies, NGO, USFS, NPS	7	7	7	7	7	
3	2.2.6.2.	Evaluate the need for and, if appropriate, designate experimental nonessential populations	1-2 years	FWS						Cost included in standard operating budget of agency.
3	2.2.6.3.1.	Develop and distribute a landowner, land manager, and lessees panther handbook	2 years	FWS, State agencies, NGO, USDA, private, USFS, NPS	10	20				
3	2.2.6.3.2.	Provide assistance to landowners, land managers, and lessees to identify and address potential conflicts on their property	Continuous	FWS, State agencies, NGO, NRCS, private						Cost included in standard operating budgets of agencies.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
3	2.2.6.3.3.	Develop, fund, and implement a compensation program	Continuous	FWS, State agencies, NGO, USDA, private						State / site-specific costs.
3	2.2.6.4.1.	Understand hunting pressure and methods in potential reintroduction areas to identify possible conflicts, including a real or perceived decline in deer populations	2 years	FWS, State agencies, NGO, private	5	5				
3	2.2.6.4.2.	Partner with hunters and hunting lease holders, including timber companies, to address panther, hunter, and prey issues	Continuous	FWS, State agencies, NGO, USDA, private						State / site-specific costs.
Release of Panthers										
1	2.2.7.	Develop a protocol and release panthers into selected reintroduction sites	Continuous / As needed	FWS, State agencies, NGO, private, USGS, universities						State / site-specific costs.
Monitoring Reintroduced Panthers										
3	2.2.8.	Develop and implement monitoring plans for the selected reintroduction areas	Continuous	FWS, State agencies, USGS, USFS universities	100	100	100	100	100	
3	2.2.9.1.	Enforce existing Federal and State laws and regulations regarding illegal killing	Continuous	FWS, State agencies, USFS						Cost included in standard operating budgets of agencies.
3	2.2.9.2.	Extend ESA “similarity of appearance” protection to puma in applicable portions of the historic range prior to	2 years	FWS						Cost included in standard operating budget of agency.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
		reintroduction								
3	2.2.9.3.	Implement a toll free telephone tip number in reintroduction areas	Continuous	FWS, State agencies	2	2	2	2	2	
Actions Once Populations Are Established										
3	2.3.	As additional populations are established, implement appropriate actions in Section 1	As needed							Duration, participants, and costs depend on actions as well as State / site selection.
Public Awareness and Education										
Design and Develop Materials and Programs										
Education Working Group										
2	3.1.1.	Form a working group to design and develop education and outreach materials and programs	Continuous	FWS*, FWC, NPS, USDA, NRCS, FDEP, FDOF, WMD, State agencies, NGO	10	10	10	10	10	
Social Science Research										
2	3.1.2.1.	Identify target audiences, content, strategic messages, and methods of getting the message out using social science research	1 year	FWS, FWC, NPS, USFS, NRCS, FDOF, WMD, State agencies, NGO	30					
Production of Materials and Programs										
Natural History, Recovery, and Reduction of Threats to Panthers										
3	3.1.3.1.	Produce information on natural history, place in the ecosystem, panther facts, benefits of recovery, and ways to reduce threats to panthers and their habitat	Continuous	FWS, FWC, FDEP, NPS, NRCS, FDOF, USFS, WMD, NGO, State agencies, counties, local governments,	50	50	50	50	50	

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**Estimated Fiscal Year Costs ($000s)**					**Comments**
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
				universities, private						
Habitat Conservation and Management										
3	3.1.3.2.1.	Compile information and produce materials and programs on landowner incentives	Continuous	FWS, FWC, FDEP, NPS, NRCS, FDOF, USFS, WMD, NGO, State agencies, counties, local governments, universities, private	10	10	10	10	10	
3	3.1.3.2.2.	Identify ecotourism values and economic incentives related to panthers and develop materials for ecotourism programs	1-2 years	FWS, State agencies, NGO, private, universities	25					
3	3.1.3.2.3.	Compile information on land management techniques	1-2 years	FWS, FWC, NRCS, FDEP, FDOF, WMD, NGO	30	30				
3	3.1.3.2.4.	Develop a panther habitat management handbook for public and private land managers based on the best management practices	1-2 years	FWS, FWC, NRCS, FDEP, FDOF, WMD, NGO						Costs included in 3.1.3.2.3.
South Florida Population										
3	3.1.3.3.1.	Develop materials to inform the public and decision makers about methods for reducing panther-vehicle collisions	Continuous	FWS, FWC, NPS, USDA, NRCS, FDOF, WMD, State agencies, NGO						Costs included in 3.1.3.1.
Human / Panther Interactions										

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**Estimated Fiscal Year Costs ($000s)**					**Comments**
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
3	3.1.3.4.1.	Develop educational material to address human social issues related to panther conservation and recovery	Continuous	FWS, FWC, FDEP, NPS, NRCS, FDOF, USFS, WMD, NGO, State agencies, counties, local governments, universities, private	20	20	20	20	20	
2	3.1.3.4.2.	Develop a Living With Panthers outreach program	1 year	FWS, FWC, NPS, Tribes, NRCS, NGO, State agencies	15					
3	3.1.3.4.3.	Develop materials and programs to address hunting concerns, such as a real or perceived decline in the deer population	2-3 years	FWS, FWC, NPS, USGS, universities, State agencies, NGO	10	10	10			
3	3.1.3.4.4.	Include panther conservation issues in ORV educational materials	Continuous	FWS, FWC, NPS, USFS, NRCS, FDOF, WMD, State agencies, NGO	1	1	1	1	1	
	Population Expansion and Reintroduction									
2	3.1.3.5.1.	Examine sociological information, such as public attitudes in and around reintroduction sites	2-3 years	FWS, USGS, universities, State agencies, NGO	30	30	30			
2	3.1.3.5.2.	Develop a media plan	1 year	FWS, FWC, NPS, Tribes, NGO, State agencies	100					
	Displays and Programs in Public Environmental Education Centers									

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
3	3.1.3.6.	Design education displays and programs for public environmental education centers, such as zoos and natural history museums	Continuous	FWS, FWC, NPS, Tribes, NGO, State agencies, private	50	5	5	5	5	
Programs and Materials for School Children										
3	3.1.3.7.	Develop education programs and materials for school children	1 year	FWS, FWC, NPS, Tribes, NGO, State agencies, private	100					
3	3.1.3.8.	Develop materials to promote Florida Panther Day	1 year	FWC*, NPS, FWS, NGO, State agencies, private	30					
Provide Materials and Programs										
Communications Teams										
3	3.2.1.	Form communication teams to give presentations to audiences in and adjacent to panther habitat and in selected reintroduction sites	Continuous	FWS, FWC, NPS, USFS, NRCS, FDEP, FDOF, WMD, State agencies, NGO	5	5	5	5	5	
Media / Public Relations Training for Agency Personnel										
2	3.2.2.	Provide media / public relations training for agency personnel who will be on-the-ground and interfacing with the public (including private landowners) and media	Continuous	NRCS, FWS, FWC, NPS, NRCS, Tribes, NGO, State agencies, private	5	5	5	5	5	
Distribute Materials and Provide Programs										
3	3.2.3.1.	Distribute information on landowner incentives	Continuous	FWS, FWC, FDEP, NPS,						Costs included in 3.2.3.3.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**Estimated Fiscal Year Costs ($000s)**					**Comments**
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
				NRCS, FDOF, USFS, WMD, NGO, State agencies, counties, local governments, universities, private						
3	3.2.3.2.	Provide existing ecotourism facilities and the Visit Florida tourism promotion program with updated information on panthers	Continuous	NPS, FWS, FWC, Tribes, private, NGO	7	5	5	5	5	
2	3.2.3.3.	Distribute information on land management techniques and provide technical assistance to public and private land managers regarding techniques to maintain and increase the value of habitat to panthers and their prey	Continuous	FWS, FWC, NRCS, FDEP, FDOF, WMD, NGO	300	300	300	300	300	
3	3.2.3.4.	Inform the public, landowners, and decision makers about the needs and benefits of invasive species control / management and prescribed fire	Continuous	FWS, FWC, NPS, USDA, NRCS, FDEP, counties, NGO, DCA, IFAS, USFS						Costs included in standard operating budgets of agencies.
3	3.2.3.5.	Distribute information on prey management techniques (including exotic game) on public and private lands	Continuous	FWS, FWC, NPS, USDA, NRCS, FDEP, FDOF, WMD, State agencies, counties, local						Costs included in standard operating budgets of agencies. Costs included in 3.2.3.3.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
				governments, NGO						
3	3.2.3.6.	Distribute materials to promote Florida Panther Day	Continuous	FWC*, NPS, FWS, NGO, State agencies	10	10	10	10	10	
South Florida Population										
3	3.2.4.1.	Provide information on genetic restoration	Continuous	FWS, FWC, NPS, NGO, private						Costs included in 3.1.3.1.
3	3.2.4.2.	Provide information on panther conservation issues in ORV educational materials	Continuous	FWS, FWC, NPS, USFS, NRCS, FDOF, WMD, State agencies, NGO						Costs included in 3.1.3.1.
3	3.2.4.3.	Educate sportsmen groups and the public about the legal consequences of illegal harassment	Continuous	FWS, FWC, NPS, USDA, NRCS, FDOF, WMD, State agencies, NGO						Costs included in 3.1.3.1.
3	3.2.4.4.	Provide information on panther management, including monitoring	Continuous	FWC, FWS, NPS, USDA, NRCS, FDOF, State agencies, NGO						Costs included in 3.1.3.1.
Human / Panther Interactions										
2	3.2.5.1.	Provide education and outreach to residents living in and adjacent to panther habitat	Continuous	FWS, FWC, NPS, USDA, NRCS, FDOF, WMD, State agencies, NGO	50	50	50	50	50	
3	3.2.5.2.	Provide tips for recreating in panther habitat	Continuous	FWS, FWC, NPS, USFS, NRCS, FDEP, FDOF, WMD,						Cost included in 3.2.5.1.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule

Priority	Action Number	Recovery Action Description	Action Duration	Participants	Estimated Fiscal Year Costs ($000s)					Comments
					FY1	FY2	FY3	FY4	FY5	
				State agencies, NGO						
3	3.2.5.3.	Provide information on protecting livestock and pets	Continuous	FWS, FWC, NPS, USFS, NRCS, FDOF, WMD, State agencies, NGO						Cost included in 3.2.5.1.
3	3.2.5.4.	Provide outreach materials to address hunting concerns	Continuous	FWS, FWC, NPS, USDA, NRCS, FDOF, WMD, State agencies, NGO						Cost included in 3.2.5.1.
Population Expansion and Reintroduction										
2	3.2.6.1.	Engage and provide materials to landowners and the public in south-central Florida to build support for restoring and maintaining habitat and for expansion and reintroductions	Continuous	FWS, FWC, NRCS, FDOF, WMD, counties, NGO						Costs included in 3.2.3.3.
2	3.2.6.2.	Target education at reintroduction sites to address social issues in advance of releasing panthers	Continuous	FWS, State agencies, NRCS, USFS, NGO, private	50	50	50	50	50	
3	3.2.6.3.	Continue education and outreach efforts after panthers are released into a reintroduction site	Continuous	FWS, State agencies, NRCS, USFS, NGO, private						Cost included in 3.2.6.2.
3	3.2.6.4.	Identify existing ecotourism facilities and State ecotourism boards in or near selected reintroduction sites and provide them with	Continuous	FWS, State agencies, private, NGO						Costs included in 3.2.3.2.

EXHIBIT 22

Florida Panther Recovery Plan Implementation Schedule										
Priority	**Action Number**	**Recovery Action Description**	**Action Duration**	**Participants**	**Estimated Fiscal Year Costs ($000s)**					**Comments**
					FY1	**FY2**	**FY3**	**FY4**	**FY5**	
		updated panther information								
Displays and Programs in Public Environmental Education Centers										
3	3.2.7.	Identify and work with existing environmental education facilities to provide or enhance panther education displays and programs	Continuous	NPS, FWS, FWC, FDEP, Tribes, private, NGO	50	50	50	50	50	
Programs and Materials for School Children										
3	3.2.8.	Distribute education programs and materials to school children	Continuous	FWS, FWC, NPS, Tribes, NGO, State agencies, private	20	20	20	20	20	
Evaluation										
3	3.3.	Evaluate outreach and educational materials and programs	Continuous	FWS, FWC, NPS, Tribes, NGO, State agencies	15	15	15	15	15	
3	3.4	Revise materials where evaluation indicates a need	Continuous	FWS, FWC, NPS, Tribes, NGO, State agencies	150	150	150	150	150	

EXHIBIT 22

VI. LITERATURE CITED

Ackerman, B. B., F. G. Lindzey, and T. P. Hemker. 1986. Predictive energetics model for cougars. Pages 333-352 *in* S. D. Miller and D. D. Everett (eds). Cats of the world: biology, conservation, and management. National Wildlife Federation and Caesar Kleberg Wildlife Research Institute, Washington, D. C. and Kingsville, TX.

Adams, B., and J. A. Bozzo. 2002. Big Cypress National Preserve deer and hog annual report 2001 – 2002. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Anderson, A. E. 1983. A critical review of literature on puma (*Felis concolor*). Special Report No. 54. Colorado Division of Wildlife, Fort Collins, CO.

Anderson, C. R. Jr., F. G. Lindzey, D. B. McDonald. 2004. Genetic structure of cougar populations across the Wyoming Basin: metapopulation or megapopulation. Journal of Mammalogy 85:1207-1214.

Ballou, J. D., T. J. Foose, R. C. Lacy, and U. S. Seal. 1989. Florida panther (*Felis concolor coryi*) population viability analysis and recommendations. Captive Breeding Specialist Group, Species Survival Commission, IUCN, Apple Valley, MN.

Bangs, O. 1899. The Florida puma. Proceedings of the Biological Society of Washington 13:15-17.

Barone, M. A., M. E. Roelke, J. Howard, J. L. Brown, A. E. Anderson, and D. E. Wildt. 1994. Reproductive characteristics of male Florida panthers: comparative studies from Florida, Texas, Colorado, Latin America, and North American Zoos. Journal of Mammalogy 75:150-162.

Bass, O. L., and D. S. Maehr. 1991. Do recent panther deaths in Everglades National Park suggest and ephemeral population? Research & Exploration 7:426-427.

Beier, P. 1993. Determining minimum habitat areas and habitat corridors for cougars. Conservation Biology 7:94-108.

Beier, P. 1995. Dispersal of juvenile cougars in fragmented habitat. Journal of Wildlife Management 59:228-237.

Beier P., M. R. Vaughan, M. J. Conroy, and H. Quigley. 2003. An analysis of scientific literature related to the Florida panther. Final report, Project NG01-105, Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Beier P., M. R. Vaughan, M. J. Conroy, and H. Quigley. 2006. Evaluating scientific inferences about the Florida panther. Journal of Wildlife Management 70:236-245.

EXHIBIT 22

Beissinger, S., and M. I. Westphal. 1998. On the use of demographic models of population viability in endangered species management. Journal of Wildlife Management 62:821-841.

Belden, R. C. 1986. Florida panther recovery plan implementation - a 1983 progress report. Pages 159-172 *in* S. D. Miller and D. D. Everett (eds). Cats of the world: biology, conservation, and management. National Wildlife Federation and Caesar Kleberg Wildlife Research Institute, Washington, D.C. and Kingsville, TX.

Belden, R. C. 1988. The Florida panther. Pages 515-532 *in* Audubon Wildlife Report 1988/1989. National Audubon Society, New York, NY.

Belden, R. C., and B. W. Hagedorn. 1993. Feasibility of translocating panthers into northern Florida. Journal of Wildlife Management 57:388-397.

Belden, R. C., and R. T. McBride. 1983a. Florida panther surveys – Big Cypress National Preserve. Final report to Hughes and Hughes Oil and Gas Company, Wichita Falls, TX.

Belden, R. C., and R. T. McBride. 1983b. Florida panther surveys – South Florida Indian Reservations. Final report to Natural Resources Management Corporation, Eureka, CA.

Belden, R. C., and R. T. McBride. 2006. Florida panther peripheral areas survey final report 1998-2004. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Belden, R. C., and J. W. McCown. 1996. Florida panther reintroduction feasibility study. Final Report 7507. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Belden, R. C., W. B. Frankenberger, R. T. McBride, and S. T. Schwikert. 1988. Panther habitat use in southern Florida. Journal of Wildlife Management 52:660-663.

Belden, R. C., W. B. Frankenberger, and J. C. Roof. 1991. Florida panther distribution. Final Report 7501, E-1 II-E-1. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Berglund, F., and M. Berlin. 1969. Risk of methylmercury cumulation in man and mammals and the relation between body burden of methylmercury and toxic effects. *In* M. W. Miller and G. G. Berg (eds). Chemical fallout. Charles C. Thomas, Springfield, IL.

Boyce, M. S. 1992. Population viability analysis. Annual Review of Ecology and Systematics 23:481-506.

Brown, J. H., and A. Kodric-Brown. 1977. Turnover rates in insular biogeography: effect of immigration on extinction. Ecology 58:445-449.

Burridge, M. J., L. A. Sawyer, and W. J. Bigler. 1986. Rabies in Florida. Florida Department of Health and Rehabilitative Services, Tallahassee, FL.

EXHIBIT 22

Carlson, A., and P. Edenhamn. 2000. Extinction dynamics and the regional persistence of a tree frog metapopulation. Proceedings for the Royal Society of London Series B-Biological Sciences 267:1311-1313.

Carroll, C., R. F. Noss, P. C. Paquet, and N. H. Schumaker. 2004. Extinction debt of protected areas in developing landscapes. Conservation Biology 18:1110-1120.

Clark J. D., D. Huber, and C. Servheen. 2002. Bear reintroductions: lessons and challenges. Ursus 13:335-345.

Comiskey, E. J., L. J. Gross, D. M. Fleming, M. A. Huston, O. L. Bass, Jr., H. Luh, and Y. Wu. 1994. A spatially-explicit individual-based simulation model for Florida panther and white-tailed deer in the Everglades and Big Cypress landscapes. Pages 494-503 *in* D. Jordan (ed). Proceedings of the Florida Panther Conference. U.S. Fish and Wildlife Service, Gainesville, FL.

Comiskey, E. J., O. L. Bass, Jr., L. J. Gross, R. T. McBride, and R. Salinas. 2002. Panthers and forests in south Florida: an ecological perspective. Conservation Ecology 6:18.

Cory, C. B. 1896. Hunting and fishing in Florida. Estes and Lauriat, Boston, MA.

Cox, J., R. Kautz, M. MacLaughlin, and T. Gilbert. 1994. Closing the gaps in Florida’s wildlife habitat conservation system. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Cox, J. J., D. S. Maehr, and J. L. Larkin. 2006. Florida panther habitat use: New approach to an old problem. Journal of Wildlife Management 70:1778-1785.

Cramer P. 1995. The northeast Florida panther education program. Final report to Florida Advisory Council on Environmental Education. University of Florida, Gainesville, FL.

Culver, M., W. E. Johnson, J. Pecon-Slattery, and S. J. O’Brien. 2000. Genomic ancestry of the American puma (*Puma concolor*). Journal of Heredity 91:186-197.

Cunningham, M. W. 2005. Epizootiology of feline leukemia virus in the Florida panther. M.S. Thesis. University of Florida, Gainesville, FL.

Dalrymple, G. H., and O. L. Bass. 1996. The diet of the Florida panther in Everglades National Park, Florida. Bulletin of the Florida Museum of Natural History 39:173-193.

Dees, C. S., J. D. Clark, and F. T. van Manen. 1999. Florida panther habitat use in response to prescribed fire at Florida Panther National Wildlife Refuge and Big Cypress National Preserve. Final report to Florida Panther National Wildlife Refuge. University of Tennessee, Knoxville, TN.

EXHIBIT 22

Dees, C. S., J. D. Clark, and F. T. Van Manen. 2001. Florida panther habitat use in response to prescribed fire. Journal of Wildlife Management 65:141-147.

Doak, D. F., P. Kareiva, and B. Klepetka. 1994. Modeling population viability for the desert tortoise in the Western Mojave Desert. Ecological Applications 4:446-460.

Duda, M., and K. Young. 1995. Floridian's knowledge, opinions, and attitudes toward panther habitat and panther-related issues. Florida Advisory Council on Environmental Education, Tallahassee, FL.

Duever, M. J., J. E. Carlson, J. F. Meeder, L. C. Duever, L. H. Gunderson, L. A. Riopelle, T. R. Alexander, R. L. Myers, and D. P. Spangler. 1986. The Big Cypress National Preserve. Research Report 8. National Audubon Society, New York, NY.

Dunbar, M. R. 1995. Florida panther biomedical investigations. Annual performance report. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Dunbar, M. R., G. S. McLaughin, D. M. Murphy, and M. W. Cunningham. 1994. Pathogenicity of the hookworm, *Ancylostoma pluridentatum*, in a Florida panther (*Felis concolor coryi*) kitten. Journal of Wildlife Diseases 30:548-551.

Ellis, S., R. C. Lacy, S. Kennedy-Stoskopf, D. E. Wildt, J. Shillcox, O. Byers, and U. S. Seal (eds). 1999. Florida panther population and habitat viability assessment and genetics workshop report. IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, MN.

Ewens, W. J. 1990. The minimum viable population size as a genetic and demographic concept. Pages 307-316 *in* J. Adams, D. A. Lam, A. I. Hermalin, and P. E. Smouse (eds). Convergent issues in genetics and demography. Oxford University Press, New York, NY.

Falconer, D. S. 1989. Introduction to quantitative genetics. Third edition. Longman, NY.

Fieberg, J., and S. P. Ellner. 2000. When is it meaningful to estimate an extinction probability? Ecology 81:2040-2047.

Fleming, M., J. Schortemeyer, and J. Ault. 1994. Distribution, abundance, and demography of white-tailed deer in the Everglades. Pages 247-274 *in* D. Jordan (ed). Proceedings of the Florida Panther Conference. U.S. Fish and Wildlife Service, Gainesville, FL.

Florida Fish and Wildlife Conservation Commission. 2006. Annual report on the research and management of Florida panthers: 2005-2006. Fish and Wildlife Research Institute and Division of Habitat and Species Conservation, Naples, FL.

Forrester, D. J. 1992. Parasites and diseases of wild mammals in Florida. University Press of Florida, Gainesville, FL.

EXHIBIT 22

Forrester, D. J., J. A. Conti, and R. C. Belden. 1985. Parasites of the Florida panther (*Felis concolor coryi*). Proceedings of the Helminthological Society of Washington 52:95-97.

Frank, K. 2005. Metapopulation persistence in heterogeneous landscapes: lessons about the effect of stochasticity. American Naturalist 165:374-388.

Frankham, R. 1995. Effective population size / adult population size ratios in wildlife: a review. Genetical Research 66:95-107.

Franklin, I. R. 1980. Evolutionary change in small populations. Pages 135-149 *in* M. E. Soulé and B. A. Wilcox (eds). Conservation biology: an evolutionary-ecological perspective. Sinauer Associates, Sunderland, MA.

Franklin, I. R., and R. Frankham. 1998. How large must populations be to retain evolutionary potential? Animal Conservation 1:69-70.

Frederick, P. C., M. G. Spalding, and R. Dusek. 2002. Wading birds as bioindicators of mercury contamination in Florida, USA; annual and geographic variation. Environmental Toxicology and Chemistry 21:163-167.

Gautschi, B., J. P. Muller, B. Schmid, and J. A. Shykoff. 2003. Effective number of breeders and maintenance of genetic diversity in the captive bearded vulture population. Heredity 91:9-16.

Gilpin, M. E., and M. E. Soulé. 1986. Minimum viable populations: Processes of species extinction. Pages 19-34 *in* M. E. Soulé (ed). Conservation Biology: The Science of Scarcity and Diversity. Sinauer Associates, Inc., Sunderland, MA.

Glass, C. M., R. G. McLean, J. B. Katz, D. S. Maehr, C. B. Cropp, L. J. Kirk, A. J. McKeirnan, and J. F. Evermann. 1994. Isolation of pseudorabies (Aujeszky's disease) virus from a Florida panther. Journal of Wildlife Diseases 30:180-184.

Goodman, D. 1987. Consideration of stochastic demography in the design and management of biological reserves. Natural Resources Modeling 1:205-234.

Grimm, V., and C. Wissel. 2004. The intrinsic mean time to extinction: a unifying approach to analyzing persistence and viability of populations. Oikos 105:501-511.

Hall, E. R., and K. R. Kelson. 1959. The mammals of North America. 2 vols. Ronald Press, New York, NY.

Hamilton, S., and H. Moller. 1995. Can PVA models using computer packages offer useful conservation advice? Sooty shearwaters *Puffinus griseus* in New Zealand as a case study. Biological Conservation 73:107-117.

EXHIBIT 22

Hanski, I. 2002. Metapopulations of animals in highly fragmented landscapes and population viability analysis. Pages 86-108 *in* S. R. Beissinger and D. R. McCullough (eds). Population Viability Analysis. University of Chicago Press, Chicago, IL.

Harlow, R. F. 1959. An evaluation of white-tailed deer habitat in Florida. Florida Game and Fresh Water Fish Commission Technical Bulletin 5, Tallahassee, FL.

Harlow, R. F., and F. K. Jones. 1965. The white-tailed deer in Florida. Florida Game and Fresh Water Fish Commission Technical Bulletin 9, Tallahassee, FL.

Harris, L. D. 1984. The fragmented forest: island biogeography theory and the preservation of biotic diversity. University of Chicago Press, Chicago, IL.

Harrison, R. L. 1992. Toward a theory of inter-refuge corridor design. Conservation Biology 6:293-295.

Hedrick, P. W., R. N. Lee, and C. Buchanan. 2003. Canine parvovirus enteritis, canine distemper, and major histocompatibility complex genetic variation in Mexican wolves. Journal of Wildlife Diseases 39:909-913.

Hellgren, E. C., D. P. Onorato, and J. R. Skiles. 2005. Dynamics of a black bear population within a desert metapopulation. Biological Conservation 122:131-140.

Hollister, N. 1911. The Louisiana puma. Proceedings of the Biological Society of Washington 24:175-178.

Horino, S., and S. Miura. 2000. Population viability analysis of a Japanese black bear population. Population Ecology 42:37-44.

Jacobson, S. K. 1999. Case study of public communications for the gray wolf reintroduction to Yellowstone National Park. Appendix *in* Communication Skills for Conservation Professionals. Island Press, Washington, DC.

Janis, M. W., and J. D. Clark. 1999. The effects of recreational deer and hog hunting on the behavior of Florida panthers. Final report to Big Cypress National Preserve, National Park Service, Ochopee, FL.

Janis, M. W., and J. D. Clark. 2002. Responses of Florida panthers to recreational deer and hog hunting. Journal of Wildlife Management 66:839-848.

Jansen, D. K., S. R. Schulze, and A. T. Johnson. 2005. Florida panther (*Puma concolor coryi*) research and monitoring in Big Cypress National Preserve. Annual report 2004-2005. National Park Service, Ochopee, FL.

EXHIBIT 22

Jordan, D. B. 1991. Final Supplemental Environmental Assessment – A proposal to establish a captive breeding population of Florida panthers. U.S. Fish and Wildlife Service, Atlanta, GA.

Jordan, D. B. 1994. Identification and evaluation of candidate Florida panther population reestablishment sites. Pages 106-153 *in* D. B. Jordan (ed). Proceedings of the Florida Panther Conference. U.S. Fish and Wildlife Service, Gainesville, FL.

Kautz, R. S. 1994. Historical trends within the range of the Florida panther. Pages 285-296 *in* D. B. Jordan (ed). Proceedings of the Florida panther conference. U.S. Fish and Wildlife Service, Gainesville, FL.

Kautz, R. S., and J. A. Cox. 2001. Strategic habitats for biodiversity conservation in Florida. Conservation Biology 15:55-77.

Kautz, R. S., D. T. Gilbert, and G. M. Mauldin. 1993. Vegetative cover in Florida based on 1985-1989 Landsat Thematic Mapper imagery. Florida Scientist 56:135-154.

Kautz, R., R. Kawula, T. Hoctor, J. Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How much is enough? Landscape-scale conservation for the Florida panther. Biological Conservation 130:118-133.

Kautz, R., B. Stys, and R. Kawula. 2007. Florida vegetation 2003 and land use change between 1985-89 and 2003. Florida Scientist 70:12-23.

Kelly, M. J., and S. M. Durant. 2000. Viability of the Serengeti cheetah population. Conservation Biology 14:786-797.

Kendall, B. E., O. N. Bjornstad, J. Bascompte, T. H. Keitt, and W. F. Fagan. 2000. Dispersal, environmental correlation, and spatial synchrony in population dynamics. American Naturalist 155:628-636.

Kerkhoff, A. J., B. T. Milne, and D. S. Maehr. 2000. Toward a panther-centered view of the forests of south Florida. Conservation Ecology 4:1.

Kohlmann, S. G., G. A. Schmidt, D. K. Garcelon. 2005. A population viability analysis for the Island Fox on Santa Catalina Island, California. Ecological Modelling 183:77-94.

Kramer-Schadt S., E. Revilla, and T. Wiegand. 2005. Lynx reintroductions in fragmented landscapes of Germany: projects with a future or misunderstood wildlife conservation? Biological Conservation 125:169-182.

Labisky, R. F., M. C. Boulay, K. E. Miller, R. A. Sargent, Jr., and J. M. Zultowskil. 1995. Population ecology of white-tailed deer in Big Cypress National Preserve and Everglades National Park. Final report to National Park Service, Ochopee, FL.

EXHIBIT 22

Land, E. D. 1994. Response of the wild Florida panther population to removals for captive breeding. Final Report 7571. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Land, E. D., and R. C. Lacy. 2000. Introgression level achieved through Florida panther genetic restoration. Endangered Species Update 17:99-103.

Land, D., and S. K. Taylor. 1998. Florida panther genetic restoration and management annual report 1997-98. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Land, D., B. Shindle, D. Singler, and S. K. Taylor. 1999. Florida panther genetic restoration annual report 1998-99. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Land, D., M. Cunningham, R. McBride, D. Shindle, and M. Lotz. 2002. Florida panther genetic restoration and management annual report 2001-02. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Land, D., D. Shindle, M. Cunningham, M. Lotz, and B. Ferree. 2004. Florida panther genetic restoration and management annual report 2003-04. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Land, E. D., D. B. Shindle, R. J. Kawula, J. F. Benson, M. A. Lotz, and D. P. Onorato. In press. Florida panther habitat selection analysis of concurrent GPS and VHF telemetry data. Journal of Wildlife Management.

Lande, R. 1988. Genetics and demography in biological conservation. Science 241:1455-1460.

Lande, R. 1995. Mutation and conservation. Conservation Biology 9:782-791.

Lande, R., and G. F. Barrowclough. 1987. Effective population size, genetic variation, and their use in population management. Pages 87-124 *in* M.E. Soulé (ed). Viable populations for conservation. Cambridge University Press, MA.

Li, Z., M. Gao, C. Hui, X. Han, and H. Shi. 2005. Impact of predator pursuit and prey invasion on synchrony and spatial patterns in metapopulation. Ecological Modelling 185:245-254.

Lindsey, P. A., R. Alexander, J. T. Du Toit, and M. G. L. Mills. 2005. The cost efficiency of wild dog conservation in South Africa. Conservation Biology 19:1205-1214.

Linnaeus, C. 1758. Systema Naturae, 10th edition. Stockholm, Sweden.

Logan, K. A., L. L. Irwin, and R. Skinner. 1986. Characteristics of a hunted mountain lion population in Wyoming. Journal of Wildlife Management 50:648-654.

EXHIBIT 22

Logan, K. A., and L. L. Sweanor. 2001. Desert puma: evolutionary ecology and conservation of an enduring carnivore. Island Press, Washington.

Logan, T., A. C. Eller, Jr., R. Morrell, D. Ruffner, and J. Sewell. 1993. Florida panther habitat preservation plan: south Florida population. Florida Panther Interagency Committee, U.S. Fish and Wildlife Service, Gainesville, FL.

Lotz, M., D. Land, M. Cunningham, and B. Ferree. 2005. Florida panther annual report 2004-05. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Lubow, B. C. 1996. Optimal translocation strategies for enhancing stochastic metapopulation viability. Ecological Applications 6:1268-1280.

Maehr, D. S. 1990a. Florida panther movements, social organization, and habitat utilization. Final Performance Report 7502. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Maehr, D. S. 1990b. The Florida panther and private lands. Conservation Biology 4:167-170.

Maehr, D. S. 1992. Florida panther. Pages 176-189 *in* S.R. Humphrey (ed). Rare and endangered biota of Florida. Volume I: mammals. University Press of Florida, Gainesville, FL.

Maehr, D. S. 1997a. The comparative ecology of bobcat, black bear, and Florida panther in south Florida. Bulletin of the Florida Museum of Natural History 40:1-176.

Maehr, D. S. 1997b. The Florida panther: Life and death of a vanishing carnivore. Island Press, Washington, D.C.

Maehr, D. S., J. C. Roof, E. D. Land, and J. W. McCown. 1989a. First reproduction of a panther (*Felis concolor coryi*) in southwestern Florida, U.S.A. Mammalia 53: 129-131.

Maehr, D. S., J. C. Roof, E. D. Land, J. W. McCown, R. C. Belden, and W. B. Frankenberger. 1989b. Fates of wild hogs released into occupied Florida panther home ranges. Florida Field Naturalist 17:42-43.

Maehr, D. S., E. D. Land, J. C. Roof, and J. W. McCown. 1990a. Day beds, natal dens, and activity of Florida panthers. Proceedings of Annual Conference of Southeastern Fish and Wildlife Agencies 44:310-318.

Maehr, D. S., R. C. Belden, E. D. Land, and L. Wilkins. 1990b. Food habits of panthers in southwest Florida. Journal of Wildlife Management 54:420-423.

Maehr, D. S., E. D. Land, and J. C. Roof. 1991a. Social ecology of Florida panthers. National Geographic Research & Exploration 7:414-431.

EXHIBIT 22

Maehr, D. S., E. D. Land, and M. E. Roelke. 1991b. Mortality patterns of panthers in southwest Florida. Proceedings of Annual Conference of Southeastern Fish and Wildlife Agencies 45:201-207.

Maehr, D. S., E. C. Greiner, J. E. Lanier, and D. Murphy. 1995. Notoedric mange in the Florida panther (*Felis concolor coryi*). Journal of Wildlife Diseases 31:251-254.

Maehr, D. S., E. D. Land, D. B. Shindle, O. L. Bass, and T. S. Hoctor. 2002a. Florida panther dispersal and conservation. Biological Conservation 106:187-197.

Maehr, D. S., R. C. Lacy, E. D. Land, O. L. Bass, Jr., and T. S. Hoctor. 2002b. Evolution of population viability assessments for the Florida panther: a multi-perspective approach. Pages 284-311 *in* S. R. Beissinger and D. R. McCullough (eds). Population Viability Analysis. University of Chicago Press, Chicago, IL.

Margan, S. H., R. K. Nurthen, M. E. Montgomery, L. M. Woodworth, E. H. Lowe, D. A. Briscoe, and R. Frankham. 1998. Single large or several small? Population fragmentation in the captive management of endangered species. Zoo Biology 17:467-480.

McBride, R. T. 1985. Population status of the Florida panther in Everglades National Park and Big Cypress National Preserve. Report to National Park Service in fulfillment of Contract #RFP 5280-84 04, Homestead, FL.

McBride, R. T. 2000. Current panther distribution and habitat use: a review of field notes, fall 1999-winter 2000. Report to Florida Panther Subteam of MERIT, U.S. Fish and Wildlife Service, Vero Beach, FL.

McBride, R. T. 2001. Current panther distribution, population trends, and habitat use: report of field work: fall 2000-winter 2001. Report to Florida Panther Subteam of MERIT, U.S. Fish and Wildlife Service, Vero Beach, FL.

McBride, R. T. 2002. Current panther distribution and conservation implications -- highlights of field work: fall 2001 -- winter 2002. Report to Florida Panther Subteam of MERIT, U.S. Fish and Wildlife Service, Vero Beach, FL.

McBride, R. T. 2003. The documented panther population (DPP) and its current distribution from July 1, 2002 to June 30, 2003. Appendix IV *in* D. Shindle, M. Cunningham, D. Land, R. McBride, M. Lotz, and B. Ferree. Florida panther genetic restoration and management. Annual report 93112503002. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

McBride, R. T., R. M. McBride, J. L. Cashman, and D. S. Maehr. 1993. Do mountain lions exist in Arkansas? Proceedings Annual Conference Southeastern Fish and Wildlife Agencies 47:394-402.

EXHIBIT 22

McCarthy, M. A., C. J. Thompson, and H. P. Possingham. 2005. Theory for designing nature reserves for single species. American Naturalist 165:250-257.

McCown, J. W. 1994. Big Cypress deer/panther relationships: deer herd health and reproduction. Pages 197-217 *in* D. B. Jordan (ed). Proceedings of the Florida Panther Conference. U.S. Fish and Wildlife Service, Gainesville, FL.

Miller, K. E. 1993. Habitat use by white-tailed deer in the Everglades: tree islands in a seasonally flooded landscape. M.S. Thesis. University of Florida, Gainesville, FL.

Mills, L. S., and F. W. Allendorf. 1996. The one-migrant-per-generation rule in conservation and management. Conservation Biology 10:1509-1518.

Mooring, M. S., T. A. Fitzpatrick, T. T. Nishihira, and D. D. Reisig. 2004. Vigilance, predation risk, and the Allee effect in desert bighorn sheep. Journal of Wildlife Management 68:519-532.

Morris, W. F., and D. F. Doak. 2002. Quantitative conservation biology: Theory and practice of population viability analysis. Sinauer Associates, Sunderland, MA.

Murphy, F. A., E. P. J. Gibbs, M. C. Horzinek, and M. J. Studdert. 1999. Veterinary virology. Academic Press, New York, NY.

Musiani, M., and P. C. Paquet. 2004. The practice of wolf persecution, protection, and restoration in Canada and the United States. BioScience 54:50-60.

National Marine Fisheries Service. 2004. Interim endangered and threatened species recovery planning guidance. Silver Springs, MD.

Nelson, E. W., and E. A. Goldman. 1929. List of the pumas with three described as new. Journal of Mammalogy 10:345-350.

Newman, J., E. Zillioux, E. Rich, L. Liang, and C. Newman. 2004. Historical and other patterns of monomethyl and inorganic mercury in the Florida panther (*Puma concolor coryi*). Archives of Environmental Contaminants and Toxicology 48:75-80.

Newmark, W. D. 1987. A land-bridge island perspective on mammalian extinctions in western North American parks. Nature 325:430-432.

Noss, R. F. 1987. Corridors in real landscapes: a reply to Simberloff and Cox. Conservation Biology 1:159-164.

Noss, R. F. 1992. The wildlands project land conservation strategy. Wild Earth (Special Issue):10-25.

EXHIBIT 22

Noss, R. F., and A.Y. Cooperrider. 1994. Saving Nature's Legacy: Protecting and Restoring Biodiversity. Island Press, Washington, D.C.

Nowak, R. M., and R. T. McBride. 1974. Status survey of the Florida panther. Project 973. World Wildlife Fund Yearbook 1973-74:237-242.

Nowak, R. M., and R. T. McBride. 1975. Status of the Florida panther. Project 973. World Wildlife Fund Yearbook 1974-75:245-46.

Nowak, R. M., and J. L. Paradiso. 1983. Walker's mammals of the world, Volume II. John Hopkins University Press, Baltimore, MD.

Nowell, K., and P. Jackson. 1996. Status survey and conservation action plan: Wild cats. International Union for Conservation of Nature and Natural Resources. Burlington Press, Cambridge, U.K.

Nunney, L. 1993. The influence of mating system and overlapping generations on effective population size. Evolution 47:1329-1341.

Nunney, L., and D. R. Elam. 1994. Estimating the effective population size of conserved populations. Conservation Biology 8:175-184.

O'Brien, S. J. 1996a. Molecular genetics and phylogenetics of the Felidae. Pages xxiii-xxiv in K. Nowell and P. Jackson. Status survey and conservation action plan: Wild cats. International Union for Conservation of Nature and Natural Resources. Burlington Press, Cambridge, U.K.

O'Brien, S. J. 1996b. Subspecies identification incorporating molecular genetics. Pages 210-211 *in* K. Nowell and P. Jackson. Status survey and conservation action plan: Wild cats. International Union for Conservation of Nature and Natural Resources. Burlington Press, Cambridge, U.K.

O'Brien, S. J., and E. Mayr. 1991. Bureaucratic mischief: Recognizing endangered species and subspecies. Science 251:1187-1188.

O'Brien, S. J., M. E. Roelke, N. Yuhki, K. W. Richards, W. E. Johnson, W. L. Franklin, A. E. Anderson, O. L. Bass, R. C. Belden, and J. S. Martin. 1990. Genetic introgression within the Florida panther *Felis concolor coryi*. National Geographic Research 6:485-494.

Olmstead, R. A., R. Langley, M. E. Roelke, R. M. Goeken, D. Adger-Johnson, J. P. Goff, J. P. Albert, C. Packer, M. K. Laurenson, T. M. Caro, L. Scheepers, D. E. Wildt, M. Bush, J. S. Martenson, and S. J. O'Brien. 1992. Worldwide prevalence of lentivirus infection in wild feline species: epidemiologic and phylogenetic aspects. Journal of Virology 66:6008-6018.

EXHIBIT 22

Parysow, P., and D. J. Tazik. 2002. Assessing the effect of estimation error on population viability analysis: an example using the black-capped vireo. Ecological Modelling 155:217-229.

Pimm, S. L., L. Dollar, and O. L. Bass Jr. 2006a. The genetic rescue of the Florida panther. Animal Conservation 9:115-122.

Pimm, S. L., O. L. Bass Jr., and L. Dollar. 2006b Ockham and Garp. Reply to Maehr et al.'s (2006) response to Pimm et al. (2006). Animal Conservation 9:133-134.

Pulliam, H. R., J. B. Dunning, and J. Liu. 1992. Population dynamics in complex landscapes: a case study. Ecological Applications 2:165-177.

Ralls, K., and J. D. Ballou. 2004. Genetic status and management of California condors. Condor 106:215-228.

Reed, D. H. 2004. Extinction risk in fragmented habitats. Animal Conservation 7:181-191.

Reed, D. H., and E. H. Bryant. 2000. Experimental tests of minimum viable population size. Animal Conservation 3:7-14.

Reed, D. H., J. J. O'Grady, B. W. Brook, J. D. Ballou, and R. Frankham. 2003. Estimates of minimum viable population sizes for vertebrates and factors influencing those estimates. Biological Conservation 113:23-34.

Reed, J. M., P. D. Doerr, and J. R. Walters. 1988. Minimum viable population size of the red-cockaded woodpecker. Journal of Wildlife Management 50:239-247.

Reeves, K. A. 1978. Preliminary investigation of the Florida panther in Big Cypress Swamp. Unpublished report. Everglades National Park, Homestead, FL.

Roelke, M. E. 1990. Florida panther biomedical investigation. Final Performance Report 7506. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Roelke, M. E. 1991. Florida panther biomedical investigation. Annual performance report, Study no. 7506. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Roelke, M. E., J. S. Martenson, and S. J. O'Brien. 1993a. The consequences of demographic reduction and genetic depletion in the endangered Florida panther. Current Biology 3:340-350.

Roelke, M. E., D. J. Forrester, E. R. Jacobsen, G. V. Kollias, F. W. Scott, M. C. Barr, J. F. Evermann, and E. C. Pirtle. 1993b. Seroprevalence of infectious disease agents in free-ranging Florida panthers (*Felis concolor coryi*). Journal of Wildlife Diseases 29:36-49.

EXHIBIT 22

Root, K. 1998. Evaluating effects of habitat quality, connectivity, and catastrophes on a threatened species. Ecological Applications 8:854-865.

Root, K. 2004. Florida panther (*Puma concolor coryi*): Using models to guide recovery efforts. Pages 491-504 *in* H. R. Akcakaya, M. Burgman, O. Kindvall, C. C. Wood, P. Sjogren-Gulve, J. Hatfield, and M. McCarthy (eds). Species Conservation and Management, Case Studies. Oxford University Press, New York, NY.

Ross, P. I., and M. G. Jalkotzy. 1992. Characteristics of a hunted population of cougars in southwestern Alberta. Journal of Wildlife Management 56:417-426.

Rotstein, D. S., R. Thomas, K. Helmick, S. B. Citino, S. K. Taylor, and M. R. Dunbar. 1999. Dermatophyte infections in free-ranging Florida panthers (*Felis concolor coryi*). Journal of Zoo and Wildlife Medicine 30:281-284.

Ruediger, B. 1998. Rare carnivores and highways moving into the 21st century. Pages 10-16 *in* Evink, G. L., P. Garrett, and J. Berry (eds). Proceedings of the international conference on wildlife ecology and transportation. FL-ER-69-98, Florida Department of Transportation, Tallahassee, FL.

Saenz D., K. A. Baum, R. N. Conner, D. C. Rudolph, and R. Costa. 2002. Large-scale translocation strategies for reintroducing red-cockaded woodpeckers. Journal of Wildlife Management 66:212-221.

Schemnitz, S. D. 1974. Populations of bear, panther, alligator, and deer in the Florida Everglades. Florida Scientist 37:157-167.

Schortemeyer, J. L., D. S. Maehr, J. W. McCown, E. D. Land, and P. D. Manor. 1991. Prey management for the Florida panther: a unique role for wildlife managers. Transactions of the North American Wildlife and Natural Resources Conference 56:512-526.

Schultz, S. T., and M. Lynch. 1997. Mutation and extinction: the role of variable mutational effects, synergistic epistasis, beneficial mutations, and degree of outcrossing. Evolution 51:1363-1371.

Seal, U. S. (ed). 1994a. A plan for genetic restoration and management of the Florida panther (*Felis concolor coryi*). Report to the Florida Game and Fresh Water Fish Commission, by the Conservation Breeding Specialist Group, Species Survival Commission, IUCN, Apple Valley, MN.

Seal, U. S. 1994b. Florida panther population viability analysis. Pages 434-439 *in* D. Jordan (ed). Proceedings of the Florida Panther Conference (Fort Myers, Florida, USA). U.S. Fish and Wildlife Service, Gainesville, FL.

Seal, U. S., and R. C. Lacy (eds). 1989. Florida panther (*Felis concolor coryi*) viability analysis and species survival plan. Report to the U. S. Fish and Wildlife Service, by the Captive Breeding Specialist Group, Species Survival Commission, IUCN, Apple Valley, MN.

EXHIBIT 22

Seal, U. S., and R. C. Lacy (eds). 1992. Genetic management strategies and population viability of the Florida panther (*Felis concolor coryi*). Report to the U. S. Fish and Wildlife Service, by the Captive Breeding Specialist Group, Species Survival Commission, IUCN, Apple Valley, MN.

Seidensticker, J. C., IV, M. G. Hornocker, W. V. Wiles, and J. P. Messick. 1973. Mountain lion social organization in the Idaho primitive area. Wildlife Monographs 35:1-60.

Shaffer, M. L. 1981. Minimum population sizes for species conservation. BioScience 31:131-134.

Shaffer, M. L. 1987. Minimum viable populations: coping with uncertainty. Pages 69-86 *in* M. E. Soulé (ed). Viable populations for conservation. Cambridge University Press, New York, NY.

Shaffer M. L., and F. B. Sampson. 1985. Population size and extinction: a note on determining critical population size. American Naturalist 125:144-152.

Shindle, D., D. Land, K. Charlton, and R. McBride. 2000. Florida panther genetic restoration and management. Annual Report 7500. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Shindle, D., D. Land, M. Cunningham, and M. Lotz. 2001. Florida panther genetic restoration and management. Annual Report 7500. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Shindle D., M. Cunningham, D. Land, R. McBride, M. Lotz, and B. Ferree. 2003. Florida panther genetic restoration and management. Annual Report 93112503002. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Sinclair, E. A., E. L. Swenson, M. L. Wolfe, D. C. Choate, B. Gates, and K. A. Cranall. 2001. Gene flow estimates in Utah's cougars imply management beyond Utah. Animal Conservation 4:257-264.

Smith, T. R., and O. L. Bass, Jr. 1994. Landscape, white-tailed deer, and the distribution of Florida panthers in the Everglades. Pages 693-708 *in* S. M. Davis and J. C. Ogden (eds). Everglades: the ecosystem and its restoration. Delray Beach, FL.

Smith, S. K., and J. M. Nogle. 2001. Projections of Florida population by county, 2000-2030. Florida Population Studies Bulletin 128. Bureau of Economic and Business Research, University of Florida, Gainesville, FL.

Soulé, M. E. 1980. Thresholds for survival: maintaining fitness and evolutionary potential. Pages 151-160 *in* M. E. Soulé and B. A. Wilcox (eds). Conservation biology: an evolutionary-ecological perspective. Sinauer Associates, Sunderland, MA.

EXHIBIT 22

Soulé, M. E. 1987. Introduction. Pages 1-10 *in* M. E. Soulé (ed). Viable populations for conservation. Cambridge University Press, New York, NY.

Soulé, M. E., M. Gilpin, W. Conway, and T. Foose. 1986. The Millennium Ark: How long a voyage, how many staterooms, how many passengers? Zoo Biology 5:101-113.

Spreadbury, B. R., K. Musil, J. Musil, C. Kaisner, and J. Kovak. 1996. Cougar population characteristics in southeastern British Columbia. Journal of Wildlife Management 60:962-969.

Swanson, K., D. Land, R. Kautz, and R. Kawula. 2005. Use of least cost pathways to identify key highway segments for panther conservation. Pages 191-200 *in* R. A. Beausoleil and D. A. Martorello (eds.). Proceedings of the Eighth Mountain Lion Workshop, Olympia, WA.

Swart, J., and M. J. Lawes. 1996. The effect of habitat patch connectivity on samango monkey (*Cercopithecus mitis*) metapopulation persistence. Ecological Modelling 93:15-74.

Sweanor, L. L., K. A. Logan, and M. G. Hornocker. 2000. Cougar dispersal patterns, metapopulation dynamics, and conservation. Conservation Biology 14:798-808.

Swinnerton, K. J., J. J. Groombridge, C. G. Jones, R. W. Burns, and Y. Mungroo. 2004. Inbreeding depression and founder diversity among captive and free-living populations of the endangered pink pigeon *Columba mayeri*. Animal Conservation 7:353-364.

Taylor, T. A., and C. Pedersen. 1998. Public acceptability of Florida panther reintroduction, final report based on input from community workshops in Columbia County. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.

Taylor, S. K., C. D. Buergelt, M. E. Roelke-Parker, B. L. Homer, and D. S. Rotstein. 2002. Causes of mortality of free-ranging Florida panthers. Journal of Wildlife Diseases 38:107-114.

Thatcher, C. A., F. T. van Manen, and J. D. Clark. 2006a. An assessment of habitat north of the Caloosahatchee River for Florida panthers. University of Tennessee and U.S. Geological Survey, Knoxville, TN. Final report to U.S. Fish and Wildlife Service, Vero Beach, FL.

Thatcher, C. A., F. T. van Manen, and J. D. Clark. 2006b. Identifying suitable sites for Florida panther reintroduction. Journal of Wildlife Management 70:752-763

The Nature Conservancy. 2000. The five-s framework for site conservation: a practitioner’s handbook for site conservation planning and measuring conservation success. Volume I, Second Edition. Arlington, VA.

EXHIBIT 22

Thomas, C. D. 1990. What do real population dynamics tell us about minimum viable population sizes? Conservation Biology 4:324-327.

Tinsley, J. B. 1970. The Florida panther. Great Outdoors Publishing Company, St. Petersburg, FL.

Tinsley, J. B. 1987. The puma: legendary lion of the Americas. Texas Western Press, University of Texas, El Paso, TX.

Townsend, D. 1991. An economic overview of the agricultural expansion in southwest Florida. Unpublished report. Hendry County Extension Office, LaBelle, FL.

U.S. Census Bureau. 2002. Table CO-EST2001-12-12 – time series of Florida intercensal population estimates by county: April 1, 1990 to April 1, 2000. Washington, D.C.

U.S. Census Bureau. 2004. Population estimates, census 2002, 1990 census. Washington, D.C.

U.S. Fish and Wildlife Service. 1981. Florida panther recovery plan. Atlanta, GA.

U.S. Fish and Wildlife Service. 1987. Florida panther (*Felis concolor coryi*) recovery plan. Atlanta, GA.

U.S. Fish and Wildlife Service. 1994a. Final environmental assessment: genetic restoration of the Florida panther. Gainesville, FL.

U.S. Fish and Wildlife Service. 1994b. Proposed genetic restoration program for the Florida panther. Memorandum dated June 13, 1994, from Director Beattie (Washington, D.C.) to the Regional Director (Atlanta, GA).

U.S. Fish and Wildlife Service. 1995. Second revision Florida panther recovery plan. Atlanta, GA.

U.S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Atlanta, GA.

van der Leek, M. L., H. N. Becker, E. C. Pirtle, P. Humphrey, C. L. Adams, B. P. All, G. A. Erickson, R. C. Belden, W. B. Frankenberger, and E. P. J. Gibbs. 1993. Prevalence of pseudorabies (Aujeszky's disease) virus antibodies in feral swine in Florida. Journal Wildlife Diseases 29:403-409.

Van Dyke, F. G., R. H. Brocke, and H. G. Shaw. 1986a. Use of road track counts as indices of mountain lion presence. Journal Wildlife Management 50:102-109.

Van Dyke, F. G., R. H. Brocke, H. G. Shaw, B. B. Ackerman, T. P. Hemker, and F. G. Lindzey. 1986b. Reactions of mountain lions to logging and human activity. Journal of Wildlife Management 50:95-102.

van Heezik, Y., and S. Ostrowski. 2001. Conservation breeding for reintroductions: assessing survival in a captive flock of houbara bustards. Animal Conservation 4:195-201.

Waples, R. 2002. Definition and estimation of effective population size in the conservation of endangered species. Pages 147-168 *in* S. R. Beissinger and D. R. McCullough (eds). Population viability analysis. University of Chicago Press, Chicago, IL.

Wassmer, D. A., D. D. Guenther, and J. N. Layne. 1988. Ecology of the bobcat in south-central Florida. Bulletin of the Florida Museum of Natural History 33:159-228.

Wear, D. N., and J. G. Greis (eds). 2002. Southern forest resources assessment. General Technical Report SRS-53. U.S. Department of Agriculture, Forest Service, Southern Research Station, Asheville, NC.

Wehinger, K. A., M. E. Roelke, and E. C. Greiner. 1995. Ixodid ticks from Florida panthers and bobcats in Florida. Journal of Wildlife Diseases 31:480-485.

Werdelin, L. 1996. The history of Felid Classification. Pages xviii-xxiii *in* K. Nowell and P. Jackson. Status survey and conservation action plan: Wild cats. International Union for Conservation of Nature and Natural Resources. Burlington Press, Cambridge, U.K.

Whitlock, M. C. 2000. Fixation of new alleles and the extinction of small populations: drift load, beneficial alleles, and sexual selection. Evolution 54:1855-1861.

Wikramanayake, E., M. McKnight, E. Dinerstein, A. Joshi, B. Gurung, and D. Smith. 2004. Designing a conservation landscape for tigers in human-dominated environments. Conservation Biology 18:839-844.

Wilkins, L., J. M. Arias-Reveron, B. Stith, M. E. Roelke, and R. C. Belden. 1997. The Florida panther (*Puma concolor coryi*): a morphological investigation of the subspecies with a comparison to other North and South American cougars. Bulletin of the Florida Museum of Natural History 40:221-269.

Wolf, P. 1981. Land in America: its value, use and control. Pantheon Books, New York, NY.

Wozencraft, W. C. 1993. Order Carnivora. Pages 286-346 *in* D. E. Wilson and D. M. Reeder, (eds.). Mammal species of the world, 2nd edition. Smithsonian, Washington, D.C.

Wright, S. 1943. Isolation by distance. Genetics 28:114-138.

Wright, S. 1969. The theory of gene frequencies. Vol.2, Experimental results and evolutionary deductions. University of Chicago Press, Chicago, IL.

EXHIBIT 22

Young, S. P., and E. A. Goldman. 1946. The puma-mysterious American cat. American Wildlife Institute, Washington, D.C.

EXHIBIT 22

FIGURES

EXHIBIT 22

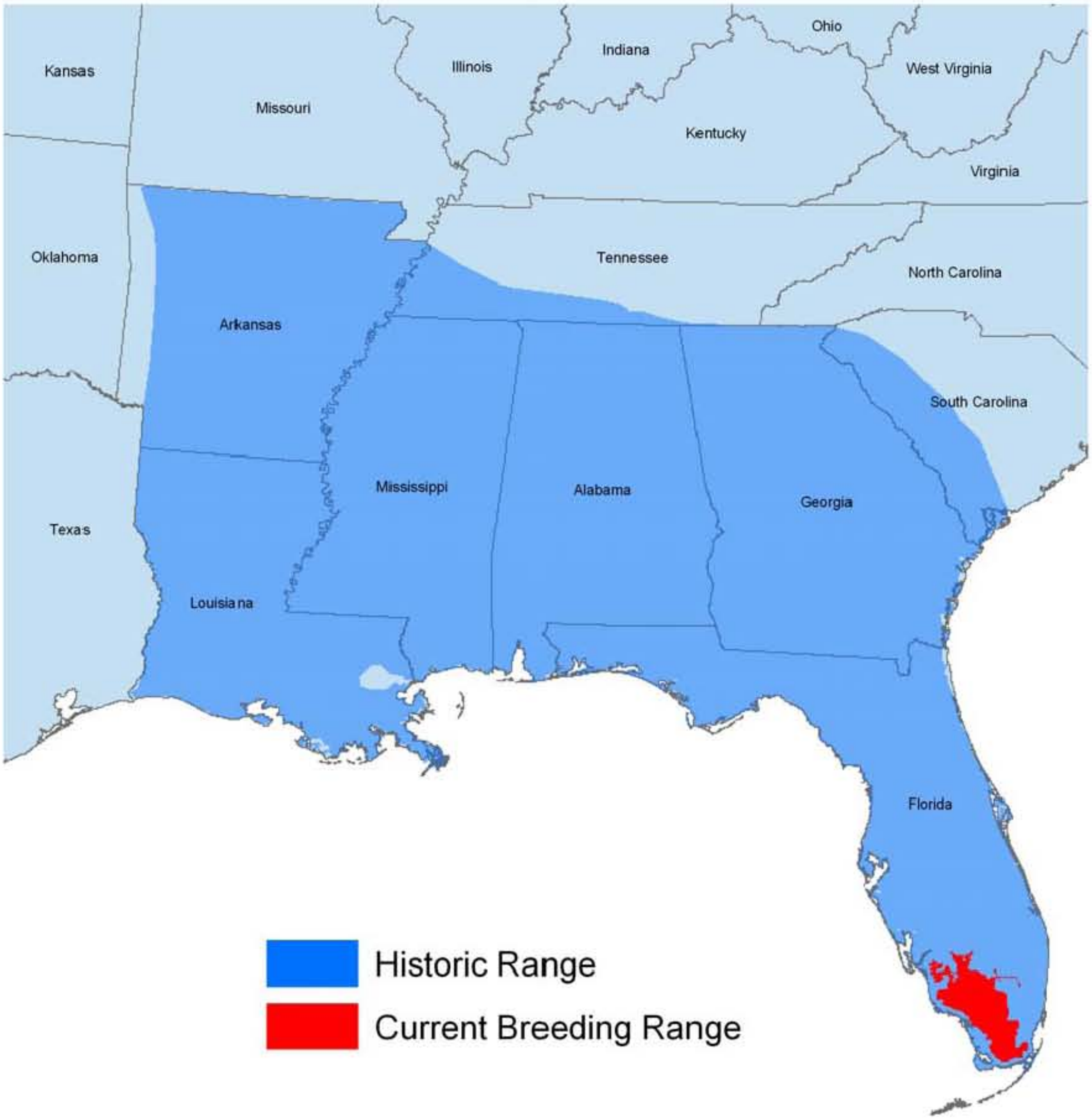


Figure 1. Historic and current range of the Florida panther.

EXHIBIT 22

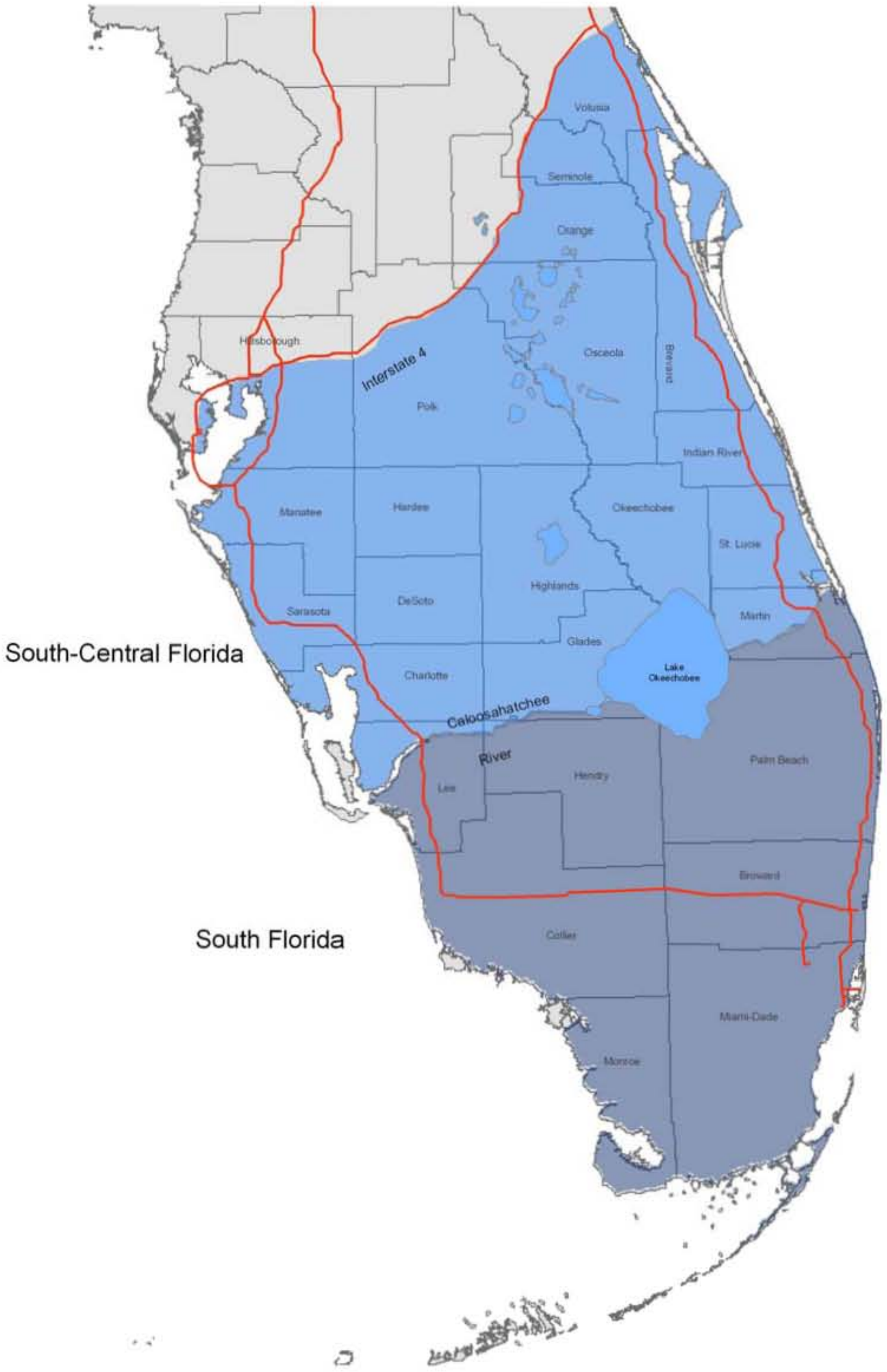


Figure 2. Delineation between south and south-central Florida.

EXHIBIT 22

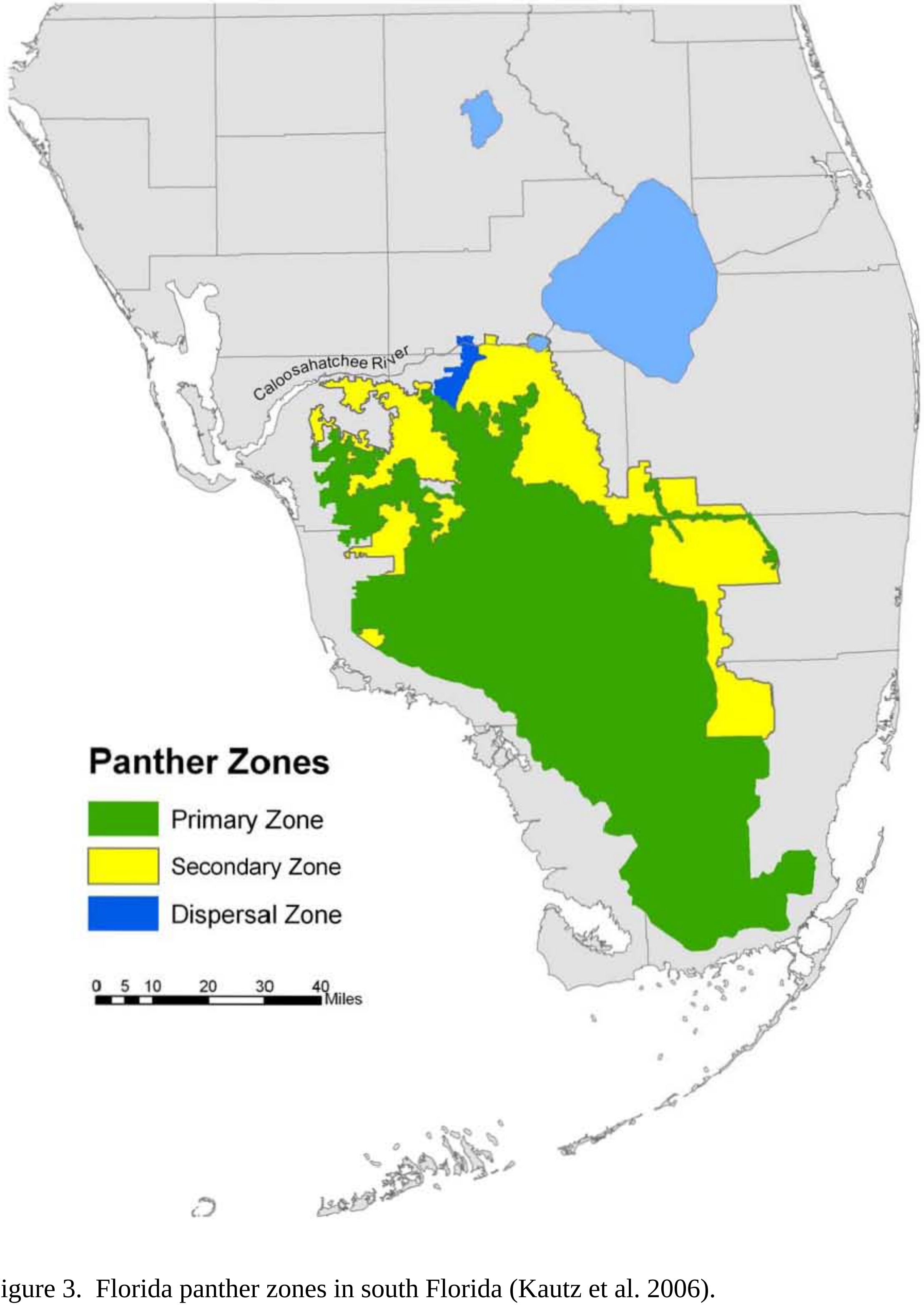


Figure 3. Florida panther zones in south Florida (Kautz et al. 2006).

EXHIBIT 22

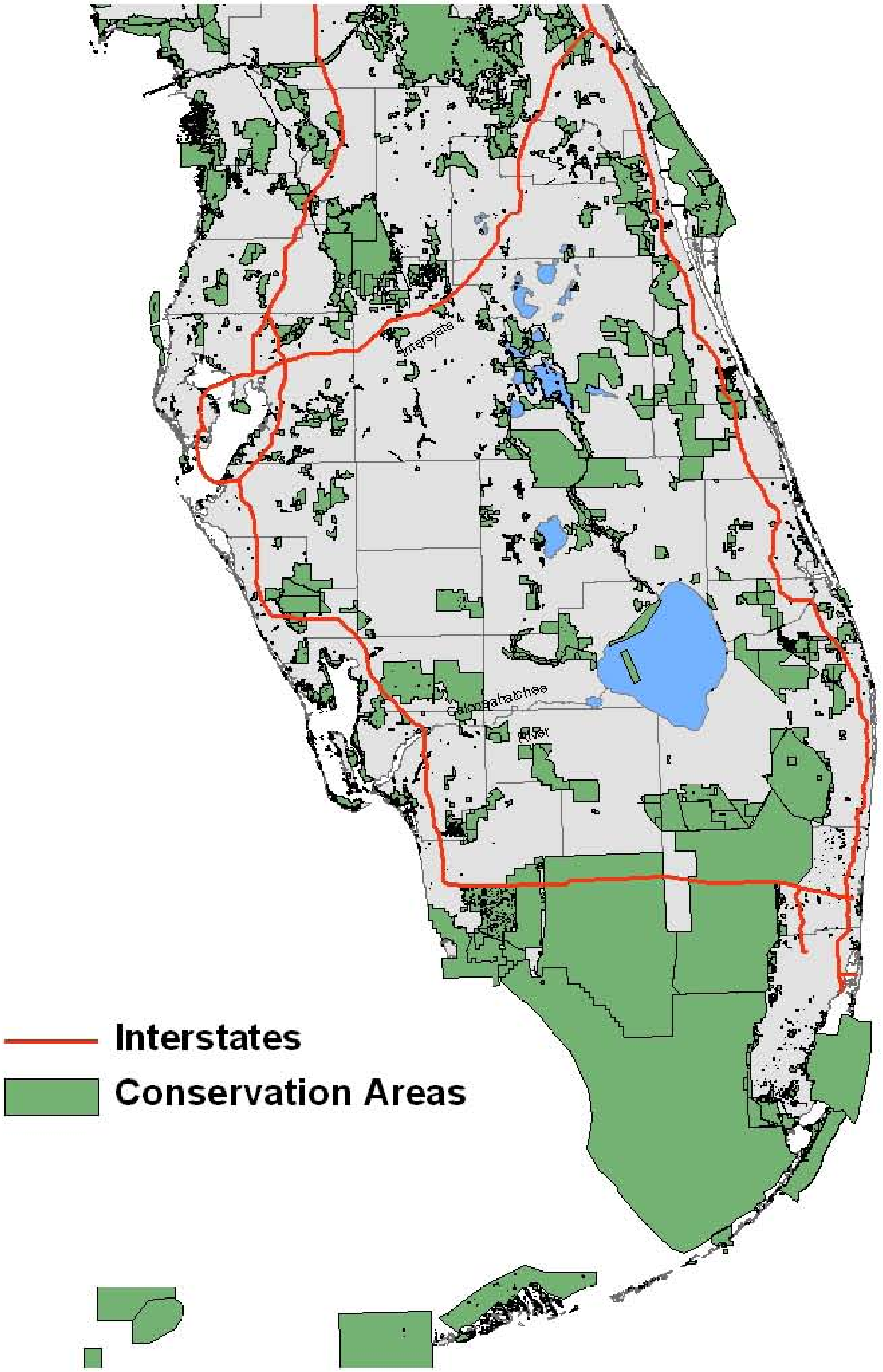


Figure 4. Conservation areas of south and south-central Florida.

EXHIBIT 22

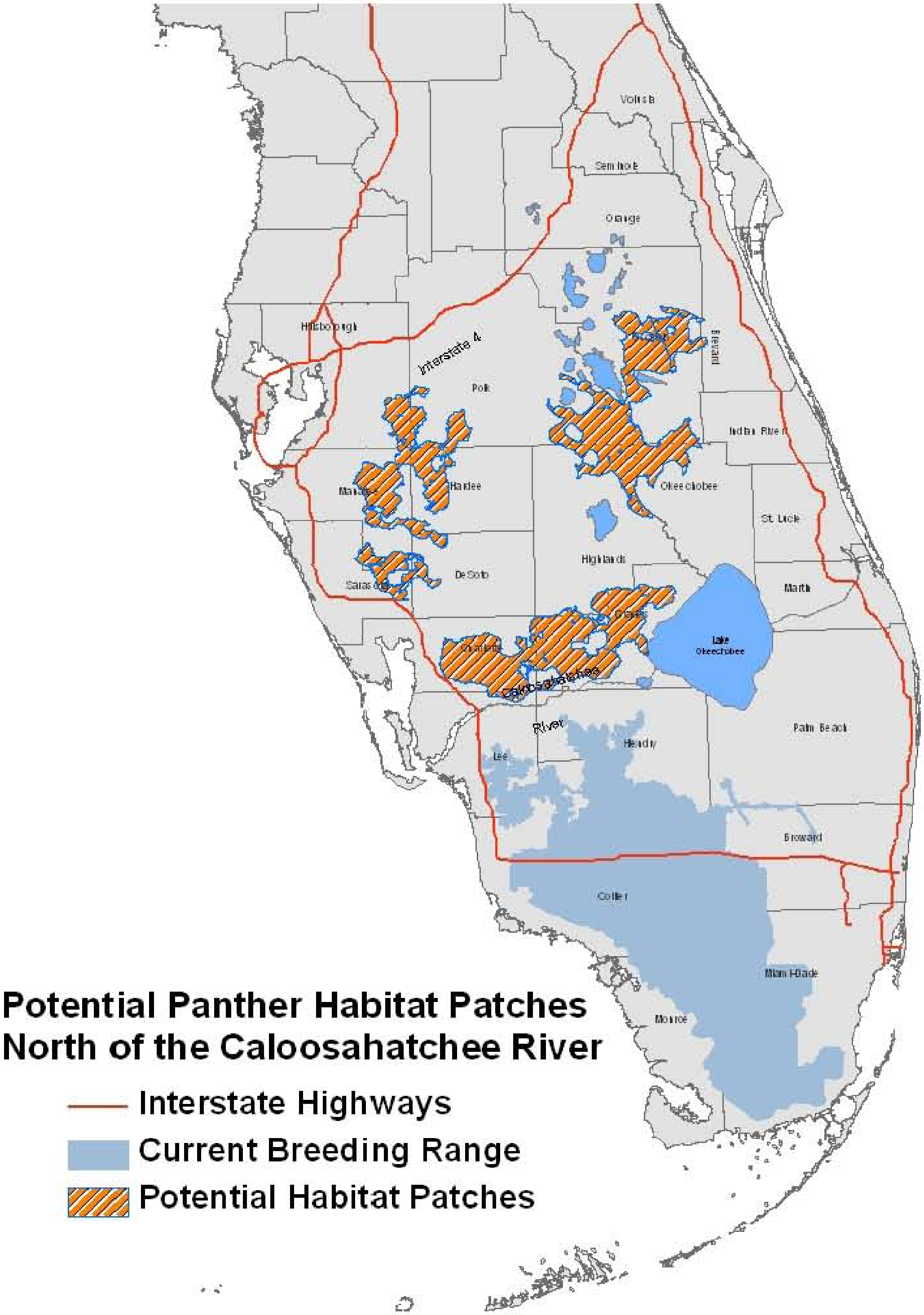


Figure 5. Potential panther habitat patches identified by Thatcher et al. (2006a).

EXHIBIT 22

APPENDIX A. DEFINITIONS

ALLEE EFFECTS – Inverse density dependence; for smaller populations, the reproduction and survival of individuals decrease; reproduction, finding a mate in particular, may be increasingly difficult as the population density decreases.

EFFECTIVE POPULATION SIZE (N_e) – A theoretical population with a 1:1 sex ratio that would result in the same amount of inbreeding or genetic drift as the actual population. Denoted as N_e, the effective population size is usually less than the actual population size.

ENDANGERED – Any species which is in danger of extinction throughout all or a significant portion of its range.

HABITAT – The physical space within which an animal lives. The various factors commonly recognized as components of habitat – cover, food, water, and such – are contained within this area. Panther habitat includes all areas required for the panther to live out its full life-cycle, including areas providing food and shelter and supporting characteristic movement such as hunting, breeding, dispersal, and territorial behavior.

INBREEDING (individual) – The mating of related individuals (e.g., brother-sister, father-daughter, mother-son).

INBREEDING (population) – A population in which matings occur between relatives at a frequency greater than expected by chance.

INBREEDING DEPRESSION – Reduction in reproduction, survival, or other fitness characters due to inbreeding.

INTROGRESSION – The incorporation of genes of one subspecies into the gene pool of another.

LEAST-COST PATHWAYS ANALYSES – a modeling method to measure effective distance between habitat patches and connectivity between existing or potential reserves. Maps routes of least resistance or travel cost between habitat patches.

METAPOPULATION – Two or more partially isolated populations, called subpopulations, which are linked by dispersal events.

PHILOPATRY – The tendency of an individual to return to or stay in its home area. Female panthers tend to be more philopatric than males.

POLYGYNOUS – A pattern of mating in which a male has more than one female partner.

EXHIBIT 22

POPULATION – A group of interbreeding individuals living in the same geographic area at the same time and sharing a common gene pool.

SELF-SUSTAINING POPULATION – A population that is able to sustain itself independently.

SPATIAL CONFIGURATION – Refers to how patches of habitat are arranged on the landscape with respect to one another as well as their degree of connectivity and relative land cover composition. An extensive arrangement of contiguous tracts of land that incorporates connectivity to support panther life history needs (e.g., appropriate cover, spatial extent, landscape configuration, prey densities, mating access, dispersal routes, minimizing human disturbance).

SPECIES (ESA definition) – includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife which interbreeds when mature.

SUBPOPULATION – Each distinct population in a metapopulation.

THREATENED – Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

VIABLE – A viable species is one that can reasonably be expected to avoid extinction over a long period of time. Viability is the ability of a population or species to persist over time. A viable panther population is considered to have a 95% probability of persistence for 100 years.

EXHIBIT 22

APPENDIX B. THREATS ANALYSIS USING THE FIVE LISTING FACTORS

SOUTH FLORIDA

Factor A: The present or threatened destruction, modification, or curtailment of the Florida panther's habitat or range.

	Stress																				
	Loss of ability for natural expansion of range				Habitat destruction				Habitat fragmentation				Population isolation & lack of connectivity				Habitat degradation				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	H	High		V	H	High		H	H	High		H	M	Medium		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor A overall threat rank**
Transportation projects	H	H	H	Very high	L	V	M	Medium	V	V	V	High	M	V	H	High	-	-	-	-	Very high
Lack of suitable habitat	V	H	V	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Water management & conversion to water (includes CERP)	-	-	-	-	M	H	M	Medium	M	V	H	High	M	V	H	High	L	M	L	Low	High
Residential development	-	-	-	-	V	V	V	High	H	V	H	High	-	-	-	-	-	-	-	-	High
Inadequate habitat patch size	-	-	-	-	-	-	-	-	-	-	-	-	M	V	H	High	-	-	-	-	High
Mining and mineral exploration	-	-	-	-	L	V	M	Medium	L	V	M	Medium	-	-	-	-	L	L	L	Low	Medium
Conversion of habitat to agriculture	-	-	-	-	L	H	M	Medium	L	L	L	Low	-	-	-	-	M	H	M	Low	Medium

EXHIBIT 22

Factor A continued

	Stress																				
	Loss of ability for natural expansion of range				Habitat destruction				Habitat fragmentation				Population isolation & lack of connectivity				Habitat degradation				
	Severity	Scope	Stress rank		Severity	Scope	Stress rank		Severity	Scope	Stress rank		Severity	Scope	Stress rank		Severity	Scope	Stress rank		
	V	V	Very high		V	H	High		V	H	High		H	H	High		H	M	Medium		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor A overall threat rank**
Major ditches	-	-	-	-	-	-	-	-	L	V	M	Medium	-	-	-	-	-	-	-	-	Medium
Caloosahatchee River as a barrier	L	M	L	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Intensification of agricultural uses	-	-	-	-	-	-	-	-	L	M	L	Low	-	-	-	-	L	H	M	Low	Low
Invasive exotic plant species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	M	M	Low	Low
Lack of or poor habitat management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	M	M	Low	Low

EXHIBIT 22

SOUTH FLORIDA

Factor B: Overutilization for commercial, recreational, scientific, or education purposes.

	Stress				
	Overutilization for scientific purposes				
	Severity	Scope	**Stress rank**		
	L	L	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	**Factor B overall threat rank**
Impacts of capture and monitoring	L	L	L	Low	Low

EXHIBIT 22

SOUTH FLORIDA

Factor C: Disease and predation.

	Stress				
	Disease				
	Severity	Scope	Stress rank		
	L	L	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	**Factor C overall threat rank**
Feline leukemia	M	L	M	Medium	Medium
All diseases	L	M	L	Low	Low

EXHIBIT 22

SOUTH FLORIDA

Factor D: The inadequacy of existing regulatory mechanisms.

The Recovery Team believed regulatory mechanisms were more appropriately considered as strategies underlying the other stresses and sources. Therefore, they chose not to evaluate Factor D.

EXHIBIT 22

SOUTH FLORIDA

Factor E: Other natural or manmade factors affecting the Florida panther’s continued existence.

	Stress																				
	Panther mortality				Loss of genetic diversity				Decline of prey base				Genetic swamping				Loss/lack of support for panther conservation				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	H	H	High		M	H	Medium		M	M	Medium		L	V	Low		L	V	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Intraspecific aggression	H	V	H	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High
Mercury toxicity	L	V	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Road kills	H	M	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Illegal kills	L	H	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Disease	L	H	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Effect of small population size	-	-	-	-	V	M	H	Medium	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Lack of suitable habitat	-	-	-	-	V	V	V	Medium	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Lack of corridors for dispersal	-	-	-	-	M	H	M	Low	-	-	-	-	-	-	-	-	-	-	-	-	Low
Escape of captive pumas	-	-	-	-	-	-	-	-	-	-	-	-	L	H	M	Low	-	-	-	-	Low
Managed releases of pumas	-	-	-	-	-	-	-	-	-	-	-	-	M	M	M	Low	-	-	-	-	Low
Ungulate disease	-	-	-	-	-	-	-	-	L	H	M	Low	-	-	-	-	-	-	-	-	Low

EXHIBIT 22

Factor E continued

	Stress																				
	Panther mortality				Loss of genetic diversity				Decline of prey base				Genetic swamping				Loss/lack of support for panther conservation				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	H	H	High		M	H	Medium		M	M	Medium		L	V	Low		L	V	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Water management or conversion to water	-	-	-	-	-	-	-	-	M	M	M	Low	-	-	-	-	-	-	-	-	Low
Natural climate or environmental change	-	-	-	-	-	-	-	-	L	V	M	Low	-	-	-	-	-	-	-	-	Low
Lack of or poor prey management (e.g, over hunting)	-	-	-	-	-	-		-	L	L	L	Low	-	-	-	-	-	-	-	-	Low
Prey habitat loss / degradation	-	-	-	-	-	-	-	-	M	H	M	Low	-	-	-	-	-	-	-	-	Low
Exotic prey management	-	-	-	-	-	-	-	-	L	L	L	Low	-	-	-	-	-	-	-	-	Low
Change in the legal description	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	H	V	Low	Low

EXHIBIT 22

Factor E continued

	Stress																				
	Panther mortality				Loss of genetic diversity				Decline of prey base				Genetic swamping				Loss/lack of support for panther conservation				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	H	H	High		M	H	Medium		M	M	Medium		L	V	Low		L	V	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Public fear of panthers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	M	L	Low	Low
Landowner fear of regulation, lost property rights, and negative economic consequences	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H	M	M	Low	Low

EXHIBIT 22

REINTRODUCTION

Factor A: The present or threatened destruction, modification, or curtailment of the Florida panther's habitat or range.

	Stress																				
	Unidentified potential habitat				Habitat fragmentation				Habitat destruction				Incompatible management of private lands				Incompatible management of public lands				
	Severity	**Scope**	**Stress rank**		**Severity**	**Scope**	**Stress rank**		**Severity**	**Scope**	**Stress rank**		**Severity**	**Scope**	**Stress rank**		**Severity**	**Scope**	**Stress rank**		
	V	V	Very high		V	V	Very high		H	H	High		M	M	Medium		L	M	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor A overall threat rank**
Urbanization	-	-	-	-	M	V	H	Very high	M	V	H	High	-	-	-	-	-	-	-	-	Very high
Transportation projects	-	-	-	-	V	V	V	Very high	H	H	H	High	-	-	-	-	-	-	-	-	Very high
Low density residential development	-	-	-	-	V	H	V	Very high	V	H	V	High	-	-	-	-	-	-	-	-	Very high
Lack of land use planning	-	-	-	-	H	V	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Inadequate evaluation of potential habitat in historic range	V	L	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Lack of prioritization system among areas	V	L	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Conversion of habitat to agriculture	-	-	-	-	M	M	M	High	M	M	M	Medium	-	-	-	-	-	-	-	-	High
Human recreational uses in panther habitat	-	-	-	-	M	M	M	High	M	M	M	Medium	-	-	-	-	M	M	M	Low	High
Invasive exotic plant species	-	-	-	-	L	H	M	High	L	H	M	Medium	-	-	-	-	-	-	-	-	High
Large public works projects (e.g, dams)	-	-	-	-	L	V	M	High	L	V	M	Medium	-	-	-	-	-	-	-	-	High

EXHIBIT 22

Factor A continued

	Stress																				
	Unidentified potential habitat				Habitat fragmentation				Habitat destruction				Incompatible management of private lands				Incompatible management of public lands				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	V	Very high		H	H	High		M	M	Medium		L	M	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor A overall threat rank**
Lack of incentives to maintain / restore panther habitat	-	-	-	-	H	M	M	High	H	M	M	Medium	H	M	M	Low	-	-	-	-	High
Lack of complete data in historical range	M	M	M	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High
Right of ways	-	-	-	-	L	V	M	High	-	-	-	-	-	-	-	-	-	-	-	-	High
Conversion of habitat to silviculture	-	-	-	-	L	L	L	Medium	L	L	L	Low	-	-	-	-	-	-	-	-	Medium
Mining and mineral exploration	-	-	-	-	L	M	L	Medium	L	M	L	Low	-	-	-	-	-	-	-	-	Medium
Conflicting mandates	-	-	-	-	-	-	-	-	-	-	-	-	H	H	H	Medium	L	H	M	Low	Medium
Conflicting management of other species	-	-	-	-	-	-	-	-	-	-	-	-	L	L	L	Low	L	L	L	Low	Low
Lack of implementation of management plans	-	-	-	-	-	-	-	-	-	-	-	-	H	M	M	Low	L	M	L	Low	Low

EXHIBIT 22

REINTRODUCTION

Factor B: Overutilization for commercial, recreational, scientific, or education purposes.

	Stress				
	Overutilization for scientific purposes				
	Severity	Scope	Stress rank		
	L	H	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	**Factor B overall threat rank**
Impacts of capture and monitoring	L	L	L	Low	Low
Impacts of removals for reintroductions to donor populations	L	L	L	Low	Low

EXHIBIT 22

REINTRODUCTION

Factor C: Disease and predation.

	Stress												
	Disease				Parasites				Predation				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	L	H	Low		L	H	Low		L	L	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor C overall threat rank**
Feline leukemia	M	L	M	Medium	-	-	-	-	-	-	-	-	Medium
Rabies	M	M	M	Low	-	-	-	-	-	-	-	-	Low
Pseudorabies	H	M	M	Low	-	-	-	-	-	-	-	-	Low
Hookworm	-	-	-	-	H	M	M	Low	-	-	-	-	Low
Manges	-	-	-	-	H	M	M	Low	-	-	-	-	Low
Unknown / other	L	L	L	Low	L	L	L	Low	-	-	-	-	Low
All sources of predation	-	-	-	-	-	-	-	-	V	M	H	Low	Low

EXHIBIT 22

REINTRODUCTION

Factor D: The inadequacy of existing regulatory mechanisms.

	Stress												
	Inadequate land use planning or regulation				Lack of agency coordination				Inconsistent state regulation or protection				
	Severity	**Scope**	**Stress rank**		**Severity**	**Scope**	**Stress rank**		**Severity**	**Scope**	**Stress rank**		
	V	V	Very high		H	V	High		H	L	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor D overall threat rank**
Inadequate development, implementation, and enforcement of comprehensive plans and zoning	V	H	V	Very high	-	-	-	-	-	-	-	-	Very high
Inadequate growth management planning and implementation	V	H	V	Very high	-	-	-	-	-	-	-	-	Very high
Little or no protection of upland habitats	H	H	H	Very high	-	-	-	-	-	-	-	-	Very high
Inadequate development, and implementation of corridor / greenway planning	V	H	V	Very high	-	-	-	-	-	-	-	-	Very high
Lack of cumulative impacts evaluation	H	H	H	Very high	-	-	-	-	-	-	-	-	Very high
Inadequate land conservation of acquisition programs	H	H	H	Very high	-	-	-	-	-	-	-	-	Very high

EXHIBIT 22

Factor D continued

	Stress												
	Inadequate land use planning or regulation				Lack of agency coordination				Inconsistent state regulation or protection				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		H	V	High		H	L	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor D overall threat rank**
Lack of public awareness of environmental issues and needs	H	H	H	Very high	-	-	-	-	-	-	-	-	Very high
Conflicting laws, regulations, mandates, or policies	M	M	M	High	-	-	-	-	H	M	M	Low	High
No mechanism for agency communication or coordination	-	-	-	-	H	L	M	Medium	H	L	M	Low	Medium
Lack of a mutually defined common goal	-	-	-	-	H	L	M	Medium	H	L	M	Low	Medium
Interagency distrust and lack of relationships and partnerships	-	-	-	-	M	M	M	Medium	-	-	-	-	Medium

EXHIBIT 22

REINTRODUCTION

Factor E: Other natural or manmade factors affecting the Florida panther's continued existence.

	Stress																																
	Public / landowner resistance to reintroduction				Political and agency resistance to reintroduction				Human / panther interactions				Panther mortality				Genetic viability and population connectivity				Conflicting prey management				Conflicts with escaped pumas				Competition with other species				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	V	Very high		H	V	High		H	V	High		M	H	Medium		M	H	Medium		L	M	Low		L	H	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Public perception, misconception, and lack of knowledge	V	M	H	Very high	-	-	-	-	V	M	H	High	-	-	-	-	-	-	-	-	H	M	M	Low	-	-	-	-	-	-	-	-	Very high
Conflicts with livestock (attacks on)	V	M	H	Very high	V	M	H	Very high	M	M	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Public fear of panthers (including fear of attacks / mortality)	V	H	V	Very high	V	H	V	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Distrust of government agencies	H	H	H	Very high	H	H	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Agency funding and resource constraints	-	-	-	-	V	M	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Lack of incentives for states	-	-	-	-	H	H	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high

EXHIBIT 22

Factor E continued

	Stress																																
	Public / landowner resistance to reintroduction				Political and agency resistance to reintroduction				Human / panther interactions				Panther mortality				Genetic viability and population connectivity				Conflicting prey management				Conflicts with escaped pumas				Competition with other species				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	V	Very high		H	V	High		H	V	High		M	H	Medium		M	H	Medium		L	M	Low		L	H	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Agency's fear of liability (political, financial, and professional)	-	-	-	-	V	M	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Public official's fear of losing constituent's support	-	-	-	-	H	H	H	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Influence of opposing special interest groups on public officials	-	-	-	-	V	V	V	Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Very high
Conflicts with hunters and hunting	H	M	M	High	H	M	M	High	H	M	M	Medium	-	-	-	-	-	-	-	-	H	M	M	Low	-	-	-	-	-	-	-	-	High
Landowner fear of regulation, lost property rights, and negative economic consequences	H	M	M	High	H	M	M	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High

EXHIBIT 22

Factor E continued

	Stress																																
	Public / landowner resistance to reintroduction				Political and agency resistance to reintroduction				Human / panther interactions				Panther mortality				Genetic viability and population connectivity				Conflicting prey management				Conflicts with escaped pumas				Competition with other species				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	V	Very high		H	V	High		H	V	High		M	H	Medium		M	H	Medium		L	M	Low		L	H	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Media sensationalism and panther myths	M	M	M	High	M	M	M	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High
Relationships among potential supporting landowners and their neighbors	M	M	M	High	M	M	M	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High
Lack of panther information dissemination to public officials and agencies	-	-	-	-	H	L	M	High	-	-	-	-	-	-	-	-	-	-	-	-	M	L	L	Low	-	-	-	-	-	-	-	-	High
Road kills	-	-	-	-	-	-	-	-	-	-	-	-	H	H	H	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High
Illegal kill	-	-	-	-	-	-	-	-	-	-	-	-	H	M	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Accidental death (including contaminants)	-	-	-	-	-	-	-	-	-	-	-	-	L	H	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium

EXHIBIT 22

Factor E continued

	Stress																																
	Public / landowner resistance to reintroduction				Political and agency resistance to reintroduction				Human / panther interactions				Panther mortality				Genetic viability and population connectivity				Conflicting prey management				Conflicts with escaped pumas				Competition with other species				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	V	Very high		H	V	High		H	V	High		M	H	Medium		M	H	Medium		L	M	Low		L	H	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Natural catastrophes	-	-	-	-	-	-	-	-	-	-	-	-	L	V	M	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Small number of founder panthers available	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	M	H	Medium	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Unidentified or secured pathways for dispersal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H	H	H	Medium	-	-	-	-	-	-	-	-	-	-	-	-	Medium
Deer management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	M	H	Medium	-	-	-	-	-	-	-	-	Medium
Intraspecific aggression or predation	-	-	-	-	-	-	-	-	-	-	-	-	L	M	L	Low	-	-	-	-	-	-	-	-	-	-	-	-	L	M	L	Low	Low
Removal of panthers for management purposes	-	-	-	-	-	-	-	-	-	-	-	-	L	M	L	Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Low

EXHIBIT 22

Factor E continued

	Stress																																
	Public / landowner resistance to reintroduction				Political and agency resistance to reintroduction				Human / panther interactions				Panther mortality				Genetic viability and population connectivity				Conflicting prey management				Conflicts with escaped pumas				Competition with other species				
	Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		Severity	Scope	**Stress rank**		
	V	V	Very high		V	V	Very high		H	V	High		H	V	High		M	H	Medium		M	H	Medium		L	M	Low		L	H	Low		
Source of stress	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	Contribution	Irreversibility	Rank	**Threat rank**	**Factor E overall threat rank**
Panther visibility to local public	-	-	-	-	-	-	-	-	M	L	L	Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Low
Inadequate regulation or understanding of distribution and occurrence of pet puma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H	M	M	Low	-	-	-	-	Low
Competition with other large predators	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	L	L	Low	Low
Feral hog management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H	M	M	Low	-	-	-	-	-	-	-	-	Low

EXHIBIT 22

APPENDIX C. Summary of Comments Received

The FWS received comments on the Technical / Agency Draft from 33,739 individuals / organizations. Of these, 33,676 individuals commented through the Defenders of Wildlife website. These comments were faxed to the FWS South Florida Field Office in Vero Beach, Florida. With few exceptions, these comments were identical and followed the suggested wording on the website. The remaining 63 individuals / organizations offered 299 comments.

Support for the Recovery Plan and suggested edits to text

Ten commenters stated that they were supportive of the Recovery Plan and offered no changes. One-hundred twenty-two comments regarded suggested edits to the text.

FWS Response

The FWS considered all suggested edits and incorporated those that were appropriate.

Criteria and need for interim goals and supporting actions

Seven commenters offered 11 comments concerning the recovery criteria and the need of interim goals. These commenters believed that the recovery criteria have little or no chance of being realized. It was suggested that achievable goals or benchmarks be set that would reduce the risk

EXHIBIT 22

of extinction to acceptable levels and suggested a target of establishing 3 separate populations of approximately 80 animals (a total of 240).

FWS Response

The population size of 240 for a viable Florida panther population was derived from the most recent PVA. The Recovery Team believes that 3 populations are needed for redundancy and resiliency. FWS agreed that an interim goal of 3 subpopulations of 80 animals each was needed to show that progress towards the recovery criteria is being achieved. This interim goal and associated criteria were added.

Panther Range and Taxonomy

Five commenters offered 10 comments questioning the accuracy of Young and Goldman's 1946 range map for the Florida panther in regards to taxonomic status. Commenters further stated that given the arbitrary nature of the estimated historic range and new information regarding genetic ancestry and the current state of the science, the plan appears to rest on a rather weak foundation.

FWS Response

EXHIBIT 22

The map in Young and Goldman (1946) is the most current and best available historic range map for the Florida panther. The degree to which the scientific community has accepted the use of genetics in puma taxonomy is not resolved at this time. Additional research is needed to understand genetic and morphological similarities and differences of puma across North America.

Panther Habitat

<u>Development / Habitat Protection</u>--The majority of the 36 comments received from 24 commenters concerning panther habitat had little to do with the Recovery Plan and were directed at the FWS's regulatory process. It was suggested that FWS place primary emphasis on protecting and restoring panther habitat in Florida by not permitting development in panther habitat. They felt that too often developers have been permitted to build developments that directly impact the survival of the panther.

FWS Response

Through section 7 of the ESA, as amended, the FWS works with Federal agencies to ensure that any action that is federally funded, authorized, or carried out that may affect the Florida panther does not jeopardize the continued existence of the panther. The FWS works with Federal agencies to emphasize the identification of potential conflicts in the early stages of project

EXHIBIT 22

planning and advises the agencies and applicants on means to avoid adverse impacts. In addition to habitat conservation, important compensation strategies include the configuration of new roads to direct traffic away from panther habitat and the construction of wildlife crossings aimed primarily at allowing panthers to pass safely from one side of a road to another. The section 7 process can be complemented by activities such as fee-title acquisition, easements, and other local, State, and Federal conservation tools to achieve maximum benefits.

Critical Habitat--Four commenters suggested the need to designate critical habitat for the Florida panther.

FWS Response

When the panther became a listed species pursuant to the ESA in 1973, critical habitat was not designated. Designation of critical habitat for a species could occur only through a rulemaking process that would include opportunity for public comment. Because it is listed as endangered pursuant to the ESA, the panther and its habitat receive protection whether or not they are in an area designated as critical habitat.

Panther Management and Research

EXHIBIT 22

Annual counts or other census techniques--One commenter stated that the Recovery Plan should explicitly commit the three agencies to coordinate efforts to conduct annual verified counts or other appropriate census techniques to track progress made towards achieving a self-sustaining, viable population. A second commenter stated that the Population Trends and Distribution section would benefit from a description of the extensive annual field surveys conducted since 1981 by McBride for the FWC.

FWS Response

An FWS recovery plan does not commit other agencies to conduct specific tasks; it does however recommend which agencies / organizations would be best suited to accomplish certain tasks. Since 1981, an annual count of documented panthers has been conducted. Roy McBride drafted the Population Trends and Distribution section for the Recovery Plan and more details about annual field surveys discussed therein can be found in the literature.

Provide crossing points on the Caloosahatchee River and create a panther corridor to North Florida and South Georgia--28 comments were received from 17 commenters suggesting that the Recovery Plan address providing panther crossing points along the Caloosahatchee River to facilitate movement to the north and create a panther corridor that would connect habitat in south Florida with habitat in north Florida and Georgia by linking the Ocala National Forest and Okeefenokee National Wildlife Refuge.

EXHIBIT 22

FWS Response

As described in the Recovery Plan, the Dispersal Zone encompasses 44 mi^2 (113 km^2) with a mean width of 3.4 mi (5.4 km). The Dispersal Zone is strategically located and expected to function as a critical landscape linkage to south-central Florida (Kautz et al. 2006). Transient male panthers currently utilize this zone as they disperse northward into south-central Florida. Within south-central Florida, corridors have been identified to connect potential panther habitat patches (Thatcher et al. 2006a). The Florida Ecological Greenways Network (Hoctor 2004) identifies and prioritizes landscape corridors that would also serve as panther travelways.

<u>Growing transportation threats</u>--Sixteen commenters offered 19 comments concerning panthers and highways. Some felt that the Recovery Plan trivializes the impact that transportation has had and continues to have on the current population. Suggestions were made to “Prohibit road development in panther habitat and retrofit existing highways that experience panther mortality with crossing underpasses similar to I-75.” Others, however, felt that too much emphasis was placed on highway underpasses and that “…it would be misleading to infer that crossings can adequately substitute for sound transportation and land use planning that realistically assess the harm suffered by wildlife and for landscape level habitat protection.”

FWS Response

FWS agrees that roads are one of the major sources of mortality for the panther population as well as limiting their ability to disperse and travel across the landscape. We believe that the potential impact of roads to the conservation and recovery of the panther is adequately addressed in the Recovery Plan and we are working closely with public and private entities to help minimize these impacts.

Genetics management plan--One comment was received encouraging the continued monitoring of physical and physiological characteristics correlated with inbreeding and depletion of genetic variability along with the development and implementation of a genetics management plan that would detect levels of heterozygosity that may trigger future introgressions of genetic material into the southern Florida population.

FWS Response

FWC continues to monitor panther physical and physiological characteristics correlated with inbreeding and depletion of genetic variability. The genetics data collected over the past two decades is being analyzed and published and will be used to help map future panther management actions.

EXHIBIT 22

Captive breeding program--One commenter suggested that a limited captive breeding program be considered as a hedge against sudden extinction.

FWS Response

The history of Florida panther captive breeding is presented in the Recovery Plan. The captive breeding program for panthers was discontinued in the early 1990s due to the fact that the genetic health of the Florida panther population had deteriorated to a point where continued survival was questionable, even with selective breeding within a captive population. Genetic restoration by simulating natural gene flow through introducing animals from western puma populations has proven to be more successful. This plan does consider the establishment of a captive breeding program to address other issues, however.

Monitor prey densities--Two commenters made 2 comments to the effect that prey animals should be monitored along with panthers as part of the recovery program.

FWS Response

FWS agrees that prey animals should be monitored along with panthers, and one of the actions in the Recovery Plan is to assess and monitor the status of deer populations in panther habitat.

EXHIBIT 22

PVA--One individual commented that the continued focus on panther demographics is strongly warranted and that the key vital rates for data collection should be kitten survival and adult female survival. However, they were not sure that convening another group of experts to conduct a PVA with existing data would be worthwhile unless solid new data are obtained on vital rates and variation in those rates. Also, they were uncertain whether Root's PVA was based on the Florida panther population only or on a hypothetical metapopulation of *Puma* as would be meaningful for the entire southeast region.

FWS Response

FWS and FWC are cooperatively funding a new PVA project that is analyzing new as well as reanalyzing old data. This PVA project should be completed by the end of 2008. The Root model was based on the Florida panther population as well as a hypothetical metapopulation and would be meaningful for the entire southeast region.

Independent scientific review of recovery program--One individual recommended that the Recovery Plan "provide for an independent scientific review panel of the recovery program that would issue annual reports on panther recovery."

FWS Response

EXHIBIT 22

There is no requirement for FWS to provide for an independent scientific review panel. FWC, NPS, and FWS prepare scientifically based annual updates on the status of panther recovery; however, these updates are not reviewed by an independent scientific panel.

<u>Add research questions that need to be addressed</u>--One individual commented that “the paper by Janis and Clark (2002) on the effects of ORV use and hunting on panthers is exemplary for its experimental design. This Plan should recommend more such studies about other subjects. The plan is particularly weak in its lack of attention to the identification of important questions that could be addressed with experimental management approaches.”

FWS Response

Almost any recovery action mentioned in this plan could be addressed with experimental management approaches. The purpose of this plan is to outline the actions necessary to recover the panther to the extent that it can be reclassified and eventually delisted.

Panther Translocation / Reintroduction

<u>Opposed / supports translocation / reintroduction</u>--Ten comments were received from 8 commenters that were opposed to reintroduction into Arkansas (3), into Arkansas as it affects Missouri (2), Okefenokee National Wildlife Refuge (1), and Georgia (1). Seven comments by 4

EXHIBIT 22

commenters were supportive of the need to expand the breeding portion of the Florida panther population into south-central Florida and to establish viable populations in two areas in the southeastern U.S. outside of Florida.

FWS Response

The numbers of panthers required to obtain reclassification and delisting thresholds will require expansion of the existing population as well as the reintroduction of additional populations. Prior to any translocation / reintroduction efforts extensive cooperation / coordination will occur.

<u>Clarify the relative priorities and the process for translocation of panthers into central Florida versus other portions of the historic range</u>--Because the pool of individuals available for translocation into central Florida and other portions of the panther's historic range is limited, one individual felt that any decision to physically move cats out of the currently occupied range must be made in light of the competing goals involving range expansion and establishment of additional populations. They felt that the best available science indicates that translocation of panthers into central Florida would not only impede recovery but also would jeopardize panther survival. Two other commenters made 3 comments suggesting that any translocation of panthers would be considered a population "augmentation" versus a "reintroduction."

FWS Response

EXHIBIT 22

FWS will proceed cautiously by preparing an EIS that explores a reasonable range of translocation scenarios into central Florida and other portions of the historic range, and adequately presents the scientific information concerning habitat suitability for these areas and the biological limitations of the south Florida source population.

<u>Panthers and habitat suitability north of the Caloosahatchee River</u>-- Two commenters were concerned about a lack of activity by FWS in exploring the possible existence of a small but viable population of panthers in south-central Florida, especially in the western portion of this region. They suggested that an immediate systematic survey be conducted. Another commenter requested that additional information be provided about the land uses, potential conflicts, and size and connectivity of blocks of potential panther habitat in south-central Florida.

FWS Response

FWC conducted a systematic survey from July 1998 to June 2004 to determine the occurrence and status of panthers in south-central Florida and to evaluate the area's potential for expansion of the breeding population from south Florida (Belden and McBride 2006). No evidence of a breeding population of panthers was found. Dispersing males from the southern Florida population have immigrated into south-central Florida, but an absence of females has inhibited expansion of a breeding population into this area. This study suggested that three segments of

EXHIBIT 22

remaining habitat possibly could support small numbers of panthers. A model to identify potential panther habitat in south-central Florida was also developed by Thatcher et al. (2006b).

Panther Effects on Humans

Increased potential for adverse human-panther encounters--One individual commented that they were uncertain about the socio-political feasibility of the Recovery Plan. Two other commenters recommended that due to the rapidly escalating significance of people-panther interactions, that the Human Dimensions discussion be expanded beyond the north Florida reintroduction research to include a brief synopsis of south Florida issues and the extant population. Another individual commented that FWS needs to clarify what is meant both by ‘extreme’ and ‘permanent.’

FWS Response

FWS agreed and this section of the Recovery Plan was updated.

Recovery Plan threatens hunting / public access--Thirty-two comments were received from four commenters suggesting that more panthers would result in a loss in outdoor recreation to near zero, particularly hunting and use of ORVs. They believed that the Recovery Plan was intentionally focused upon doing away with the traditional cultural community associated with the Gladesman folk culture of southern Florida.

EXHIBIT 22

FWS Response

The majority of outdoor recreational activities are compatible with panther recovery if they are conducted in a manner consistent with existing local, state, and Federal laws and regulations. The Recovery Plan is not aimed at any culture or traditional cultural practices. Our mandate was to write a plan that outlined actions necessary to recover the panther to the extent that it can be reclassified and eventually delisted.

EXHIBIT 22

APPENDIX D. List of Peer Reviewers

Dr. Eric Hellgren
Cooperative Wildlife Research Lab
Mailcode 6504, Department of Zoology
Southern Illinois University
Carbondale, IL 62901

Dr. Fran James
Department of Biological Sciences
Florida State University
Tallahassee, FL 32306

Dr. Robert A. Kluson
University of Florida – Sarasota County Extension
Twin Lakes Park
6700 Clark Rd.
Sarasota, FL 34241

Dr. Kenny Logan
Colorado Division of Wildlife
2300 South Townsend Avenue
Montrose, Colorado 81401

Dr. Clay Nielsen
Cooperative Wildlife Research Lab
Mailcode 6504, Department of Zoology
Southern Illinois University
Carbondale, IL 62901

Linda Sweanor
Colorado Division of Wildlife
2300 South Townsend Avenue
Montrose, Colorado 81401

EXHIBIT 23

INTRODUCTION

In response to extensive agency questions, comments and data requests in the completeness process related to operational impacts of FPL's proposed backup cooling water supply for the Project, FPL is continuing to perform additional and more refined groundwater modeling of the radial collector wells to address these completeness questions.

For purposes of the Site Certification Application (SCA), in order to be conservative, FPL modeled and included the results for the radial collector well system operating 24 hours per day, 365 days per year. However, in actuality, and as stated in the SCA, the radial collector well system is proposed as a backup cooling water supply which would be required only during periods when reclaimed water (the primary cooling water supply source) is not delivered to the Site in sufficient quality or quantity. FPL is currently conducting a reliability study to quantitatively characterize the expected reliability of the reclaimed water treatment and delivery systems to Turkey Point Units 6 & 7. The results of this study will enable a more accurate assessment of expected annual use of the radial collector well system.

The Southwest Florida Water Management District (SFWMD) water use regulatory program recognizes that when reclaimed water is proposed as a source, a limited duration backup or secondary water supply may be authorized. FPL's West County Energy Center (WCEC) provides an example of a recently licensed power plant that uses reclaimed water as its primary water source. The WCEC certification allows withdrawals from the Floridan Aquifer for up to 90 days per year as a temporary secondary water supply source. FPL is prepared to accept a similar water use restriction for the backup water supply for Turkey Point Units 6 & 7 that would allow for operational reliability in the event that reclaimed water is not available. FPL proposes, for discussion purposes, that a durational restriction be applied to use of the radial collector wells for Turkey Point Units 6 & 7. An example of language for such a condition, based on the WCEC condition, is provided below.

"Although reclaimed water will be the primary water source for Turkey Point Units 6 & 7, there may be temporary interruptions in the delivery, quantity, or quality of reclaimed water supply to the Site. Consequently, authorizing a reliable, secondary water supply source for the Project is in the public interest. Therefore, this Certification authorizes withdrawals from the radial collector wells as a temporary secondary water supply source for up to 90 days during any calendar year."

FPL requests that FDEP, SFWMD, and MDC advise whether this type of restriction would be acceptable and allow a recommendation for approval of the radial collector wells or whether such a restriction would alter the information necessary to prepare the Project Analysis Reports pursuant to Section 403.507, F.S.

FPL has endeavored to work with the reviewing agencies with remaining completeness questions to clarify the requests and to provide the information sought, where available. Although not stated for each 3rd Completeness Round plant and non-transmission response, FPL maintains its objections to those incompleteness questions identified in the 1st and 2nd Round Part A plant and non-transmission completeness responses.

EXHIBIT 23

QUESTIONS AND RESPONSES

I. DEP SED WATERSHED MANAGEMENT AND PLANNING

3FDEP-I-C-4: Radial Collector Wells

FPL notes that they are still working with the SFWMD and the Department to evaluate the potential impact of the construction dewatering and radial collector well operation and the results will be provided with the second set of responses (Part B Submittal) by July 15, 2010. Until the Part B Submittal is received and reviewed, concerns still remain regarding unknowns including but not limited to possible impacts to the Bay including the seabed, seagrasses and salinity. The reliability of the well to produce the water at a volume and quality needed for the facility will remain speculative until it is in production. This is a significant unknown and thus a risk for the facility, public and the environment.

RESPONSE:

Comment noted.

New Question: FPL –Owned Fill Source

In an amendment to the Site Certification Application submitted in May 2010, FPL has suspended pursuit of local approvals for the FPL-owned fill source site. With that being said, how will FPL obtain the required amount of fill for the project?

RESPONSE:

Fill for the Project will be obtained from commercial sources.

II. DEP SED ENVIRONMENTAL RESOURCE PERMITTING

A. Drainage/Engineering

3-FDEP-II-A-1: As a proposed post-certification requirement prior to construction, it will be necessary for FPL to demonstrate that all runoff from Units 6 & 7 and associated impervious areas will be treated and directed to and contained within the industrial wastewater facility (Cooling Canal System).

DEP Comment: DEP is modifying the above proposed post-certification requirement as shown in strikethrough/underline.

EXHIBIT 23

RESPONSE:

All areas where hazardous materials are stored, transferred or handled will have engineered containment systems. Therefore, pretreatment of stormwater is not required before release to the industrial wastewater facility under the ERP BOR Section 5.2.2(a).

As per discussion with FDEP SED on 6/17/2010, FPL suggests the proposed condition be modified to read as follows,

> "Prior to construction, FPL shall demonstrate that all runoff from the Units 6 & 7 Site, and the nuclear administration building, training building and parking area, will be directed to the industrial wastewater facility (cooling canal system). All areas where hazardous materials are stored, transferred or handled shall have engineered containment systems."

3-FDEP-II-A-12: As a proposed post-certification requirement prior to excavation, FPL will be required to perform an appropriate environmental site investigation for the fill area. In the event any potential waste disposal areas and/or contaminated soils are identified during the site investigation or encountered during construction activities, FPL will be required to notify and will coordinate closely with FDEP and DERM for a specific plan for handling of any such material. There may be additional specific requirements conditioned for this part of the project.

DEP Comment: FPL has amended the SCA to remove the FPL-owned fill source. As a proposed post-certification requirement, FPL shall notify the DEP of its selection(s) of the fill source(s). FPL shall demonstrate that imported fill materials to be deposited on site is free of contaminants so as to know adversely impact ground water and/or surface water onsite or offsite.

RESPONSE:

FPL has withdrawn the proposed fill site from the SCA (Rev. 1, May, 2010). FPL will continue to work with the County and other agencies to evaluate the viability of future potential fill sites and will continue to pursue commercial fill sources. FPL is agreeable to a post-certification requirement to advise the FDEP of its selected fill sources and methodology for insuring that fill material is free of contaminants.

III. DEP OFFICE OF COASTAL AND AQUATIC MANAGED AREAS (CAMA)

Part of the proposed project is located within the boundaries of Biscayne Bay Aquatic Preserve, as described in Chapter 258.397 Florida Statute (F.S.) and Chapter 18-18 Florida Administrative Code (F.A.C.) and is located in Miami-Dade County.

The Biscayne Bay Aquatic Preserve (BBAP) was established to preserve Biscayne Bay in an essentially natural condition so that its biological and aesthetic values may endure for the enjoyment of future generations. Preservation and promotion of seagrass habitat is specifically named in the „Intent' of the Biscayne Bay Aquatic Preserve Rule, Paragraph 18-18.001(f), F.A.C. Furthermore, it was the intent of the Legislature upon designating and establishing Biscayne Bay an aquatic preserve, including Card Sound, "…that Biscayne Bay be preserved in

EXHIBIT 23

an essentially natural condition so that its biological and aesthetic values may endure for the enjoyment of future generations" Chapter 258.397, F.S.

The project is located in the waters of the BBAP, which is a Class III Outstanding Florida Waters, pursuant to Rule 62-302.700(9)(h)5 & 6. This rule states, "It shall be the Department [of Environmental Protection] policy to afford the highest protection to Outstanding Florida Waters and Outstanding National Resource Waters." It defines this as "no degradation of water quality."

BBAP staff has identified several areas of the FPL Site Certification Application that lack sufficient data and/or pertinent information to substantiate claims that there will be little or no adverse impacts to the BBAP, thereby prohibiting any further evaluation of the proposed activities until such information can be obtained. In reviewing the Site Certification Application for completeness, staff cited authority in Chapter 18-18 F.A.C. and 258.397 F.S. that established the Biscayne Bay Aquatic Preserve, Chapter 18-21 F.A.C. that rules Sovereignty Submerged Lands Management as well as the Outstanding Florida Water designation pursuant to rule 62-302.700(9)(h) 5 and 6. Staff also employed Environmental Control 403.509(3)(e) and (f) F.S. which states that "…In determining whether an application should be approved in whole, approved with modifications or conditions, or denied, the board, or secretary when applicable, shall consider whether, and the extent to which, the location, construction, and operation of the electrical power plant will…(e) Effect a reasonable balance between the need for the facility as established pursuant to s. 403.519 and the impacts upon air and water quality, fish and wildlife, water resources, and other natural resources of the state resulting from the construction and operation of the facility" as well as "…(f) Minimize, through the use of reasonable and available methods, the adverse effects on human health, the environment, and the ecology of the land and its wildlife and the ecology of state waters and their aquatic life."

Each of the questions or requests that follow is categorized under Groundwater Issues, and Surface Water and Benthic Resources and can be qualified by the authority cited above.

Groundwater Issues

Concerns still remain regarding unknowns related to the Radial Collector Well (RCW) System including, but not limited to: possible impacts to the Bay including benthic flora and fauna; salinity; and possible impacts of the radial collector wells on the freshwater input to the bay, flora and fauna. These issues and concerns will require further review and discussion. Notably, questions related to 2FDEP-VI (CAMA)-1, -2, -4, -5, -6, -7 remain. We look forward to receiving the additional information to be sent with July 15, 2010 response to better understand these issues and may have further questions after reviewing the new information.

New Groundwater Issues requests/questions relating to FPL's responses:

3FDEP-VI(CAMA)-1: The seepage meter data provided (see excerpt below) indicates that the bay bottom experiences a net loss of freshwater flow, as the "All Days No Pumping" scenario produces a higher flow rate than the "All Days Active Pumping" at all but two meters. Please provide the field data for the "7 day APT Test" and "All Days Active Pumping" as well as all pump tests conducted within the footprint of the proposed units (PW-6U, PW-7U, PW-6L, and PW-7L) including Aqua Trolls data logger results from all observation wells, water quality

EXHIBIT 23

analyses, and field measurements (i.e., depth to water readings, temperature, conductivity, flow rates, etc.).

Note: "The seepage meter data provided (see excerpt below)" was appended to the same page with Questions 3FDEP-VI(CAMA)-1 and 3FDEP-VI(CAMA)-2. FPL has copied it here for reference.

Seepage Meter Data Provided:

		Meter Number											
		11 (S. Array)	**12 (S. Array)**	**1**	**3**	**7**	**2**	**4**	**8**	**5**	**6**	**9**	**10**
	Distance from Pump	230'	230'	265'	255'	255'	290'	280'	280'	305'	330'	500 '	900'
7 Day APT Test: Pumping	Minimum	-0.0063	0.0103	0.0017	-0.0013	0.0066	0.0084	-0.0025	0.0072	0.0002	0.0000	0.0016	-0.0035
	Maximum	0.0124	0.0314	0.0173	0.0169	0.0305	0.0276	0.0176	0.0251	0.0195	0.0052	0.0047	0.0055
	Average	0.0081	0.0163	0.0051	0.0027	0.0236	0.0167	0.0056	0.0170	0.0078	0.0015	0.0029	0.0019
2 Day Post APT Test: Not Pumping	Minimum	0.0081	0.0131	-0.0002	0.0002	0.0202	0.0220	0.0069	0.0235	0.0181	0.0006	0.0037	-0.0014
	Maximum	0.0143	0.0174	0.0049	0.0009	0.0256	0.0267	0.0090	0.0305	0.0245	0.0055	0.0055	0.0067
	Average	0.0112	0.0153	0.0024	0.0006	0.0229	0.0243	0.0079	0.0270	0.0213	0.0030	0.0046	0.0026
All Days Active Pumping (n=14)	Minimum	-0.0063	0.0095	-0.0017	-0.0013	0.0066	0.0059	-0.0025	0.0072	0.0002	0.0000	0.0016	-0.0035
	Maximum	0.0132	0.0314	0.0173	0.0214	0.0374	0.0276	0.0176	0.0316	0.0195	0.0055	0.0100	0.0115
	Average	0.0085	0.0165	0.0044	0.0093	0.0253	0.0153	0.0060	0.0198	0.0064	0.0023	0.0046	0.0039
All Days No Pumping (n=12)	Minimum	0.0025	0.0087	-0.0015	0.0002	0.0136	0.0069	0.0025	0.0018	-0.0018	-0.0002	0.0019	-0.0014
	Maximum	0.0146	0.0431	0.0182	0.0227	0.0581	0.0267	0.0126	0.0305	0.0245	0.0097	0.0084	0.0104
	Average	0.0086	0.0210	0.0051	0.0105	0.0288	0.0167	0.0055	0.0221	0.0041	0.0041	0.0047	0.0056

RESPONSE:

Regarding the field data for the APT conducted at the Turkey Point peninsula, the following information is provided:

- The files included in the Aquiferwin and Modeling folders submitted on 4/13/10 include the data pertinent to the APT. Please find additional information in the folder entitled "Water Level Elevations" on the enclosed CD #1 at 3FDEP-VI-(CAMA)-1. This data was provided in hardcopy format previously. The rainfall data was obtained from DB Hydro.
- Down hole logging tools – Please see file entitled "Geophysical Logs Turkey Point Peninsula APT" on the enclosed CD #1 at 3FDEP-VI-(CAMA)-1. Please note, these data were previously provided in hardcopy format.
- Video images- The televiewer video is provided in enclosed DVD labeled "FPL Turkey Point / Video MW-1" as an attachment for 2SFWMD-B-3(2). Snapshots of this information were included in the APT report previously submitted.

EXHIBIT 23

- Water quality- Please see attached file APT Water Quality data.pdf. in the folder 3FDEP-VI(CAMA)-1 on CD #1 at 3FDEP-VI-(CAMA)-1.

Regarding the information describing the aquifer pumping tests conducted within the footprint of the proposed Units 6 & 7 plant area, the following information is provided:

- A description of the Units 6 & 7 aquifer pumping tests is described in the FPL Turkey Points Units 6 & 7 COL Application, FSAR Chapter 2, Subsection 2.4.12, Appendix 2BB included on the attached CD #1 at 3FDEP-VI-(CAMA)-1
- The AQTESOLV ™ software package input/output files used to analyze the pumping test conducted in the Units 6 & 7 plant area were provided with Round 2, Part A completeness responses on CD#2 (April 2010).
- A description of the field activities and the data collected for the Units 6 & 7 aquifer pumping tests were provided in response to question SFWMD-B-75 in October of 2009 which is summarized below:

> Slug test results for the wells presented in SCA Appendix 10.7.7 are provided in the MACTEC, 2008 report entitled *Final Data Report – Geotechnical Exploration and Testing: Turkey Point COL Project Florida City, Florida*, *Rev. 2*., Volume 4, Appendix G on the CD attached to the response to SFWMD-B-75. The MACTEC, 2009 *Final Data Report Aquifer Pumping Test* is also contained on the same CD.
>
> The results suggest that the rate-limiting recharge of the well filter pack may be influencing the results of the tests. The rate-limiting recharge effect is caused by the formation having a higher hydraulic conductivity than the filter pack material, resulting in the filter pack controlling the slug test response rather than the formation. This interpretation is supported by regional studies that suggest much higher hydraulic conductivity values for the aquifer as presented in SCA Table 3.3.1-2.

The raw water level and temperature data (WinSitu® format files) from the data loggers, tidally corrected water level data (Microsoft Excel format files), and electronic flowmeter data files (Microsoft Excel format files) for the Units 6 & 7 aquifer pumping tests (PW-6U, PW-6L, PW-7U, and PW-7L) are provided as electronic files attached to this response on CD #1 at 3FDEP-VI-(CAMA)-1.

3FDEP-VI(CAMA)-2: Please provide further information regarding the operation of the RCWs, including the frequency at which the following readings will be collected; pumped water volume rates, water elevations inside the caissons, and water sample parameters, including a map to scale showing the layout of the RCW laterals and the Biscayne Bay Aquatic Preserve boundaries including the proposed coordinates of the position of the RCWs and the projected cone of influence of the full-scale operation of the RCWs, and a definitive depth at which the laterals will be placed as well as their length and diameter.

EXHIBIT 23

RESPONSE:

During the operation of the radical collector wells, it is anticipated that flow rate of the water pumped from each from each caisson, water level within the caisson, temperature, conductivity and salinity would be measure on a continuous basis. A typical layout of the radial collector well laterals was presented in Figure 4.5-2 of the SCA. In addition, SCA Figure 4.5-3 of the SCA presents the area anticipated for the installation of the laterals.

Information on the predicted “cone of influence” from the operation of the radial collect wells will be provided upon completion of the current groundwater modeling effort. Although general information as to the location, lengths and diameters of the laterals was presented in the SCA, exact details will not be available until the detail design activities are completed.

3FDEP-VI (CAMA)-4: Documentation for the Salinity Impact Analysis is incomplete. Please provide published references for the use of an equilibrium mixing chamber model in estuarine environments. Please provide published references and/or supporting documentation for the equations applied and assumptions made for the SFWMD B-63b Mixing Chamber Analysis model (steady state conditions are assumed). Please include published references and/or supporting documentation for the adjustments used to estimate the input parameters provided in the Scenario 1 and Scenario 2 Table of the Salinity Impact Analysis.

RESPONSE:

In the water treatment field, a mixing chamber model is often referred to as a continuous flow stirred-tank reactor (Metcalf & Eddy, Inc. (1991). The tidal prism method for calculating estuary flushing times uses an equilibrium mixing chamber model. This method is discussed in the EPA guidance document entitled *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water – Part II* (EPA, 1985). The concept of tidal exchange is discussed in the text book titled *Mixing in Inland and Coastal Waters* (Fischer, et. al., Academic Press, 1979).

The equations applied and the assumptions made were discussed in 1st Round Plant and non-Transmission Completeness Responses Attachment SFWMD-63a (October 2009), which was provided in both the 1st and 2nd Round Completeness responses as a PDF file: *Attachment SFWMD-B-63a Salinity Impact Analysis.pdf*, and is attached here in the folder labeled 3FDEP-VI-CAMA)-4 on CD #1 at 3FDEP-VI-(CAMA)-4.

The required model input is the freshwater inflow to the system. The freshwater inflow was estimated from an independent reference source (Langevin, 2003). The salinities in the area of interest and the freshwater inflow are matched based on the percentile of each. For example, the median freshwater inflow is used with the median salinity. The maximum freshwater inflow is used for the minimum salinity, and vice versa. The model is then “adjusted” (i.e., calibrated) to match the background salinity condition (i.e., without the radial collector wells) by adjusting the tidal exchange coefficient. Finally, the conservation equations are solved with the radial collector wells operating to determine the change in the salinity. The salinities with the radial collector wells operating are plotted against the values without the radial collector wells to obtain the regression equation.

EXHIBIT 23

References

Fischer, H.B., J.E. List, C.R. Koh, J. Imberger, N. H. Brooks. (1979) Mixing in Inland and Coastal Waters, Academic Press, San Diego, California.

Langevin, C.D. 2003. Simulation of submarine ground water discharge to a marine estuary: Biscayne Bay, Florida. *Ground Water 41, no. 6*: 758-771.

Metcalf & Eddy, Inc. (1991). Wastewater Engineering Treatment Disposal Reuse, 2 Rev. Ed. McGraw-Hill Companies.

USEPA (September 1985). Water quality assessment: A screening procedure for toxic and conventional pollutants in surface and ground water: Part II [Revised], EPA Number 600685002b at http://www.epa.gov/waterscience/models/library/wqascreenpart2.pdf

3FDEP-VI (CAMA)-5: This question was not adequately addressed in FPL's response to CAMA's submission on December 15, 2009. The SFWMD-B-63b spreadsheet does not appear to produce the exact values displayed in the "Scenario 1 & 2" table, which were used to obtain the linear regression equations that predict the 1 square mile and 4 square mile impact. It is stated that "Within ½ mile of the intake (blue line), the RCWs have a slight moderating effect on the salinity (i.e., low salinities are not as low and high salinities are not as high)," but then it is stated that "At 1.0 mile from the intake (green line), there is no measurable impact from the RCWs. This is indicated in the figure by the fact that the green and black lines separate only in a few locations. CAMA staff look forward to clarification related to this discrepancy, and given that the Biscayne Bay Coastal Wetlands projects (part of the Comprehensive Everglades Restoration Plan) seeks to do just the opposite by returning to lower salinities along the shoreline where they currently are variable depending on season, tide and distance from shore, please explain how moderating salinity in any way helps to meet restoration goals, maintains the Biscayne Bay Aquatic Preserve in an essentially natural condition and does not affect salinity values.

RESPONSE:

There is no discrepancy in the fact that there is a slight moderating effect near the radial collector wells (i.e., within ½ mile) and no measurable impact at 1 mile. It is reasonable to expect the magnitude of the impacts to decrease as the distance from the wells increases.

The Biscayne Bay Coastal Wetland (BBCW) projects have an objective to return the salinities in Biscayne Bay to more natural conditions. As mentioned above, one of the goals is to lower salinities along the shoreline. However, this is not the only consideration. It is also widely recognized that cumulative urban development and channelization of the drainage basins around Biscayne Bay have increased variability in freshwater flow to the Bay. More fresh water enters the Bay in rapid response to storm events and less enters the Bay as a steady base flow. The increased temporal variability in the freshwater inflow causes a corresponding increased variability in the Bay salinity, especially near the shoreline. The salinity impact analysis shows that operation of the radial collector wells will have no significant adverse impact on the average salinity in the Bay. Salinity changes attributable to the radial collector wells (changes that are calculable, but not likely measureable), tend to moderate the extreme salinity variations. Because the radial collector wells reduce the salinity extremes, they tend to move the system back toward the more natural salinity condition that existed before development.

EXHIBIT 23

With regard to the comment of maintaining the Biscayne Bay Aquatic Preserve "in an essentially natural condition," please see FPL's first round response to FDEP-VI-A-7. "Essentially natural condition" is not a non-procedural standard, and is therefore not the proper basis for a completeness question.

3FDEP-VI (CAMA)-6: FPL's response to this question states that "The ocean is the ultimate source of water flowing into the Bay to replace water withdrawn by the radial collector wells. Operation of the radial collector wells does not change precipitation, evaporation or freshwater inflow from upland areas. Therefore, the ocean salinity concentration of 35 ppt should reflect the ocean salinity. It should not represent the seasonally variable salinity within Biscayne Bay." While there is a semi-diurnal tidal phase in Biscayne Bay that is influenced by the ocean, the water that resides in Biscayne Bay in any one basin at any one time is greatly affected by groundwater inflow from the bay bottom and tributary discharges, wind patterns and other variables. Salinities are typically lower along the shoreline, between a few hundred meters to 1000m and during the wet season (Langevin, 2001). The referenced county water quality site, BB41, is a surface water sample site approximately 4 miles west of Turkey Point peninsula and does not reflect a near-shore salinity regime, which fluctuates seasonally. It also does not reflect the salinity at or near the bay bottom, the depths most likely to be impacted by operation of the RCWs. Please provide more accurate data for salinity in the vicinity (such as data collected on a continual basis and particularly in the vicinity of the Turkey Point) and explain how this affects the results possible impacts by the RCWs. Continuous sampling results with a frequent timestep obtained from the bay bottom are most appropriate in developing a realistic salinity impact analysis, and a bay bottom depth profile represents the depth of most probable impact by the RCWs.

RESPONSE:

The initial comment above regarding ocean salinity is correct. In the salinity impact analysis, the value represents ocean salinity; it does not represent a seasonally variable salinity within the Bay. While station BB41 is about 3.5 miles northeast of the Turkey Point peninsula, studies conducted by FPL (discussed in 1st Round Plant and non-Transmission Response SFWMD-B-60, October 2009) and by Stalker (2008) show that the average salinity in this area is similar to the salinity found at other stations around the Turkey Point peninsula. Furthermore, studies by Stalker (2008) show that this area of the Bay has a freshwater fingerprint (i.e., percent composition of canal water, groundwater and precipitation) that is similar to the composition of the fresh water predicted by Stalker for the area around the Turkey Point peninsula (see Figures 2.13 and 2.14, Stalker, 2008). Therefore, the salinities at this station are representative of salinities at the radial collector well site. In addition, FPL has provided the salinity impact analysis using data from station BISC122, which is located about 2 miles south of the Turkey Point peninsula. The conclusions remained unchanged. The radial collector wells will have no adverse impact on the salinity in Biscayne Bay.

In addition to the salinity analysis provided in SCA 6.1.3.1 and previous completeness responses, an additional salinity analysis was conducted with salinity data from Site 12B of the Biscayne Bay Salinity Monitoring Network recently provided to FPL by Biscayne National Park. The data was collected, verified and validated by Biscayne National Park. The site is a bottom station located about 1 mile east of the Turkey Point peninsula (latitude 25.43600, longitude -80.30100). The period of record is from May 7, 2004 to December 31, 2009. The data were recorded on 15-minute intervals. The average salinity at this station for the period of record was 33.02 psu. The median

EXHIBIT 23

value was 33.23 psu. The minimum and maximum weekly average salinity values were 24.63 psu and 40.83 psu, respectively. The salinity impact analysis was rerun using weekly average values calculated from this data set. Weekly average values were used in the salinity impact analysis because this interval is reasonable and appropriate considering the estimated flushing time (several days to more than a week) for the Bay volume contained within the radial collector wells area of influence. The attached Excel file *BNP Site 12 Salinity Impact Analysis.xlsx* on CD #1 at 3FDEP-VI(CAMA)-6 contains two figures. The “Time Chart” tab shows the time history salinity plot without the radial collector wells and two scenarios with the radial collector wells operating. Scenario 1 uses a control volume with a radius of approximately ½ mile. Scenario 2 uses a control volume with approximately 1 mile radius. The “Probability Chart” tab in the same Excel file shows the cumulative probability plot without the radial collector wells and with the radial collector wells operating. The other tabs in the same Excel file provide a copy of the calculations. The average and median salinity value increases by only approximately 0.1 psu (0.3 percent) within ½ mile of the radial collector wells (Scenario 1) and by less than 0.02 psu (0.06 percent) within 1 mile (scenario 2). The conclusions remain unchanged, as provided in Section 6.1.3.1 of the SCA and confirmed with salinity impact analyses of other SFWMD stations provided in 1st Round Plant and non-Transmission Completeness Response SFWMD-B-60 and 2nd Round Completeness Response 2SFWMD-B-60(58). These salinity impact analyses from multiple stations demonstrate that radial collector wells will have no adverse impact on the salinity in Biscayne Bay.

Reference

Stalker, J. C. 2008. Hydrological Dynamics Between a Coastal Aquifer and the Adjacent Estuarine System, Biscayne Bay, South Florida. Ph.D. Dissertation, Florida International University, Miami, FL.

Surface Water and Benthic Resources

3FDEP-VI (CAMA)-7: FPL’s response does not adequately address how benthic resources in the footprint of the RCWs and adjacent areas will not be significantly affected given the fact that at least 3% of the water will come from the Biscayne Aquifer,, a source of freshwater inputs to the bay bottom, helping to support the benthic community.

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

Conditions of Certification

CAMA reiterates the need for the following conditions (included in the Department’s January 13, 2010 2nd Completeness Determination) to be considered in future review of this application.

1. **An adequate baseline survey of seagrass cover and benthic fauna in the vicinity of the proposed construction and operation of the radial collector wells and the vicinity of the onsite plant where reuse water would be used, to be conducted within a certain amount of time before the onset of construction-related activities. FP&L will work with DEP staff to design monitoring studies to accomplish these surveys. The monitoring should**

EXHIBIT 23

occur sufficiently prior to and after the beginning of activities at the sites, dates to be determined by FP&L and DEP staff. More information related to the lateral extent of the radial collector wells needs to be provided during this phase also.

2. **All dewatering/construction activities happening on the upland may impact the waters of the cooling canal system in that the byproduct will be placed in the system. Given that the cooling canal system has a tidally-connected influence on the groundwater, it can be assumed based on existing knowledge that groundwater moves through the aquifer and into the surface waters of the bay. Best management practices and/or other ways to ensure that artifacts of the dewatering and construction process should be followed to protect the surface waters of the Biscayne Bay Aquatic Preserve.**

3. **FP&L will provide funds to hire an independent contractor, selected by FDEP, to study the karst features at and adjacent to the radial well collector sites and construction site to determine the feasibility of karst fractures occurring related to their activities. The report will also include recommendations to avoid any fractures during operation and construction as well as proposed mitigation measures in the event of a fracture that impacts benthic communities in the area.**

4. **FP&L will monitor the velocity of water intake from their collector wells utilizing permanently installed equipment to verify that they are not exceeding the proposed velocities submitted in the application. In addition FP&L will put in place monitoring to verify that no entrainment of vertebrate or invertebrate species is occurring due to their radial collector wells. If entrainment is occurring a remediation plan and mitigation measures will be adopted to eliminate, minimize, or mitigate for this entrainment will be adopted and followed.**

5. **FP&L will work with CAMA and DEP/ERP to monitor and ensure that no further impacts to the Biscayne Bay Aquatic Preserve will occur from the operation and/or construction of the new units.**

RESPONSE:

It is acknowledged that the items listed under the heading “Conditions of Certification” are not completeness questions and therefore no action by FPL is required for a determination of completeness. Nonetheless, FPL recognizes that under the PPSA it is appropriate for the agencies to propose conditions of certification in the agency report. FPL will continue to work with the appropriate staff of the Department to determine if there is a need for and the scope of appropriate and acceptable conditions of certification.

EXHIBIT 23

INTRODUCTION

In response to extensive agency questions, comments and data requests in the completeness process related to operational impacts of FPL's proposed backup cooling water supply for the Project, FPL is continuing to perform additional and more refined groundwater modeling of the radial collector wells to address these completeness questions.

For purposes of the Site Certification Application (SCA), in order to be conservative, FPL modeled and included the results for the radial collector well system operating 24 hours per day, 365 days per year. However, in actuality, and as stated in the SCA, the radial collector well system is proposed as a backup cooling water supply which would be required only during periods when reclaimed water (the primary cooling water supply source) is not delivered to the Site in sufficient quality or quantity. FPL is currently conducting a reliability study to quantitatively characterize the expected reliability of the reclaimed water treatment and delivery systems to Turkey Point Units 6 & 7. The results of this study will enable a more accurate assessment of expected annual use of the radial collector well system.

The SFWMD water use regulatory program recognizes that when reclaimed water is proposed as a source, a limited duration backup or secondary water supply may be authorized. FPL's West County Energy Center (WCEC) provides an example of a recently licensed power plant that uses reclaimed water as its primary water source. The WCEC certification allows withdrawals from the Floridan Aquifer for up to 90 days per year as a temporary secondary water supply source. FPL is prepared to accept a similar water use restriction for the backup water supply for Turkey Point Units 6 & 7 that would allow for operational reliability in the event that reclaimed water is not available. FPL proposes, for discussion purposes, that a durational restriction be applied to use of the radial collector wells for Turkey Point Units 6 & 7. An example of language for such a condition, based on the WCEC condition, is provided below.

"Although reclaimed water will be the primary water source for Turkey Point Units 6 & 7, there may be temporary interruptions in the delivery, quantity, or quality of reclaimed water supply to the Site. Consequently, authorizing a reliable, secondary water supply source for the Project is in the public interest. Therefore, this Certification authorizes withdrawals from the radial collector wells as a temporary secondary water supply source for up to 90 days during any calendar year."

FPL requests that FDEP, SFWMD, and MDC advise whether this type of restriction would be acceptable and allow a recommendation of approval for the radial collector wells or whether such a restriction would alter the information necessary to prepare the Project Analysis Reports pursuant to Section 403.507, Florida Statutes (F.S.).

FPL has endeavored to work with the reviewing agencies with remaining completeness questions to clarify the requests and to provide the information sought, where available. Although not stated for each 3rd Round plant and non-transmission response, FPL maintains its objections to those incompleteness questions identified in the 1st and 2nd Round Part A plant and non-transmission completeness responses.

EXHIBIT 23

QUESTION AND RESPONSE

Sea Level Rise

In response to our request for analysis of sea level rise, FPL provided an assessment of some potential impacts from a one-foot rise, based historical data and SLOSH data from early 2009. The most recent SLOSH data (December 2009) proposes a higher level of surge for Biscayne Bay, than the earlier data iteration. Please provide a revised analysis of the possible impacts of sea level rise on the proposed project with all of its associated facilities, using the most current SLOSH data (available from NOAA).

The South Florida Regional Planning Council is an affected agency, as identified in Florida Statute 403.407(2)(a), and will be actively involved in the review and comment during the Site Certification process. This provides the Council the opportunity to ensure the project's consistency with the *Strategic Regional Policy Plan for South Florida*. If you require further information, please contact me at 954-985-4416.

RESPONSE: The effect of long-term sea level rise is included in the analysis of the Turkey Point Units 6 & 7 site, as described in the previous response to this question. The adopted long-term sea level rise of 1.0 foot is input to the SLOSH Biscayne Bay Basin model, which is used to simulate the maximum storm surge elevation from a probable maximum hurricane event near the site. The model grid data including basin topography and bathymetry used in SLOSH model simulations were updated in 1998 and were the latest at the time of the analysis.

The recent update of SLOSH grid data mainly includes terrestrial LiDAR (Light Detection and Ranging) data along the coastline with limited bathymetric data update near the shore with very shallow water depths [National Oceanographic and Atmospheric Administration (NOAA), 2010a)]. Because the Turkey Point Units 6 & 7 site is located on the shore where the hurricane storm surge approaches from Biscayne Bay with nearly unchanged bay bathymetry, the storm surge elevation at the site is not expected to change significantly. The most recent SLOSH Display Program (Version 1.62a, June 2010) (NOAA, 2010b) indicates that for a Category V hurricane, the change in surge elevation at the site, if any, would be small and well within the range of SLOSH model uncertainties applied for the Turkey Point site. Consequently, the SLOSH model results used for the Turkey Point Units 6 & 7 site are expected to remain valid for the updated SLOSH model grid.

References

NOAA, 2010a. Digital Coast: Data Access Viewer, website http://csc-s-maps-q.csc.noaa.gov/dataviewer/viewer.html, access date 6/18/2010.

NOAA, 2010b. SLOSH Display Package, National Weather Service, MDL Evaluation Branch, website http://slosh.nws.noaa.gov/sloshPriv/download.php?L=6, access date 6/17/2010.

EXHIBIT 23

3RD ROUND PLANT AND NON-TRANSMISSION COMPLETENESS RESPONSES
FPL-TURKEY POINT UNITS 6 & 7 SITE CERTIFICATION APPLICATION

INTRODUCTION

In response to extensive agency questions, comments and data requests in the completeness process related to operational impacts of FPL's proposed backup cooling water supply for the Project, FPL is continuing to perform additional and more refined groundwater modeling of the radial collector wells to address these completeness questions.

For purposes of the Site Certification Application (SCA), in order to be conservative, FPL modeled and included the results for the radial collector well system operating 24 hours per day, 365 days per year. However, in actuality, and as stated in the SCA, the radial collector well system is proposed as a backup cooling water supply which would be required only during periods when reclaimed water (the primary cooling water supply source) is not delivered to the Site in sufficient quality or quantity. FPL is currently conducting a reliability study to quantitatively characterize the expected reliability of the reclaimed water treatment and delivery systems to Turkey Point Units 6 & 7. The results of this study will enable a more accurate assessment of expected annual use of the radial collector well system.

The SFWMD water use regulatory program recognizes that when reclaimed water is proposed as a source, a limited duration backup or secondary water supply may be authorized. FPL's West County Energy Center (WCEC) provides an example of a recently licensed power plant that uses reclaimed water as its primary water source. The WCEC certification allows withdrawals from the Floridan Aquifer for up to 90 days per year as a temporary secondary water supply source. FPL is prepared to accept a similar water use restriction for the backup water supply for Turkey Point Units 6 & 7 that would allow for operational reliability in the event that reclaimed water is not available. FPL proposes, for discussion purposes, that a durational restriction be applied to use of the radial collector wells for Turkey Point Units 6 & 7. An example of language for such a condition, based on the WCEC condition, is provided below.

"Although reclaimed water will be the primary water source for Turkey Point Units 6 & 7, there may be temporary interruptions in the delivery, quantity, or quality of reclaimed water supply to the Site. Consequently, authorizing a reliable, secondary water supply source for the Project is in the public interest. Therefore, this Certification authorizes withdrawals from the radial collector wells as a temporary secondary water supply source for up to 90 days during any calendar year."

FPL requests that FDEP, SFWMD, and MDC advise whether this type of restriction would be acceptable and allow a recommendation for approval of the radial collector wells or whether such a restriction would alter the information necessary to prepare the Project Analysis Reports pursuant to Section 403.507, F.S.

FPL has endeavored to work with the reviewing agencies with remaining completeness questions to clarify the requests and to provide the information sought, where available. Although not stated for each 3rd Round plant and non-transmission response, FPL maintains its objections to those incompleteness questions identified in the 1st and 2nd Round Part A plant and non-transmission completeness responses.

EXHIBIT 23

QUESTIONS AND RESPONSES

3SFWMD-B-10(8)

1) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

While the projected water level in the cooling canal system may change with the updated modeling of the dewatering quantities, the conclusion that a local westward gradient between the cooling canal system and the Interceptor Ditch is consistent with the intended operation of the Ditch will not change. Therefore this question was addressed previously.

3SFWMD-B-15(10)(h)

2) Please provide the following:

- **Copies of all Aqua Troll calibration sheets discussed in this question.**
- **A corrected version of Figure 6.3.**
- **A correlation graphics between grab samples (lab samples) and the corresponding Aqua Troll readings. .**

Please explain why the Aqua Troll recorded relatively constant specific conductance while water quality results in Appendices G-1 and G-2 report decreases in chlorides in MW1, MW2, MW4, andMW5 (while Bay chloride levels increased).

The responses to be provided by FPL for Part B could be related to certain parts of this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD may have additional completeness questions/comments after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

The Aqua Trolls were factory-calibrated and installed in accordance with the manufacturer's recommendations.

The graphical representation of the Salinity data for the aquifer performance test (APT) Test Period is attached as SCA Figure 6.3 (Revised) on CD #1 at 3SFWMD-B-15(10)(h).

The chloride measurements for the monitoring wells were two grab sample events prior to and at the end of the APT test period. As such, it is not possible to determine an increasing or decreasing trend. A table of the chloride values from the grab sample events is presented in Response 3SFWMD-B-26(18) below.

EXHIBIT 23

3SFWMD-B-19(11)

3) **Please provide missing attachment SFWMD K-167A & B. Please provide a map showing the location of the sample taken.**

RESPONSE:

Attachments SFWMD-K-167a & b were included on the CD as part of the 1st Round Plant and non-Transmission Completeness Responses (October 2009). Please note that the information on the CD included analyses taken in the L-31 Canal and the industrial wastewater treatment facility since they were taken at the same time. The location was described in the 1st Round Plant and non-Transmission Completeness Response SFWMD-K-167(b) as being near the intakes of Units 1 through 4. This area is relatively small compared to the area of the industrial wastewater facility and well-mixed due to the high flow rates of the intake pumps for Units 1 through 4.

3SFWMD-B-26(15)

4) **If reported values are validated by available quality control, then there appears to be a potential water quality problem at these well sites. The response that these values "do not appear to be inconsistent with the water quality expected from individual grab samples" seems incorrect. For example, a TP concentration of 0.956 mg/L is between ten times and 100 times greater than that typically found in regional groundwater. Please investigate and explain these apparent anomalous values.**

RESPONSE:

The value for Total Phosphorus (TP) is as reported by the laboratory. In general, the values of the grab sample analysis are within the expected range. The TP results may appear to be high based on what the long-term continuous monitoring of the Bay may indicate. There is no additional information that either confirms or disputes the values present for TP.

3SFWMD-B-26(16)

5) **Please provide calibration sheets or other QA/QC documents concerning Genepure's "questionable" conductivity values.**

The responses to be provided by FPL for Part B could be related to certain parts of this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD may have additional completeness questions/comments after FPL submits their Part B responses. Therefore, this response remains incomplete.

EXHIBIT 23

RESPONSE:

The QA/QC documents for the Genapure laboratory analysis are included with the Genapure results included on the CD attached to the 1st Round Plant and non-Transmission Completeness Responses (October 2009). This information is also included on CD #1 attached to these responses at 3SFWMD-B-26(18).

6) **Since the Aqua Troll failed in PW-1 during the APT, please provide the summarized chloride data (in Excel format) collected during the APT. In addition, please provide the lab documentation.**

RESPONSE:

The grab samples taken from PW-1 during the pump test are summarized below and included in a spreadsheet included on the CD attached to these responses. The laboratory analyses were included on the CD with the 1st Round Plant and non-Transmission Completeness Responses (October 2009) and, as referenced in 3SFWMD-B-26(16) above.

			Grab Sample Location for Chloride						
Date	**Report ID**	**Units**	**Bay/SP-1**	**MW-1**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**PW-1**
01/28/09	901055	mg/L							
01/30/09	901055	mg/L							
02/03/09	901313	mg/L							
02/06/09	901313	mg/L							
03/17/09	902963	mg/L			18400				
03/17/09	902901	mg/L	20200						
03/18/09	902964	mg/L		19600		18700	18600	17800	
04/05/09	903730	mg/L	20100						17500
04/06/09	904005	mg/L							
04/08/09	904005	mg/L							22100
04/09/09	904005	mg/L							22900
04/10/09	904005	mg/L							23300
04/11/09	904040	mg/L							12300
04/11/09	904040	mg/L							21700
04/13/09	904040	mg/L							18700
04/17/09	904223	mg/L							18100
04/28/09	904760	mg/L							17900V
04/30/09	904760	mg/L	25000V						17100V
05/01/09	904760	mg/L	21700V						16800V
05/02/09	904918	mg/L	25300						22200
05/03/09	904918	mg/L	25100						20500
05/04/09	904918	mg/L	3590						8000
05/05/09	904918	mg/L	21200						20600
05/12/09	905147	mg/L	23900	16300	13200	19500	15900	16600	

V=Present in blank

EXHIBIT 23

3SFWMD-B-26(19)

7) Please provide a scaled site map of seepage meter layouts during the APT. Please provide the distances from the pumping well and from the seepage meters. If this information is not available, please provide electronic drawings (in GIS or Autocad formats) for staff to extract the points and the distances.

RESPONSE:

A map showing the seepage meter locations was provided in Figure 3.2 "Seepage Meter Locations" in "FPL's Turkey Point Exploratory Drilling and Aquifer Performance Test Program" (HDR, 2009). The coordinates for the seepage meters are listed below. The pump well location coordinates are provided in Table 3.1 of the report entitled "Florida Power and Light Turkey Point Exploratory Drilling and Aquifer Performance Test Report, August 19, 2009" provided with the responses to the 1st Round of Completeness for the Plant and non-Transmission Associated Facilities, October 2009.

Latitude	Longitude	Seepage Meter
25.43751	-80.32150	1
25.43753	-80.32153	2
25.43748	-80.32144	3
25.43754	-80.32144	4
25.43764	-80.32146	5
25.43770	-80.32150	6
25.43750	-80.32135	7
25.43754	-80.32133	8
25.43818	-80.32154	9
25.43932	-80.32162	10
25.43649	-80.32088	11
25.43646	-80.32094	12

Reference:

HDR Engineering, Inc. (2009). *Florida Power and Light Turkey Point Exploratory Drilling and Aquifer Performance Test Report,* August 19, 2009.

3SFWMD-B-26(21)

8) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

The 2nd Round comment and the response related to water level data collected as part of the APT. It did not relate to the groundwater modeling effort. No additional APT work will be conducted. The information requested in this question was previously addressed.

EXHIBIT 23

3SFWMD-B-27(22)

9) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

The 2nd Round comment and the response related to topographic data for the Turkey Point Peninsula. Available data was provided. FPL indicated in the response that a topographic survey could be done, if the District requested it; the District has not requested the survey.

3SFWMD-B-29(25)(f)

12) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

The 2nd Round comment asked for specific information about data that was provided previously. The 2nd Round response answered the question. While this question may be related to other questions on the quality of the muck, this specific question was answered previously and in Response 2SFWMD-92(78).

3SFWMD-B-34(27)

14) Please provide all data on Unit 5 dewatering effluent production rates, water levels, and salinity and water quality in these waters at the construction site and in adjacent waters of the industrial wastewater facility, wetlands, and Biscayne Bay.

The responses to be provided by FPL for Part B could be related to certain parts of this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD may have additional completeness questions/comments after FPL submits their Part B responses. Therefore, this response remains incomplete.

EXHIBIT 23

RESPONSE:

FPL submitted dewatering plans to the SFWMD for SFWMD Unit 5 on December 21, 2004 as required by Certification Condition XXXIII.C.7. The plans were accepted by the SFWMD on February 23, 2005. FPL was not required by the dewatering authorization to collect and report the data requested above. FPL will meet with the District to discuss the Turkey Point Unit 5 dewatering.

3SFWMD-B-35(28)

15) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

Available pump test data for the radial collector well area has been provided. No additional pump test data will be submitted. The information requested in this question was previously addressed.

3SFWMD-B39(30)

Round 2: 30) Regarding the response to subsection (b), the efficacy of turbidity curtains depends upon local wave energy. Given the open waters around Turkey Point, they would not likely be effective at times when the potential for erosion is greatest (with wind and waves). Please provide additional detailed information on plans to prevent such erosion. In addition to controlling particle movement, how will the construction area be configured to minimize the discharge of dissolved materials (including nutrients and sulfides) to adjacent waters?

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

Regarding the construction techniques for the radial collector wells, previous responses have provided the available information until a design is completed and construction contractor is selected. Additional information will be available post-certification.

3SFWMD-B-40(32)

Round 2: (32) The response includes statements that “there is no evidence that water from the Industrial Wastewater Facility (IWF) flows to surface waters, including Biscayne Bay” and “there is no reason to believe there would be impacts to surface waters associated with construction dewatering at the Unit 6 & 7 site”. Arguments were presented to support these statements; however, insufficient information is considered in these arguments. The

EXHIBIT 23

response focuses on net groundwater flux from Biscayne Bay and the IWF, ignoring that very large water fluxes move both from the Bay to the IWF and from the IWF to the Bay. The Bechtel hydrologic modeling report estimates that this input to Biscayne Bay is about 4,000 acre-feet per month, equivalent to about 30,000 gpm (more than the estimated input to the IWF from dewatering the Unit 6&7 site). Given that concentrations of salts and wastewater contaminants are much higher in the WWF than in Biscayne Bay, there is almost certainly a large gross flux of these materials from the IWF to the bay and a resultant net flux in this direction as well. Additional materials will be added to the IWF from dewatering activities and muck storage. Please address the original question, considering gross fluxes of water and materials and resultant net flux between the IWF, Biscayne Bay, and other adjacent areas.

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

3SFWMD-B-40(34)

20) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2nd Round response. Future information and updated groundwater modeling will not change the information provided in the previous response.

3SFWMD-B-40(35)

Round 2: (35) The response states that there is no reason to expect that water flowing out of the IWF will flow back up to Biscayne Bay, or any other surface water. Does this statement consider the upward hydraulic gradients evidenced in the following well pairs in the Units 6 & 7 footprint: OW-606U& L, OW-621U&L, OW-706U, OW721 U&L, OW-735-U, OW-802U, OW805U, and OW809U, listed in Table 1 of the Bechtel (2008) report? The report states (page 5) that "the well pairs consistently show an upward hydraulic gradient. An upward hydraulic gradient indicates groundwater flows from deeper to shallower depths". The FPL response to SFWMD-81(c) explains that the upward gradient is likely due to extracting cooling water from the return basin that is hydraulically connected to the same hydrogeologic unit as the upper zone wells. The well pairs are approximately one-half to one-mile south of the intake basin. What is the influence of extracting cooling water on vertical gradient in the Biscayne

EXHIBIT 23

aquifer to the east of the IWF, below Biscayne Bay and intertidal areas that are closer to the plant intake than the listed well pairs?

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

3SFWMD-B-40(37)

22) Please provide all of the manually read depth to water measurements (DTW) from the deployment of the Aqua Troll in MW-5. These should have been written in a field book and collected during the operation of the data logger.

RESPONSE:

Monitoring well MW-5 was equipped with an Aqua Troll and a Level Troll. Once both probes were installed, manual measurements were suspended to avoid influencing the detailed water level data being collected by the two trolls installed in the monitor wells, including MW-5.

3SFWMD-B-42(38)

Round 2: **38) Regarding the response to subsection (a), will the proposed discharges require a modification of the existing permit? If not, will these discharges be addressed in any other permit?**

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

The additional information requested regarding this question was provided in the 2nd Round Completeness response. Nonetheless, FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

EXHIBIT 23

3SFWMD-B-46(45)

25) Staff could not find the requested report on the referenced CD. Please provide.

RESPONSE:

The report (Lyerly, 1998) is attached on CD #1 at 3SFWMD-B-46(45).

Reference:

Lyerly, R. L. (October 1998). *Thermal performance of the Turkey Point cooling canal system in 1998,* prepared for Florida Power & Light Company, Miami, Florida. (45pp.)

3SFWMD-B-46(46)(a)

26) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2nd Round response. Future information and updated groundwater modeling results will not change additional information related to the original question.

3SFWMD-B-48(48)

Round 2: 48) How much deeper will the barge canal be after dredging? How ill dredging affect the exchange of water and materials between the industrial wastewater facility and the barge canal? What is the magnitude of this exchange currently? Please provide information on the chemical constituents within the material that is proposed to be dredged and stored on the banks of cooling canals. Please estimate leaching rates and expected fate (rate of transport out of the industrial wastewater facility to adjacent areas).

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

The additional information requested regarding this question was provided in the 2nd Round Completeness response. Nonetheless, FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

3SFWMD-B-50(50)

28) Although the response states that there is no aquatic vegetation in the caisson areas, please. clarify if there is any wetland or upland vegetation in this area. If there is any wetland or upland vegetation, please provide the information previously requested.

RESPONSE:

A description of the vegetative communities within the proposed caisson area is provided in Section 3.3.6.1 of the SCA (Rev. 0, April 2009) as follows:

> Previously Filled Areas/Roadways (FLUCFCS 744) – The areas designated for the radial collector well caissons and laydown are comprised of previously filled areas and roadways generally consisting of limerock aggregate uplands. Vegetative species are sparse within the previously filled areas, primarily consisting of grasses and occasional Brazilian pepper (*Schinus terebinthifolius*), morning glory (*Ipomoea* sp.), wild sage (*Lantana involucrata*), seaside mahoe (*Thespesia populnea*), and half-flower (*Scaevola sericea*).

A survey of jurisdictional wetland boundaries associated with the radial collector well caissons and delivery pipeline is contained in SCA Appendix 10.4, Section 2, Attachment G, Sheets 3.00 through 3.08 (Rev. 1), and are attached to this response on CD #1 at 3SFWMD-B-50(50).

3SFWMD-B-51(51)

Round 2: 51) The response does not clarify whether the unnatural continuous downward flux of water, as might be produced by operation of the radial well system, would impact benthic organisms adapted to normal tidal oscillatory fluxes. Please address.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

3SFWMD-B-53(52)

Round 2 52) Please provide the location, including page number references within the cited report, that contain the specific information requested by this question and to which the other references, such as salinity data, are made. Please specify how the information provided or referenced specifically answers this question. The referenced table (Table 3.3.4-1) does not show the "water quality characteristics of the potentially affected areas adjacent to the project site." Please revise.

EXHIBIT 23

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE

The additional information requested regarding this question was provided in the 2nd Round Completeness response. Nonetheless, FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

3SFWMD-B-55(53)

(30) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

Future information and updated groundwater modeling will not change the salinity impact analysis, because the model inputs, including the radial collector well pumping rates, will not change.

3SFWMD-B-56(54)

31) Is FPL's analysis confined to the three monitoring stations indicated (i.e., BB41, Bisc 123 and Bisc 122)? In order to facilitate staff's assessment of the "general" area referenced in this response, please provide the coordinates for the Fowey Rock station. In addition, please provide the location of this station on Figure SFWMD B-59.pdf.

RESPONSE:

The monitoring stations that are considered representative of the area around the Turkey Point peninsula that were used to evaluate the salinity statistics and radial collector well impacts include: BB41, BISC123 and BISC122. The mean salinity at station BISC123 was compared to station BB41 and there was no statistically significant difference. The salinity impact analyses using salinity data stations BB41 and BISC122 have been provided.

Data from BISC101 were also evaluated. This station is approximately 2.5 miles north of the Turkey Point peninsula and directly influenced by nearby drainage canals. The mean salinity at this station is significantly less than (alpha = 0.05) the salinity at stations BB41 and BISC123. Therefore, this station is not considered representative of the area around the Turkey Point peninsula. Nevertheless, the salinity impact analysis for this station was provided in the 1st Round Plant and non-Transmission Completeness Response SFWMD-B-60 (October 2009). The analysis was done to evaluate the

EXHIBIT 23

potential impacts of the radial collector wells, assuming the salinity regime in the area of BISC101 were representative of the radial collector well area; an assumption that is not supported by the available information.

The Fowey Rocks station is located east of Soldier Key about 6.5 miles southeast of the southern end of Key Biscayne at latitude 25.59062 and longitude: -80.09673. This station is in the ocean, outside Biscayne Bay; therefore, it cannot be located on Figure SFWMD-B-59.

3SFWMD-B-57(55)

32) **Qualitative estimates of groundwater flow into Biscayne Bay were provided; however, quantitative estimates were not. Please provide quantitative estimates of groundwater flow into Biscayne Bay.**

RESPONSE:

Quantitative estimates of the groundwater contribution to Biscayne Bay in the area of the Turkey Point peninsula have been provided. As discussed in 2nd Round Response 2SFWMD-B-57(55) (April 2010), canal water contributes approximately 48 percent of the fresh water in the area around the Turkey Point peninsula. This water flows into the Bay from canals located north of Homestead Bayfront Park. The groundwater contribution to the total freshwater inflow at the Turkey Point peninsula is only approximately 2 percent in the dry season and 14 percent in the wet season. The annual average groundwater contribution to the total freshwater inflow is only approximately 8 percent. Direct precipitation contributes the remaining 44 percent of the annual average freshwater inflow. This study shows that groundwater contributes on an annual average basis less than 0.5 percent to the Bay water near the Turkey Point peninsula (Stalker, 2008).

In addition, based on modeling results, Langevin (2003) concludes that the average groundwater discharge to the coastline of Biscayne Bay is approximately 3.7×10^5 cubic meters per day (m^3/day) and the annual fluctuation is approximately 1.0×10^5 m^3/day. He also concludes that nearly 100 percent of the groundwater discharge to Biscayne Bay is to the northern half of the Bay (north of structure S-123, which is about 12 miles north of the Turkey Point peninsula). FPL is not aware of evidence of a significant direct fresh groundwater discharge to Biscayne Bay in the area of the Turkey Point peninsula (i.e., south of Homestead Bayfront Park). The fresh groundwater component of the Bay water around the Turkey Point peninsula, as estimated by Stalker (2008), is most likely transported into the area from the north by surface currents in the Bay.

References:

Langevin, C.D. 2003. Simulation of submarine ground water discharge to a marine estuary: Biscayne Bay, Florida. *Ground Water 41, no. 6*: 758-771.

Stalker, J.C. 2008. Hydrological Dynamics Between a Coastal Aquifer and the Adjacent Estuarine System, Biscayne Bay, South Florida. Ph.D. Dissertation, Florida International University, Miami, FL.

EXHIBIT 23

3SFWMD-B-60(57)

33) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2nd Round response. Future information and updated groundwater modeling will not change the salinity impact analysis, because the model inputs, including the radial collector well pumping rates, will not change.

3SFWMD-B-60(58)

34) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2nd Round response. The additional analysis was provided. Future information and updated groundwater modeling will not change the salinity impact analysis, because the model inputs, including the radial collector well pumping rates, will not change.

3SFWMD-B-61(59)

35) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2nd Round response. The requested information was provided a second time because the District could not locate it the first time. Future information and updated groundwater modeling will not change the salinity impact analysis, because the model inputs, including the radial collector well pumping rates, will not change.

3SFWMD-B-62(60)

36) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

EXHIBIT 23

RESPONSE:

This question was answered in the 2^{nd} Round response. The requested information was provided a second time because the District could not locate it the first time. Future information and updated groundwater modeling will not change the salinity impact analysis, because the model inputs, including the radial collector well pumping rates, will not change.

3SFWMD-B-63(61)

37) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2^{nd} Round response. The requested information was provided a second time because the District could not locate it the first time. Future information and updated groundwater modeling will not change the salinity impact analysis, because the model inputs, including the radial collector well pumping rates, will not change.

2SFWMD-B-65(63)

38) The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore this response remains incomplete.

RESPONSE:

This question was answered in the 2^{nd} Round response. Future information and updated groundwater modeling will not change the cooling tower drift calculations because the inputs, including the cooling water quality characteristics and the cooling tower pumping rates, will not change.

3SFWMD-B-65(64)(c)

39) The results provided were derived from a 1986 report; however, the modeling was for 2001-2005. Please provide background deposition results based on measurements at the NADP and CASTNET station in Everglades National Park for 2001-2005, along with any other concurrent relevant data.

RESPONSE: The modeling was performed with hourly meteorological data that represents a sufficiently long period of record to provide a representative prediction of future deposition. The background deposition is also a representative period of record of deposition not influenced by sources of deposition. These periods of record do not have to be coincident since they represent different components of deposition. Nonetheless, the National Atmospheric Deposition Program (NADP) and Clean Air Status and Trends Network (CASTNET) data from the station located in the Everglades National Park are summarized below. The NADP represents wet deposition while the CASTNET model represents predictions of air sampling. In contrast, the background data from the

EXHIBIT 23

Florida Acid Deposition Study (FADS) (Florida Electric Power Coordinating Group, Inc., 1986) represented an inland station near Everglades National Park that included wet deposition and measured dry deposition. The reported dry deposition included procedures to minimize contamination through sampler design and the identification of contamination through a review of the sampling results. The FADS wet deposition used the same procedures as NADP.

	NADP Summary		CASTNET Model		NADP/CASTNET	
	Wet Deposiition		Output (MLM)			
Year	kg/ha/yr	kg/ha/month	kg/ha/yr	kg/ha/month	kg/ha/yr	kg/ha/month
2001	54.76	4.56	(a)	(a)	(a)	(a)
2002	44.48	3.71	(a)	(a)	(a)	(a)
2003	51.81	4.32	4.22	0.35	56.03	4.67
2004	39.96	3.33	4.92	0.41	44.88	3.74
2005	56.47	4.71	4.85	0.40	61.32	5.11
Average	49.50	4.12	4.66	0.39	54.08	4.51
Maximum	56.47	4.71	4.92	0.41	61.32	5.11
Minimum	39.96	3.33	4.22	0.35	44.88	3.74

(a) Chloride not included in reported results.

Sources: NADP Station FL11 2001-2005; http://nadp.sws.uiuc.edu/sites/siteinfo.asp?net=NTN&id=FL11; accessed 6/1/2010; and CASTNET Station EVE419 2001-2005; http://www.epa.gov/castnet/data.html; accessed 6/2/2010.

As described in the response to 2SFWMD-B-65(64)(c) (April, 2010), a background value of 4.5 kg/ha/month was used for comparisons with potential impacts from the circulation water cooling towers using saltwater. As shown in the table, the average deposition using NADP and CASTNET data is 4.51 kg/ha/month, very similar to the FADS background deposition provided in the SCA and completeness responses. Please note that the station locations for both the FADS and NADP/CASTNET are inland from the Turkey Point Units 6 & 7 location. As presented in Completeness Response 2SFWMD-B-65(64)(c) (April, 2010), deposition for a coastal site in the Florida Keys was 6.5 ha/kg/month primarily due to the marine location. While background deposition near Turkey Point Units 6 & 7 may not be as high as 6.5 ha/ha/month, actual background near the Site is likely higher than 4.5 kg/ha/month, especially near Biscayne Bay.

Reference:

Florida Electric Power Coordinating Group, Inc. (March 1986). Florida Acid Deposition Study, Final Report: A synthesis of the Florida Acid Deposition Study, Volumes I and II, Tampa, FL.

3SFWMD-B-66(65)

40) Staff could not locate the referenced file on the CD. Please provide.

EXHIBIT 23

RESPONSE:

Figure FDEP-II-B-53 was included on the CD in the folder titled “Figures” in the sub-folder titled “1st Round Figures”. This figure was originally included in 1st Round Completeness Responses with the figures provided to FDEP.

3SFWMD-B70(69)

Round 2 69) Please provide the specific pages in the referenced report where the data to address this question is located. Please note that additional information may be requested following the completion of testing at the underground injection well site.

Round 3: The responses to be provided by FPL for Part B could be related to this response. Consequently, the SFWMD cannot conduct a full completeness evaluation of this response at this time. The SFWMD will conduct its completeness evaluation of this response after FPL submits their Part B responses. Therefore, this response remains incomplete.

RESPONSE:

The additional information requested regarding this question was provided in the 2nd Round Completeness response. Nonetheless, FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

3SFWMD-B-83(73)

42) Please provide an update on the status of the Joint Agreement between FPL and the Miami-Dade County Board of County Commissioners that is expected to be approved during the 2nd quarter of 2010. In addition, please provide the SFWMD with a copy of the approved Agreement. The Agreement should provide assurances that a volume of reclaimed water will be available by the projected Unit 6 & 7 startup dates and Miami-Dade County will supply an adequate volume of reclaimed water for the life of Units 6 &7. Please provide the revised Unit 6 & 7 startup dates. If reclaimed water is not available by the new projected startup dates, is FPL proposing to use the radial wells as the primary source in the interim?

The response references the 5th Supplemental Agreement between the South Florida Water Management District and Florida Power & Light Company. This document is for the monitoring program for the Interceptor Ditch Program and the Cooling Canal System, rather than reclaimed water supply. Consequently, this reference appears to be an error. Please clarify.

EXHIBIT 23

RESPONSE:

The Joint Participation Agreement (JPA) between FPL and Miami-Dade County (MDC) has been signed by FPL and submitted to MDC for review and approval and is attached here on CD#1 at 3SFWMD-B-83(73). The JPA will be reviewed by the appropriate Committee who will make a recommendation to the Board of County Commissioners regarding approval. The JPA identifies the roles and responsibilities of FPL and MDC in developing the Project and executing the Reclaimed Water Service Agreement (RWSA) that is included as Exhibit 1 to the JPA. The JPA and RWSA represent the intent of FPL and MDC to provide 100 percent of the cooling water requirements for the Turkey Point 6 & 7 Project using treated wastewater from the South District Waste Water Treatment Plant on a timeline that supports the in-service dates of the project. The current in-service dates are 2022 for Unit 6 and 2023 for Unit 7. 2nd Round Plant and non-Transmission Completeness Response 2SFWMD-B-83(73) (April 2010) included an incorrect reference to the *Fifth Supplemental Agreement between the South Florida Water Management District and Florida Power & Light Company*.

3SFWMD-B-84(74)

43) **Please provide a letter of commitment from Miami-Dade County stating that they have the available excess uncommitted capacity to serve all phases of the project with potable water, including both project construction and the operational life of Units 6 & 7.**

RESPONSE:

Attached is the letter dated June 28, 2010 from Miami Dade County as requested on CD#1 at 3SFWMD-B-84(74).

3SFWMD-D-119(87)

44) **As previously requested, please narrow the corridor to exclude the previously mentioned CERP Biscayne Bay Coastal wetlands parcels. If this is not possible, please provide documentation demonstrating that use of these parcels is unavoidable and the pipeline will be designed, installed, operated, and maintained in such a way as to avoid impacts to the CERP Biscayne Bay Coastal Wetlands Project or other SFWMD projects that may be proposed on these lands.**

RESPONSE:

As indicated in the previous response, it is FPL's intent to design and construct the reclaimed water pipeline so as to avoid SFWMD CERP Biscayne Bay Coastal Wetlands parcels to the greatest extent practicable. The width of the reclaimed pipeline corridor allows for flexibility in location. Parcel TA500-130 is located to the east of SW 87th Drive, outside of the reclaimed water pipeline corridor as illustrated in SCA Figure P9.0.0-2. Parcels GZ100-001 and GZ100-002 are located within the reclaimed water pipeline corridor, immediately north of the FPL transmission line right-of-way. As illustrated in SCA Figure P9.0.0-3, segments of the preliminary routes are adjacent to, but do not cross, either of these parcels. The temporary impact associated with installation of the reclaimed water pipeline will not impact the CERP Biscayne Bay Coastal Wetlands Project or other SFWMD projects that may be proposed on these lands. Details regarding the installation, operation, and maintenance of the reclaimed water pipeline are provided in SCA Chapter P9.

3SFWMD-E-131(90)

45) FPL's interpretation of Rule 40E-6.091 is incorrect. The definition of transmission lines is not limited to just electrical transmission lines; it also includes all other types of utility transmission lines, such as water supply pipelines.

FPL's proposal to place the proposed reclaimed water supply pipeline parallel to and within the SFWMD's L-31 E Canal right-of-way would require approval of a waiver of SFWMD criteria. The requirement for a waiver in this situation is consistent with the action taken at the SFWMD's February 10, 2010, Governing Board (Board) meeting where the Board approved a waiver of this same criteria for the Miami-Dade County Water and Sewer Department to construct a 42" diameter reclaimed water pipeline parallel to and within a 3.75 mile segment of the C-1 and C-1W Canal rights-of-way.

As previously mentioned, the SFWMD will be commencing construction of culverts on the east side of the L-31 E right-of-way for the CERP Biscayne Bay Coastal Wetland Project and, as per Rule 40E-6.091, F.A.C., FPL should make use of its own rights-of-way for linear facilities whenever possible. Furthermore, the SFWMD believes that the width of the existing FPL electrical transmission line right-of-way is adequate to accommodate the proposed reclaimed water pipeline. Therefore, please narrow the proposed reclaimed water pipeline(s) corridor to exclude use of the SFWMD's L-31 E Canal right-of-way. If this is not possible, please provide documentation demonstrating that the use of the L-31 E Canal right-of-way is unavoidable and that the pipeline project will be designed, installed, operated, and maintained in such a way as to avoid impacts to SFWMD operational and maintenance needs and the CERP Biscayne Bay Coastal Wetlands Project or other SFWMD projects that may be proposed on these lands.

If FPL is formally requesting a waiver of the above criteria, FPL needs to provide confirmation of this. In support of a waiver request, FPL needs to provide the additional information previously requested.

If FPL does not provide the additional information requested for further evaluation by SFWMD staff, the SFWMD will recommend a condition of certification in its agency report prohibiting FPL from using any portion of the L-31 E Canal right-of-way for the proposed pipeline project.

RESPONSE:

Comment acknowledged. FPL will schedule a meeting with District right-of-way staff to discuss the necessary informational requirements to pursue a waiver, as applicable.

EXHIBIT 23

3SFWMD-H-150(94)(a)

46) Please address the following:

- **The single (1 .5' MSL) land elevation provided is insufficient to confirm the assumed flow path of water to Biscayne Bay and to determine whether the mitigation lift can be justified. Please provide topographic survey information, or equivalent.**
- **Based on review of the figure provided, it is not clear how the remnant creeks near the L-31 E Canal will be routed around the cooling canal system to the Bay. Please provide additional details, including flow maps.**
- **While it appears that FPL is seeking to mimic seasonal patterns, the quantitative intentions are not clear. Please provide a table of monthly flow distribution for typical wet, dry, and average years.**

RESPONSE:

The figure included in the 2nd Round Completeness Responses illustrated topographic contours from Florida City to Biscayne Bay. The 1.5 MSL contour is adjacent to the L-31E Canal in the area of the proposed mitigation activity, with contours at 0.25 foot intervals illustrated eastward to Biscayne Bay. FPL is refining the mitigation plan in accordance with input from MDC, USACE, FDEP, and the SFWMD to identify a final plan of wetland enhancement, restoration, and preservation that will offset the loss of wetland functions. The final mitigation plan, including details of proposed restoration activities, monitoring, and success criteria, will be available during the post-certification review process authorized by Section 403.5113(2), F.S., and Rule 62-17.191, F.A.C. Upon finalization of the mitigation plan, FPL will update the currently available topographic data with a detailed topographic survey of the proposed S20A/L-31E hydrologic enhancement site, if applicable.

The remnant creeks near the L-31E Canal will be connected to Biscayne Bay through installation of culverts underneath existing roadways, as illustrated in SCA Appendix 10.4, Section 2, Attachment E, Figure 8 (Rev. 0, April 2009).

As described in previous completeness responses, the proposed seasonal distribution is to mimic the historical rainy season flow between May and October, through addition of 525 acre-feet of water on a 5-year rolling average, allowing for variation in annual precipitation and water availability. During dry years, no water would be diverted from the L-31E Canal for the proposed wetland rehydration project. Monthly flow distribution will be available upon completion of a detailed hydrologic analysis of the proposed S20A/L-31E hydrologic enhancement site, and consultation with SFWMD regarding elevation of the proposed weirs and the resulting quantity of water.

3SFWMD-H-153(98)(e)

47) Please provide the basis for the assumed functional lift (0.05/acre) applied to this mitigation feature. Please provide an analysis demonstrating that the additional culverts within S.W. 359th Street will not cause over-drainage of the marsh system north of S.W. 359th Street.

EXHIBIT 23

RESPONSE:

As stated in SCA Appendix 10.4, Section 2, Attachment E (Turkey Point Units 6 & 7 Project Mitigation Plan):

> The current UMAM functional score for wetlands associated with the Model Lands Basin Hydrologic Enhancement Site is 0.77. The functional score is reduced as a result of the hydrological alteration and reduction in vegetative productivity. It can reasonably be expected that following hydrologic enhancement of the area, the functional value would improve to 0.83 as a result of increased health of the vegetative community and subsequent increase of forage fish, macro-invertebrates, and wading bird utilization. Utilizing the difference between pre- and post-mitigation UMAM functional scores (0.07) divided by the TL and R factors (TL of 2 years = 1.04, R factor of 1.25, TL×R = 1.3), the resulting functional lift per acre is 0.05.
>
> TL = time lag; R factor = risk factor.

The associated UMAM functional assessment worksheet is included as an Appendix A to the Mitigation Plan. The "with-project" variable score for location and landscape remained unchanged, while the water environment and vegetation community scores were each increased by 1.

It is reasonable to assume that the unrestricted flow of freshwater through additional culverts in SW 359th Street and proposed addition of water from the Florida City Canal will benefit wetlands both north and south of 359th Street. The analysis demonstrating that the additional culverts will not cause over-drainage of the marsh system north of SW 359th Street will be provided post-certification following detailed hydrologic analysis of the existing and proposed condition of the receiving wetlands. FPL will work with the agencies to develop the appropriate conditions of certification for the culverts.

Analyses proposed by the BBCW CERP Project team in support of the proposed pump stations designed to divert freshwater from the Florida City Canal to the parcel immediately north of SW 359th Street should provide details regarding the existing water budget and proposed seasonal delivery, which would provide a baseline and proposed hydroperiod to further refine this mitigation alternative. FPL will work with FDEP and SFWMD to define the seasonal hydroperiod.

3SFWMD-H-159(104)

48) The response provided does not address the question and is, therefore, incomplete. Has FPL considered other information, such as the recent Engineering Circular released by the U.S. Army Corps of Engineers regarding seas level rise projections? Please note that a copy of the Engineering Circular was provided with our second completeness letter.

RESPONSE:

As described in the 1st Round Completeness Response SFWMD-I-159 and 2nd Round Completeness Response 2SFWMD-H-159(104), the Turkey Point Units 6 & 7 Project has been designed to accommodate the potential sea level rise during the life of the Project. Specifically, The Turkey Point Units 6 & 7 Site elevation of 26 ft NAVD 88 was based on NRC requirements that are applicable to

EXHIBIT 23

the Project. It is noted that the US Army Corps of Engineers has a circular regarding guidance for USACE Civil Works. Notwithstanding, the Site elevation of 26 ft NAVD 88 is clearly above any projected sea level rise provided in the circular.

3SFWMD-J-165(105)

49) The response does not address the question. Please provide the information previously requested.

RESPONSE:

FPL has initiated the process to collect samples as requested by FDEP as part of the renewal application for Industrial Wastewater Facility Permit No. FL0001562 and will submit the requested information to FDEP as soon as it is available. FPL will provide a courtesy copy of the results to the District in Form 2CG Section V once available.

Please note that this response is provided for the District's informational purposes although this request is outside the scope of a completeness request for additional information because it requests information about issues for which the District has no applicable regulatory standard. FDEP has primary jurisdiction over this issue.

3SFWMD-K-169(106)

50) Please provide a letter of commitment from Miami-Dade County stating that they will have an uncommitted volume of reclaimed water and the ability to provide service to FPL for the life of Units 6 & 7.

The response references the 5th Supplemental Agreement between the South Florida Water Management District and Florida Power & Light Company. This document is for the monitoring program for the Interceptor Ditch Program and the Cooling Canal System, rather than reclaimed water supply. Consequently, this reference appears to be an error. Please clarify.

RESPONSE:

The Joint Partnership Agreement (JPA) between FPL and Miami-Dade County (MDC) has been signed by FPL and submitted to MDC for review and approval and is attached to Response 3SFWMD-B-83(73) above. The JPA will be reviewed by the appropriate Committee who will make a recommendation to the Board of County Commissioners regarding approval. The JPA identifies the roles and responsibilities of FPL and MDC in developing the project and executing the Reclaimed Water Service Agreement (RWSA) that is included as Exhibit 1 to the JPA. The JPA and RWSA represent the intent of FPL and MDC to provide 100 percent of the cooling water requirements for the Turkey Point 6&7 project using treated wastewater from the South District Waste Water Treatment Plant on a timeline that supports the in-service dates of the project. The current in-service dates are 2022 for Unit 6 and 2023 for Unit 7.

The 2nd Round Plant and non-Transmission Completeness Response, 2SFWMD-B-169(106) (April 2010) included an incorrect reference to the *Fifth Supplemental Agreement between the South Florida Water Management District and Florida Power & Light Company*.

EXHIBIT 23

INTRODUCTION

In response to extensive agency questions, comments and data requests in the completeness process related to operational impacts of FPL's proposed backup cooling water supply for the Project, FPL is continuing to perform additional and more refined groundwater modeling of the radial collector wells to address these completeness questions.

For purposes of the Site Certification Application (SCA), in order to be conservative, FPL modeled and included the results for the radial collector well system operating 24 hours per day, 365 days per year. However, in actuality, and as stated in the SCA, the radial collector well system is proposed as a backup cooling water supply which would be required only during periods when reclaimed water (the primary cooling water supply source) is not delivered to the Site in sufficient quality or quantity. FPL is currently conducting a reliability study to quantitatively characterize the expected reliability of the reclaimed water treatment and delivery systems to Turkey Point Units 6 & 7. The results of this study will enable a more accurate assessment of expected annual use of the radial collector well system.

The SFWMD water use regulatory program recognizes that when reclaimed water is proposed as a source, a limited duration backup or secondary water supply may be authorized. FPL's West County Energy Center (WCEC) provides an example of a recently licensed power plant that uses reclaimed water as its primary water source. The WCEC certification allows withdrawals from the Floridan Aquifer for up to 90 days per year as a temporary secondary water supply source. FPL is prepared to accept a similar water use restriction for the backup water supply for Turkey Point Units 6 & 7 that would allow for operational reliability in the event that reclaimed water is not available. FPL proposes, for discussion purposes, that a durational restriction be applied to use of the radial collector wells for Turkey Point Units 6 & 7. An example of language for such a condition, based on the WCEC condition, is provided below.

"Although reclaimed water will be the primary water source for Turkey Point Units 6 & 7, there may be temporary interruptions in the delivery, quantity, or quality of reclaimed water supply to the Site. Consequently, authorizing a reliable, secondary water supply source for the Project is in the public interest. Therefore, this Certification authorizes withdrawals from the radial collector wells as a temporary secondary water supply source for up to 90 days during any calendar year."

FPL requests that FDEP, SFWMD, and MDC advise whether this type of restriction would be acceptable and allow a recommendation for approval of the radial collector wells or whether such a restriction would alter the information necessary to prepare the Project Analysis Reports pursuant to Section 403.507, Florida Statutes (F.S.).

FPL has endeavored to work with the reviewing agencies with remaining completeness questions to clarify the requests and to provide the information sought, where available. Although not stated for each 3rd Round plant and non-transmission response, FPL maintains its objections to those incompleteness questions identified in the 1st and 2nd Round Part A plant and non-transmission completeness responses.

EXHIBIT 23

QUESTIONS AND RESPONSES

SECTION A - PLANT SITE FOR UNITS 6 & 7 INCLUDING BARGE AREA

3MDC-A-3 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

With respect to satisfaction of Condition 15 of the Zoning Resolution, FPL recognizes that the zoning approval is an independent authorization and that the conditions of zoning are independent requirements. FPL has met with the County and is developing a submittal framework through which this zoning condition, and the remainder of the conditions, will be addressed such that the County can determine the application complete, and prepare an agency report addressing which conditions are satisfied and which conditions remain to be satisfied post-certification, during construction, or during the operation of the Project.

The Exploratory Drilling and Aquifer Performance Test Program (APT) was intended to collect data to help further evaluate the use of a radial collection well system. The APT is one element of the hydrologic study. Data collected from the APT and the hydraulic parameters derived from the test have been used to help conceptualize, calibrate and validate the Turkey Point groundwater model. As such the APT is not unlike test that are normally undertaken in planning and developing a traditional wellfield. While the APT alone does not address the impacts presented in the completeness question above, the APT together with the modeling does address those impacts.

A draft of the APT plan was provided to Miami-Dade County and reviewed with the County during a meeting at DERM on February 4, 2009 and a follow up meeting on March 20, 2009. In addition, the South Florida Water Management District was also provided a copy of the plan and a meeting was held on March 6, 2009 to discuss the plan. Both agencies had comments and suggestions, most of which were incorporated into the APT plan. The only sampling recommendation that MDC made that was not included was sampling the well water for tritium. FPL decided to use other stable isotopes during the pump test to address this question. The results of the isotope analysis were provided in the APT report (HDR, 2009). Please see also Response 3MDC-A-5 below.

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of

EXHIBIT 23

the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

Reference

HDR Engineering, Inc. (2009) *Florida Power and Light Turkey Point Exploratory Drilling and Aquifer Performance Test Program*, August 9, 2009.

> **2-MDC-A-3 (Second Round)**
>
> **The hydrologic information provided does not satisfy condition 15 of Resolution Z-56-07 or provide sufficient information for evaluation of the proposed project with requirements of Chapter 24, Miami-Dade County Code. Condition 15 requires the submittal of a hydrologic study in accordance with the substantive requirements of Chapter 24, Miami-Dade County Code in order for DERM to evaluate the impacts of the proposed project on surface and groundwater. The APT was of a narrow scope, was not approved by DERM, does not meet the substantive requirements of the County Code, and does not allow for an evaluation of the project's impacts. As an example, the study does not provide the necessary data to determine whether the model output and conclusions drawn from the modeling are reliable. In addition, it fails to show how the existing groundwater plume created by operation of the cooling canal system would respond to construction dewatering activities. Furthermore, the information provided is inadequate to determine the extent to which the plume would be drawn under Biscayne Bay and/or into the radial collector wells. Also see comments provided in MOC-C-6**
>
> **1-MDC-A-3 (First Round)**
>
> **The application proposes to dewater up to 26 MGD of groundwater by discharging it to the cooling canals. Pursuant to Condition No. 15 of the Unusual Use Approval Resolution Z-56-07, a DERM approved hydrologic study is required. The study results are required to evaluate all impacts to surface and groundwater, including but not limited to all dewatering activities.**

3MDC-A-4 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

EXHIBIT 23

RESPONSE:

Please refer to Response 3MDC-C-24 below.

2-MDC-A-4 (Second Round)

The information provided is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code and the COMP, does not meet the requirements of conditions 4 and 5 of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Additional information and further clarification of information provided 'IS required. As an example, the water source analysis was based, at least in part, on incorrect assumptions and conflicting information. See comments provided in MOC-C-24.

1-MDC-A-4 (First Round)

Not enough information provided to assess water supply alternatives.
Appendix 10.9 is a summary of alternative water supply study conducted by FPL

3MDC-A-5 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

Regarding the requested Comprehensive Environmental Impact Statement (CEIS), FPL reasserts the response contained in our 1st Round Response (October, 2009). Under the Power Plant Siting Act (PPSA), the SCA is the procedural vehicle for addressing the applicable substantive requirements of the MDC code. The procedural requirements of local ordinances are superseded by PPSA procedures and submittal requirements under Section 403.510, F.S. FPL will therefore not prepare a CEIS in support of the SCA.

EXHIBIT 23

Regarding radiological monitoring, FPL reasserts the federal NRC preemption in this area. Regarding use of radionuclides such as tritium as "tracers", FPL believes that these are not suitable for use as "tracers" in proximity to a nuclear power plant, and did not use them to identify water sources for this reason.

To determine water sources for the radial collector wells, stable isotopes of water (δD and $\delta^{18}O$) were measured during the APT. FPL believes the combined use of these two isotopes provide a better indicator of the water source (fresh or salt water) contributing to the water obtained from pumping during the APT. Fresh groundwater from the Biscayne Aquifer and saline water from Biscayne Bay can potentially have overlapping tritium signatures due to the low ambient tritium levels (< 6 tritium units*) (Price et al. 2003). Therefore, using tritium to identify fresh or saltwater sources of coastal groundwater was not a practical option for the APT.

*1 tritium unit (TU) = 3.19 picocuries/L (pCi/L)

Reference

Price, R. M., Top, Z., Happel, J.D., Swart, P.K. (2003). Use of tritium and helium to define groundwater flow conditions in Everglades National Park, *Water Resources Research, 39*:9, p. 1267, DOI 10.1029/2002WR001929

2-MDC-A-5 (Second Round)

This comment remains incomplete. The requested information is not strictly a procedural requirement under local law and FPL's response did not address the request for information provided in the County's first completeness comments. Additional information as requested regarding dewatering activities is required for proper evaluation of the potential impacts associated with the proposed project pursuant to local requirements including Chapter 24, Miami-Dade County Code. With regard to the use of radionuclide tracers such as tritium, there is no federal preemption for use of this parameter for evaluation purposes. Miami-Dade County has repeatedly advised that the use of tracers such as tritium is not related to public health and safety issues and that it would be necessary to use such tracers to determine water sources for the radial collector wells as part of a comprehensive hydrologic study.

1-MDC-A-5 (First Round)

Sufficient information is not provided to make a determination of dewatering impacts. Please provide a description of all required dewatering activities and the techniques that will be used to ensure that all surface and groundwater quality standards will be met. The application states that "General area dewatering activities will be confined to areas associated with construction within the power block and the effluent released to the existing industrial wastewater facility. Localized dewatering activities may occur during the construction of some associated non-linear facilities. Water produced during dewatering will be managed local to each facility or released to the industrial wastewater facility." Please detail which facilities will require dewatering during construction, provide a dewatering plan for each facility that includes impact to the groundwater (e.g. radius of influence, drawdown), the method of discharging the recovered groundwater, groundwater assessment, potential treatment requirements, and providing a comprehensive monitoring plan are required, a water quality analysis of the source water, duration and total volume for each dewatering project, disposal options for any contaminated water, applicable calculations and supporting models, and justification for why dry conditions are required for each specific construction element where dewatering is proposed. Mention is made of a

EXHIBIT 23

> **MODFLOW groundwater model within the submittal, however, no model runs or data is provided for review. The modeling efforts must be provided, including, but not limited to the capabilities and limitations of the model, the assumptions made during the construction of the model, boundary conditions and variables (including background data) utilized, the method in which the groundwater and surface water interaction is simulated, method of calibration, and the resulting reporting outputs**

3MDC-A-6 (Third Round)

This item remains incomplete. Miami-Dade County acknowledges the additional information provided related to the sanitary sewer wastewater issues and the requested variance to forego connection to sanitary sewers in association with the proposed onsite wastewater treatment plant not in conformance with Section 24-43 of the Miami-Dade Code, which requires connection to the public sanitary sewer system, prohibits an onsite wastewater treatment plant, and prohibits generation of liquid waste at facilities not connected to the sewer system. The appropriateness of any variance request must consider all regulatory standards applicable to the project. Although FPL asserts that all regulatory standards will be met, relevant information in support of this claim has not been provided. In particular, additional information on the wastewater treatment process and resultant discharge water quality is necessary as part of the wastewater discharge plan required by condition 6 of Z-56-07. In addition, FPL has not demonstrated how the proposed disposal of wastewater via injection wells complies with this condition including the use of this wastewater (after appropriate treatment) for the benefit of the Biscayne Bay Coastal Wetlands CERP project as required. The hydrologic study required by condition 15 of Z-56-07 is also necessary to evaluate the appropriateness of this variance request and the proposed discharge of the wastewater treatment plant effluent to deep wells. Therefore, the hydrologic study needs to include an evaluation of all impacts to surface waters as well as the boulder zone, the Floridan, and Biscayne Aquifers including an evaluation of the proposed elimination of the freshwater inputs to the Biscayne Aquifer from the existing treatment plant.

In addition, with regard to the flow analysis provided by FPL in 2MDC-A-6, please explain why the calculation of the assumed volume that would be returned to MDWASD (75,000 MGD) did not include the contribution form [*sic*] the wastewater retention basin effluent to blowdown sump (590,400 MGD). Please provide a revised analysis with this additional waste stream included. With regard to the existing septic tanks mentioned in FPL's response, please provide detailed information including locations, volumes, size of drainfields, setbacks from wetlands and other surface waters, identification of the facilities served by these septic tanks and a characterization of the wastewater discharge to each system.

RESPONSE:

This response is being provided to respond to 3MDC-A-6, 3MDC-A-8, 3MDC-A-9, and 3MDC-A-11 as these completeness questions each ask questions related to the proposed management of sanitary and industrial wastewater on-site.

With regard to FPL’s requested variance from the sanitary sewer connection requirement, FPL reasserts the response contained in 1st Round Plant and non-Transmission Completeness Response MDC-A-6 that under Section 403.511(2), F.S., the County will not be issuing a variance. Nonetheless, the information provided in this and FPL’s 1st and 2nd round responses affirmatively

EXHIBIT 23

demonstrates why a sewer connection is not technically feasible or economically reasonable and has demonstrated entitlement to a variance from sewer connection requirements pursuant to Section 25-12(1) of the MDC code. The information provided is sufficient for MDC to make a recommendation to the Siting Board that a variance from sewer connection requirements of the MDC code should be granted by the Siting Board.

FPL is continually working to identify secondary beneficial reuse opportunities for water at our facilities as evident by the proposed use of reclaimed water as the primary cooling water source. As described below, when cooling water makeup is provided by reclaimed water, the plant wastestreams are used in their entirety as another secondary beneficial reuse for dilution and are not available for other uses.

As described below, when cooling water makeup is provided by reclaimed water, the plant wastestreams are being used for a beneficial use in their entirety for dilution. FPL is continually working to identify secondary beneficial reuse opportunities for water at our facilities as evident by the proposed use of reclaimed water as the primary cooling water source.

MDC has requested that FPL provide more detail on these wastestreams to identify if there are any secondary beneficial reuse opportunities for the wastestreams on-site. The following response provides detail on the wastestreams, as well as regulatory basis governing liquid radwaste effluent discharges.

2nd Round Attachment 2MDC-A-6-1 (April 2010) details the two categories of wastestreams generated on-site: sanitary wastewater and industrial wastewater. Sanitary wastewater will be processed by the new on-site sanitary plant for Turkey Point Units 6 & 7. The details of this sanitary plant are provided in the attached technical memorandum entitled Turkey Point Plant: On-Site Sanitary Wastewater Treatment Plant on CD #1 at 3MDC-A-6. The objective of this technical memorandum is to provide a description of the treatment processes, design and regulatory criteria proposed for a new Turkey Point plant on-site sanitary wastewater treatment plant. The industrial wastestreams will be produced primarily from cooling tower blowdown with substantially smaller amounts resulting from several plant processes. The estimated water quality of these wastestreams is discussed later in this response.

As demonstrated in the water flow diagram all of the wastewater (industrial and sanitary) combines to form a single discharge stream. This provides dilution of the radionuclides liquid effluents to ensure concentrations within the limits of NRC regulatory standards (10 CFR Part 20). The NRC’s "Final Safety Evaluation Report [FSER] Related to Certification of the AP1000 Standard Design"(NUREG-1793), September 13, 2004, contained the following statement:

> “When the waste discharge flow is diluted by the circulating water blowdown flow of 22,712 liters/minute (6,000 gallons/minute), the discharge flow rate for any waste stream should be restricted, as necessary, to maintain an acceptable concentration level for radionuclides liquid effluents discharged into any unrestricted area. The above criterion for liquid waste discharge flow ensures compliance with the 10 CFR Part 20, Appendix B, Table 2, Column 2, limits for concentrations of radionuclides in liquid effluents discharged into any unrestricted area. All liquid radwaste (WLS) discharges are made through a single liquid waste discharge line to the circulating water blowdown stream.”

EXHIBIT 23

In addition, Section 11.2.2 of NUREG-1793, Conclusion, states, “The AP1000 design has met the dose requirements of 10 CFR 20.1302 by assuring that the annual average concentration of radioactive materials in liquid effluents released into an unrestricted area will not exceed the limits specified in 10 CFR Part 20,Appendix B, Table 2, Column 2.”

Basis for Dilution Flow

The design basis for the dilution flow, 6000 gallons per minute (gpm) per unit for a typical liquid waste release of 1925 gallons per day, is stated in Westinghouse AP1000 Design Control Document (DCD) Section 11.2.3.3, Dilution Factor. This value of dilution flow is part of the plant design as reviewed and approved by the NRC in support of their certification of the AP1000 design. Turkey Point Units 6 & 7 will use cooling tower blowdown water, with supplemental water from other sources, if necessary, as described below, to meet the DCD specified dilution rates. When the cooling water system is using reclaimed water as makeup to the cooling towers, the tower blowdown quantity is supplemented by additional reclaimed water from the reclaimed water treatment facility to meet the required dilution rates. When using the radial collector wells as the backup source to supply cooling tower makeup water, the blowdown quantity is sufficient to meet the dilution quantity without any supplemental supply. A small amount of dilution flow is available from the discharges of the wastewater retention basin and the sanitary wastewater treatment plant, and is added into the blowdown sump as part of the dilution flow.

NRC has accepted use of cooling water blowdown, supplemented by additional flow from the plant water sources as needed, as the method for dilution of liquid radwaste effluent as prescribed in the DCD. NRC has sole jurisdiction over the determination that this dilution flow will result in concentration levels for liquid radwaste effluent remaining within the limits of NRC regulatory standards for effluent (10 CFR Part 20). By employing the standard AP1000 design, FPL is committed to implementing the DCD requirements for dilution and therefore has used appropriate wastestreams for dilution.

Below is the link to the NRC website for Chapter 11 of the Westinghouse AP1000 DCD:

http://www.nrc.gov/reactors/new-reactors/design-cert/ap1000/dcd/Tier%202/Chapter%2011/11-toc_r10.pdf

Wastestream Quality

The flow streams shown within the “Power Plant” box in SCA Figure 4.5-1 are simplified representations of AP1000 standard plant systems. Individual wastestreams included in the flow streams listed in Tables 4.5-1 and 4.5-2 and shown in the “Power Plant” box are evaluated to the extent necessary to obtain a reasonable estimate of the concentrations of the constituents in the wastestream to/from the wastewater retention basin (#28/34) based on the potable water supply to the “Power Plant” (#2) for use in plant processes. Information necessary to demonstrate the reasonableness of the waste characterization as listed in SCA Tables 4.6-2 and 4.6-3 is available in the following:

EXHIBIT 23

- Table 4.5-3: Water Quality Data for Sources of Cooling Water (Input)
- Table 4.5-1: Plant Water Use 100% Reclaimed Water
- Table 4.5-2: Plant Water Use 100% Saltwater (provide information about various flow splits when considered in conjunction with the next item)
- Table 4.6-4: Examples of Chemicals Added to Liquid Effluent Streams (small amounts of chemicals are added only as needed to obtain desired water quality)
- Plant equipment operation assumptions (e.g. typical demineralization system recovery and operational assumptions).

Note: Additional information regarding the makeup of the wastestream to the wastewater retention basin was provided in 2nd Round Plant and non-Transmission Completeness Response 2MDC-A-9 (April 2010).

For the blowdown stream from the service water system (#32/35), the constituents are the same as the potable water supply (stream #29) except as affected by the assumed cycles of concentration associated with the service water cooling tower operation and chemical addition to obtain the desired system water quality.

For the blowdown stream from the circulating water system (#44), the constituents are the same as the reclaimed water supply (#39) or radial collector well supply (#41) except as affected by the assumed cycles of concentration associated with the circulating water system cooling tower operation, and chemical addition to obtain the desired system water quality, and inflow of the blowdown stream from the service water system (#35) discussed in the previous paragraph.

The only other waste flow stream shown in Tables 4.5-1 and 4.5-2, other than sanitary waste (#5, which is from the sanitary wastewater treatment plant that treats wastestreams #4 and #54), liquid radwaste (#22) and the wastestream to the UIC (#50/51) is the FPL reclaimed water treatment facility solid waste (#53, water entrained in FPL reclaimed water treatment facility solid waste; the solid waste will be disposed off-site by an approved disposal contractor). Because of the nature of these streams, further discussion is not necessary regarding determination of the constituents within these streams.

FPL's response to 1st Round Plant and non-Transmission Response SFWMD-K-172 (October 2009) contained a discussion of the appropriate regulatory standard for constituents listed in SCA Tables 4.6-2 and 4.6-3 and also included the numeric target limits provided in FPL's response to 1st Round Plant and non-Transmission Response MDC-A-9 (October 2009). FPL's response to SFWMD-K-172 included information as follows:

"… Rule 62-528.400(1), F.A.C., prohibits the injection of hazardous waste to any underground formation in Florida.

EXHIBIT 23

Thus, the appropriate regulatory standard for the constituents listed in SCA Tables 4.6-2 and 4.6-3 is that the fluid cannot be hazardous waste (as stated in Chapter 62-528, Underground Injection Control, the injection of hazardous waste through any well is prohibited). The definition of a hazardous waste given in Chapter 62-730, adopts by reference, with some exceptions, the definitions contained in Title 40 Code of Federal Regulations (CFR) 260.10. The limiting values associated with the constituents listed in SCA Tables 4.6-2 and 4.6-3 are the toxicity levels for metals and the characteristic limit for corrosivity. These limits apply to 10 constituents, as shown in the table below; for the other constituents, no regulatory standard is identified.

Constituent	Limit, mg/L
Hexavalent Chromium	5
Arsenic	5
Barium	100
Cadmium	1
Chromium	5
Lead	5
Selenium	1
Silver	5
Mercury	0.2
pH (standard units)	> 2 and < 12.5

For the above table, maximum concentrations that apply for metals are provided in 40 CFR 261.24, Table 1 and the characteristic limit for corrosivity is provided in 40 CFR 261.22.

Conclusion

In conclusion, the dilution of the liquid wastestream, prior to the release into the deep injection wells, by cooling tower blowdown when using reclaimed water and other plant sources is a secondary beneficial reuse and necessary to meet the dilution requirements of the Westinghouse DCD.

Beneficial Use of Reclaimed Water

As described above, all of the wastestreams are being used for beneficial use as the required volume needed for the processer. Alternatively, the reclaimed water treated by the FPL reclaimed water treatment facility will be the highest quality alternative “new” freshwater in the region. FPL has been monitoring MDWASD’s pilot study on the additional treatment of wastewater as well as the potential level of treatment required of the effluent for beneficial use in wetland rehydration. Both phases of study are important to determine how and if water from FPL’s reclaimed water treatment facility can serve as source of rehydration water or other additional beneficial uses or can does the facility serve as a pretreatment facility to another treatment process or facility to generate another quality of water. Until additional information from the ongoing study is available, the further advancement of these scenarios cannot be conducted. However, FPL is willing to continue to explore opportunities with Miami-Dade County and other agencies for further development of beneficial reuse of reclaimed water.

EXHIBIT 23

Septic Systems

Domestic wastewater generated by the personnel at Units 1 & 2 and the Land Utilization (LU) facilities are treated by septic tanks. There are no sanitary facilities specifically associated with Unit 5. The waste sent to the septic tanks is domestic wastewater generated from the plant personnel working in the facilities. Solids are removed from the tanks by an approved septic tank waste hauler. The available information on the existing septic tanks is presented in the table below and the approximate locations of these tanks are presented on the attached Figure 3MDC-A-6-1.

	LU	**Fossil Plant (Units 1,2)**
Number of septic tanks	2	1
General location	one tank at the LU offices, one tank at the LU Shop	East end of the plant
Septic tank size	1,100 gal each	3,665 gal
Estimated daily flow	Less than 100 gpd for each location	Approximately 810 gpd
Frequency of solids removal	Pumped approximately every 2 years	Pumped approximately every 2 years

These septic tanks, which were installed over 40 years ago, are proposed to be removed from service as part of the proposed new on-site sanitary treatment plant.

3MDC-A-7 (Third Round)

This item remains incomplete. Not all of the requested information has been provided such as the technical specifications of the proposed treatment train. With regard to Miami-Dade County's request to identify environmentally sensitive receptors, it is acknowledged that there are no such receptors within the boulder zone. However, sufficient information and assurances have not been provided to establish that wastewater injected via deep wells would not impact sensitive receptors beyond the boulder zone over the operational life of the facility. In addition sufficient information and assurances have not been provided to determine whether variances from Section 24-43 of the Miami-Dade County Code would be appropriate pursuant to Section 24-12 of the Miami-Dade County Code. These variances would be required for the proposed construction and operation of a wastewater treatment plant and the proposed discharge to the boulder zone (including but not limited to discharge of the sanitary wastewater stream) in lieu of the required waste stream connections to the sanitary sewer system, which are otherwise prohibited by Code. . The hydrologic study required pursuant to condition 6 of Z-56-07 is also needed to evaluate the proposed project and modeling may also be necessary to evaluate this aspect. With regard to FPL's reference to a previous EQCB approval related to the existing wastewater treatment plant, no information has been provided in the SCA to demonstrate that a variance would be appropriate relative to the effluent discharge from the proposed wastewater treatment plant to the boulder zone. FPL shall provide the necessary information (including the referenced hydrologic study) for Miami-Dade County to review this application.

Please also see MDC's response MDC-G-12 (Third Round)

EXHIBIT 23

RESPONSE:

Please see Response 3MDC-A-6 above.

In addition, a technical memorandum entitled Turkey Point Plant: On-Site Sanitary Wastewater Treatment Plant is attached to Response 3MDC-A-6 above. The objective of this technical memorandum is to provide a description of the treatment processes, design and regulatory criteria proposed for a new Turkey Point Plant on-site sanitary wastewater treatment plant.

3MDC-A-8 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Also, during the March 8th, 2010 meeting FPL explained to County staff that, when using reclaimed water as the cooling water source, nearly all of the wastewater streams proposed to be injected into the boulder zone are needed to dilute the liquid radiologic waste that will be generated by the operation of Units 6 & 7. According to the information presented during the meeting (using the waste stream flow rates presented in Table 4.5-1 of the SCA) an estimated volume of 12,458 gpm is required for the dilution of the estimated 3 gpm of liquid radwaste effluent that will be generated by the operation of the proposed Units 6 & 7. . Therefore, further clarification is needed and all information that has been provided to DERM outside of the SCA process shall be submitted in response to this item. This clarification shall include details of all regulatory requirements related to the disposal of liquid radwaste effluent, including but not limited to the federal requirements to dilute the liquid radwaste effluent discharge and the applicable dilution target concentrations of the discharge. This shall also include a description of the regulatory thresholds based on receiving water volumes or other criteria that pertain to whether dilution is required under federal or other applicable laws. FPL shall also include in the response a description of all the available liquid radiologic waste alternative disposal methods along with any studies and alternative analysis performed and evaluated in the process that led to FPL's selection of the proposed disposal method. FPL shall include a complete characterization of the radiologic components of the waste stream including but not limited to the estimated Gross Beta activity of the proposed discharge prior to and after the proposed dilution relative to the standard contained within Section 24-42 of the Miami-Dade County Code.

During the aforementioned March 8th, 2010 meeting with County staff, FPL explained that FPL had not determined that the proposed dilution of the liquid radwaste effluent was required pursuant to applicable federal law because the volume of the receiving water body within the boulder zone was not known. Rather, FPL conservatively assumed that the volume would be inadequate and is therefore proposing dilution. However this information has not been provided as part of the SCA process and therefore this information shall be included in the

EXHIBIT 23

applicant's response to this item i. Pursuant to condition 15 of Z-56-07, a hydrologic study is required to evaluate all impacts to surface and groundwaters. Therefore, the hydrologic study shall include an investigation of the receiving waters within the boulder zone to determine if use of the wastewater discharge is required for dilution of the liquid radwaste effluent pursuant to applicable federal law as well as to evaluate the appropriateness of the proposed disposal of wastewaters including liquid radwaste effluent to the boulder zone. FPL shall provide the information necessary including the referenced hydrologic study, for Miami-Dade County to review this application for compliance with the substantive requirements of Miami-Dade County Code and the CDMP.

Please also see MDC's response MDC-A-6 (Third Round)

RESPONSE:

Please refer to 3rd Round Plant and non-Transmission Completeness Response 3MDC-A-6 above for a complete description of all cooling water sources and wastestreams when using either reclaimed water and/or radial collector wells.

With respect to the question regarding the volume of the boulder zone for providing the dilution volume, Section 11.2.3.3 of the Westinghouse AP1000 Design Control Document (DCD), Dilution Factor, states, in part, "With a typical liquid waste release of 1925 gallons per day, the nominal *circulating water blowdown* (emphasis added) flow of 6000 gpm provides sufficient dilution flow to maintain the annual average discharge concentrations well below the effluent concentration limits." DCD Section 11.2.3.4, Release Concentrations, indicated that "The annual release data provided in Table 11.2-7 represent expected releases from the plant. To demonstrate compliance with the Reference 1* effluent concentration limits, the discharge concentrations have been evaluated for the release of a typical daily liquid waste volume of 1925 gallons per day and using the nominal circulating water blowdown flow of 6000 gpm. Table 11.2-8 lists the annual average nuclide release concentrations and the fraction of the effluent concentration limits using base BWR-GALE (Boiling Water Reactor Gaseous and Liquid Effluents) code assumptions. As shown in Table 11.2-8, the overall fraction of the effluent concentration limit is 0.11, which is well below the allowable value of 1.0."

The NRC's "Final Safety Evaluation Report [FSER] Related to Certification of the AP1000 Standard Design"(NUREG-1793), September 13, 2004, contained the following statement:

> "When the waste discharge flow is diluted by the circulating water blowdown flow of 22,712 liters/minute (6,000 gallons/minute), the discharge flow rate for any waste stream should be restricted, as necessary, to maintain an acceptable concentration level for radionuclides liquid effluents discharged into any unrestricted area. The above criterion for liquid waste discharge flow ensures compliance with the 10 CFR Part 20, Appendix B, Table 2, Column 2, limits for concentrations of radionuclides in liquid effluents discharged into any unrestricted area. All liquid radwaste (WLS) discharges are made through a single liquid waste discharge line to the circulating water blowdown stream."

In addition, Section 11.2.2 of NUREG-1793, Conclusion, states, "The AP1000 design has met the dose requirements of 10 CFR 20.1302 by assuring that the annual average concentration of radioactive materials in liquid effluents released into an unrestricted area will not exceed the limits specified in 10 CFR Part 20,Appendix B, Table 2, Column 2."

In conclusion, the dilution of the liquid waste stream, prior to the release into the Underground Control Injection, by the waste stream from the cooling tower blowdown when using reclaimed water and the 458 gpm from other plant sources is in compliance and consistent with the requirements of the Westinghouse DCD and as shown in SCA Tables 4.5-1 and 4.5-2 and Figure 4.5.-1 and 4.5-2.

Below is the link to the NRC website for Chapter 11 of the Westinghouse AP1000 DCD:

http://www.nrc.gov/reactors/new-reactors/design-cert/ap1000/dcd/Tier%202/Chapter%2011/11-toc_r10.pdf

Reference

10 CFR Part 20, Appendix B, Table 2, Column 2

3MDC-A-9 (Third Round)

The information necessary to verify the accuracy of the waste characterization as listed in Tables 4.6-2 and 4.6-3 must be provided. Specifically the concentration of each constituent needs to be provided for each of the individual waste streams listed in Tables 4.5-1 and 4.5-2. In addition, please provide the specific regulatory reference for the numeric target limits provided in FPL's response to MDC-A-9.

RESPONSE:

Please see Response 3MDC-A-6 above.

3MDC-A-11 (Third Round)

This item remains incomplete. Based on the information presented to date, it is premature to conclude what waste streams, if any, are necessary for the dilution of the liquid radwaste effluent, or whether this is the appropriate disposal method for said waste. The information requested in other completeness items such as MDC-A-8 (Third Round) above is required in order to evaluate this issue.

FPL's conclusion that the most appropriate option for disposal of cooling water is injection to the boulder zone is premature in the absence of the Miami-Dade County required hydrologic study and wastewater discharge plan and the additional information requested that relates to impacts to surface and groundwaters and to wastewater disposal issues. In addition, information needs to be provided in support of FPL's characterization that injection of the cooling water to the boulder zone is the most appropriate disposal option for this waste stream and that there are only two potential disposal options (i.e. wastewater treatment plant or deep well injection to the boulder zone). Miami-Dade County acknowledges that disposal of the cooling water to the public sewer system may not be appropriate given the large volume of water involved. However, the feasibility analysis of treating the wastewater discharge for the benefit of the Biscayne Bay Coastal Wetlands project, as required by condition 6 of Z-56-07 has not been adequately performed by FPL.

RESPONSE:

Please see Response 3 MDC-A-6 above.

3MDC-A-13 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Please also see MDC response MDC-A-6 (Third Round)

RESPONSE:

FPL believes that the information provided in our responses is sufficient to demonstrate compliance with the applicable, adopted non-procedural requirements of the Miami-Dade County Code related to wastewater discharge, including any applicable water quality standards for the receiving groundwater.

With respect to satisfaction of Condition 6 of the Zoning Resolution, FPL recognizes that the zoning approval is an independent authorization and that the conditions of zoning are independent requirements. FPL is committed to satisfying all conditions of zoning. FPL has met with the County and agreed to a submittal framework through which this zoning condition, and the remainder of the conditions, will be addressed such that the County can determine the application complete and prepare an agency report addressing which conditions are satisfied and which conditions remain to be satisfied post-certification, during construction or during the operation of the Project.

> **2-MDC-A-13 (Second Round)**
>
> **FPL's assertion that Miami-Dade County has no regulatory standards with regard to the disposal of industrial or other wastewater via injection into the groundwaters of Miami-Dade County is incorrect. FPL is advised that the mere generation of liquid waste other than domestic sewage at a property not connected to the sanitary sewers system is not allowed under Chapter 24. The hydrologic study required pursuant to condition 15 of Z-56-07 is intended to examine all aspects of water use and wastewater disposal that will impact surface and groundwaters, including groundwaters within the Floridan Aquifer and boulder zone. No such study has been provided and no information on the impacts to these groundwaters is presented. In addition, FPL has not demonstrated how the proposed disposal of wastewater via injection wells complies with condition 6 of Z-56-07 including the use of this wastewater (after appropriate treatment) for the benefit of the Biscayne Bay Coastal Wetlands CERP project as required. Miami-Dade County notes that FPL is required to provide a wastewater**

discharge plan that meets the requirements of Chapter 24 and to "modify the plan as needed to satisfy compliance with Chapter 24." (Please see comment under MDC-A-11). This information is required for evaluation of the proposed project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, and with requirements of the local land use approval Resolution Z-56-07.

1-MDC-A-13 (First Round)

The application proposes the discharges of industrial wastes from several sources to injection wells. No information was provided to ascertain compliance with the applicable discharge standards. No information was provided to show that no treatment is necessary or that contamination will not result from such discharges

3MDC-A-17

Please see MDC's responses MDC-A-18-1 to MDC-A-18-9 (Third Round)

RESPONSE:

Please see Responses 3MDC-A-18-1 to 3MDC-A-18-9 below.

3MDC-A-18 (Third Round MDC-A-18-1 to MDC-A-18-4)

This item remains incomplete. Please provide revised calculations following the procedures established in *"Design Example for an Industrial Site,* p XF-1 to XF-20, Permit Information Manual Volume IV, SFWMD, 2009" Please ensure that all drawings and plans accurately depict the location and details of the emergency spill ways, include all necessary elevations and dimensions including length and width of streets, buildings, ponds, weir, orifices, inverts, etc. that are needed to verify (re-calculate) the elevations vs. area/volume curve and hydraulic characteristics of the proposed drainage system. Also please ensure the areas used to calculate surface runoff in pre and post development are the same.

Please also see MDC's response MDC-A-18-8 (Third Round)

RESPONSE to 3MDC-A-18-1, -2, -3, -4:

Although the calculations presented in SCA Appendix 10.8 do not directly follow the methodology presented in *"Design Example for an Industrial Site,* pp. XF-1 to XF-20, Permit Information Manual Volume IV” (SFWMD 2009), they contain the information required to show that the surface water management for the Turkey Point Site and associated non-linear facilities will be designed to meet applicable requirements. The stormwater runoff from the proposed Site (plant area plus laydown area), and the administration building, training building and parking area will decrease in runoff volume as compared to the pre-development condition. All runoff from these areas is directed to the industrial wastewater facility, not to the waters of the state. For the FPL reclaimed water treatment facility, it has been demonstrated that a) two stormwater basins as designed are adequate in meeting the water quality treatment requirements, b) reduced runoff volume of post-development as compared to the existing condition, thus meeting the water quantity requirement, and c) the emergency

EXHIBIT 23

spillways are so designed that they will safely pass the 100-year 72-hour storm's peak discharge without overtopping the basins or flooding the Site.

As presented in Tables 24 and 25 of SCA Appendix 10.8, stage-area-storage data for both stormwater basins of the FPL reclaimed water treatment facility are provided. Within each of these two basins, an emergency spillway is provided with the design criteria to pass the 100-year 72-hour storm without overtopping. Both of these two emergency spillways are to have a 50 ft crest width with the spillway crest at El. 12.5 ft NAVD 88. Updated SCA Appendix 10.8 Attachment B (Rev. 1) and SCA Figure 4.2-6 (Rev.1), which were submitted as part of 2nd Round Plant and non-Transmission Response 2MDC-A-18-4 (April 2010), show the location, width, and the elevation of the emergency spillways.

Finally the areas used for pre-development and post-development drainage analysis are consistent as presented in SCA Appendix 10.8, as clarified in 2nd Round Response 2MDC-A-18-2 (April 2010).

To further facilitate the review process of SCA Appendix 10.8, as discussed during a conference call between FPL and MDC DERM on June 22, 2010, the following items are being generated and will be provided and discussed in a meeting in the near future.

1. FPL will revise the figures of SCA Appendix 10.8 and SCA Figure 4.2-6 to include, where applicable:
   - Vertical datum
   - Scale
   - Dimensions of stormwater ponds
   - Additional information on outlet structures (emergency spillway and riser outlet) such as locations, dimensions and elevations.
   - Area identification to facilitate runoff computation

2. FPL will generate an Excel table showing pre- and post-development areas (part by part) of the entire site along with the runoff calculations for the respective areas.

3. FPL will generate extra figures/drawings that will include:

   - A figure/drawing showing the pre- and post-development drainage areas identifying the contributing and non-contributing areas
   - A figure/drawing showing the outlet structures (emergency spillway and riser outlet) details and elevations of the stormwater basins in the reclaimed water treatment facility area.
   - A figure/drawing for the plant area showing the dimensions and sectional views of the makeup water reservoir

4. FPL will update stormwater calculation for the reclaimed water treatment facility to add the peak discharge rate calculation for the pre-development condition. This is to facilitate comparison with the peak discharge rate for the post-development.

EXHIBIT 23

3MDC-A-18-5 (Third Round)

This item remains incomplete. Miami-Dade County disagrees with FPL's conclusion that FPL is not required to perform the flood routing calculations for the 25-year and the 100-year rainfall events. The absence of stormwater discharges to waters of the state does not exempt the project from this regulatory requirement. These calculations are required to demonstrate absence of impact to the adjacent floodplain.

RESPONSE:

FPL believes that adequate information has been provided in previous responses to demonstrate absence of impact to the adjacent floodplain. To further facilitate the review process of SCA Appendix 10.8, as discussed during a conference call between FPL and MDC DERM on June 22, 2010, this question will be discussed in a meeting in the near future.

3MDC-A-18-6 and MDC-A-18-7 (Third Round)

This item remains incomplete. Regulatory requirements include water quality and water quantity criteria that must be met by the applicant. Absence of stormwater discharges to waters of the state does not exempt the project from these regulatory requirements. In addition, with regard to the proposed reclaimed treatment facility, please provide the design criteria for emergency overflow and the proposed operation schedule. Please note that onsite retention is required for all rainfall events below the 100-year rainfall event; offsite discharges should only occur for rainfall events above the 100-year rainfall event provided that the applicable water quality discharge criteria are met.

RESPONSE:

Please see Response MDC-A-18 above for a discussion of the emergency overflow design criteria. FPL does not agree with the statement “that onsite retention is required for all rainfall events below the 100-year rainfall event; offsite discharges should only occur for rainfall events above the 100-year rainfall event…” To further facilitate the review process of SCA Appendix 10.8, as discussed during a conference call between FPL and MDC DERM on June 22, 2010, this question will be discussed in a meeting in the near future.

3MDC-A-18-8 (Third Round)

This item remains incomplete. The plans, figures and other information provided in Appendix 10.8 of the SCA and FPL's first and second completeness responses are inadequate because they do not meet the minimum required Environmental Resource Permit standards for the 35% design. Please provide revised plans, figures and information consistent with these requirements.

RESPONSE:

Please see Response MDC-A-18 for a discussion of additional information that will be provided. To further facilitate the review process of SCA Appendix 10.8, as discussed during a conference call between FPL and MDC DERM on June 22, 2010, this question will be discussed in a meeting in the near future.

3MDC-A-18-9 (Third Round)

This item remains incomplete. Please explain how stormwater rainfall associated with industrial activity (equipment area runoff) at FPL's proposed reclaimed water treatment facility will be captured, treated as necessary, and reused within the reclaimed water treatment process. The explanation shall include appropriate drawings and flow charts.

The stormwater management facilities exceed the pre-treatment water quality requirements for stormwater runoff, however they do not have the capacity to retain the total runoff volume from the 25-year 72-hour rainfall event. Under those conditions, stormwater could be discharged directly to the adjacent wetlands. For the 100-Y 72-H rainfall event, the runoff volume is 33.94 (Table 22 Appendix 10.8), and the total volume of the two SWBs is 10.11 Ac-FT at 14.0 FT elevation. SWB-A is overtopped at 14 FT, and SWB-B at 16 FT. If FPL believes that the SWB-A and SWB-B will not be overtopped during a 100-year 72-hour rainfall event, FPL shall submit additional information (i.e., modeling information) to demonstrate that the proposed structures will not be overtopped. If FPL agrees with the County's conclusion that the SWB-A and SWB-B will be overtopped during a 100-year 72-hour rainfall event then FPL shall provide a detailed description of alternative stormwater management features that could be used to eliminate the possibility of stormwater discharges to adjacent wetlands and retain any excess stormwater onsite.

Please also see MDC's responses MDC-A-18-1 (Third Round) to MDC-A-18-9 (Third Round)

RESPONSE:

Within the equipment area, there are open basin structures that will completely retain the design storm rainfall. The open basin structures, including trickling filters, chemical unloading areas, solid contact basin, filters, waste backwash basins and chlorine contact basins, are formed by berms or walls. For the chemical unloading areas, stormwater is pumped to the backwash basin and is then added to the process flow stream. Stormwater collected in the equipment areas is treated and re-used with zero surface water discharge. The stormwater basins and the emergency spillways have been designed to account for the removal of this pre-development runoff.

FPL could not locate a regulation that requires retaining total stormwater runoff volume either from a 25-year 72-hr storm event or a 100-year 72-hr storm event. Please cite to any such specific standard that the County believes is applicable. As demonstrated in SCA Appendix 10.8, the total stormwater runoff volume from the post-development is actually less than that at the pre-development level, and all stormwater discharges fully comply with all the pre-treatment water quality requirements. Therefore FPL believes that applicable regulations have been satisfied and does not see the impact on the post-treatment stormwater discharge to the adjacent wetlands.

As already demonstrated in SCA Appendix 10.8, the emergency spillways located within the two stormwater basins can safely pass the peak discharges associated with storm events up to and including a 100-year 72-hr event without overtopping the basins or flooding the treatment facility. Because there are no rules or regulations that FPL is aware of that preclude stormwater discharge from the reclaimed water treatment facility, no alternate stormwater management features are presented.

EXHIBIT 23

3MDC-A-20-1 (Third Round)

Please see responses MDC-A-18-1 (Third Round) through 2MDC-A-18-9 (Third Round).

RESPONSE:

Please see Responses 3MDC-A-18-1 through 3MDC-A-18-9 above.

3MDC-A-20-2 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-A-20 (Second Round)**
>
> **The information provided is incomplete because the surface water model and groundwater model should be coupled. For example, MODFLOW and HEC-RAS). Please provide revised modeling with coupled surface and groundwater models.**
>
> **1-MDC-A-20 (First Round)**
>
> **The Report does not cover enough drainage area within the hydrologic model. Simulation should cover, at a minimum, the area bounded by SW 344th St in the north, Old Card Sound Road in the west, and the coastline in the south and east. The EPA-SWMM and XP-SWMM are recommended models to simulate the variety of structures within the area, in order to obtain hydrographs and pollutographs at selected points. The model should also simulate contaminant transport and dilution effect. Event simulations should be run to obtain the conditions before and after the proposed development, including the new inflow and loads from the proposed Administrative/Training Buildings, Parking area, and Reclaimed Water Treatment Facility. Please provide model runs with the expanded area.**

MDC-A-20-1 (Third Round)

Please see responses MDC-A-18-1 (Third Round) though 2MDC-A-18-9 (Third Round).

EXHIBIT 23

Response:

Please see Responses 3MDC-A-18-1 through 3MDC-A-18-9 above.

3MDC-A-21 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-A-21 (Second Round)**
>
> **According to Bechtel (2009) report entitled *Groundwater Model Development and Analysis: Units 6 & 7 Dewatering and Radial Collector Well Simulations Report* did not use MODFLOW packages to include the canal flows and the two/variable groundwater density. Further evaluation will require the MODFLOW input and output files.**
>
> **1-MDC-A-21 (First Round)**
>
> **The SCA does not include sufficient information to evaluate the results and applicability of the referenced models, and does not contain sufficient information to ascertain the effect that the proposed facility would have on surface and groundwater quality, and groundwater table elevation within the C111 Basin (Model Land Area). Furthermore, any model used for evaluation of this project should be able to predict changes, if any, in the contaminant concentrations; in the water table elevations; and in the salinity wedge movement under different scenarios (baseline and postconstruction conditions, for a wet, dry, and average year, etc). Models should combine groundwater with surface water and contaminant transport, and shall include the effect of the difference in densities between salt and fresh water. In addition, the area in the model should be large enough to avoid any boundary-induced bias; boundary conditions could be taken from South Florida Water Management District regional models. EPA authorized models, such as MODFLOW, MODPATH, and FEMWATER should be considered for use in this study. Another possible model would be the FEFLOW, which combines the**

EXHIBIT 23

groundwater contaminant transport (MODFLOW and MODPATH capabilities) with the two density fluids wedge salinity difference (FEMWATER capability).

3MDC-A-23 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. Miami-Dade County notes that opportunistic observations should not be the sole basis for a determination of which habitats are utilized by wildlife and which of those habitats are critical to wildlife, including threatened and endangered species. Miami-Dade County has continued to request comprehensive, seasonal studies on both wildlife utilization and plant occurrence for the region within and surrounding the proposed locations for the plant and associated nontransmission facilities. Such studies are needed to properly document the use and value of the habitat in order to understand the potential impacts of the proposed project on flora and fauna of the region. Miami-Dade County notes that FPL has continued to dismiss the County's request for comprehensive information for flora and fauna, including seasonal utilization, or any other 9 information resulting from a Comprehensive Environmental Impact Statement based upon FPL's assertion that the request is procedural in nature. However, Miami-Dade County reiterates that the information regarding flora and fauna including seasonal variations is required to evaluate this project for conformance with nonprocedural requirements of Miami-Dade County. Miami-Dade County acknowledges the additional information provided by FPL in its completeness responses related to this issue; however, the information remains incomplete. Without the requested information, Miami-Dade County is unable to determine whether the proposed plant and associated non-transmission facilities meet the requirements of Chapter 24 of the Miami-Dade Code and the CDMP, and is unable to prepare the reports required by Section 403.526, F.S.

FPL's response also remains incomplete because: 1) Some of the reports cited in FPL's response were missing from the provided CD or were corrupt/unable to be opened, and 2) the requested seasonally-based biological survey for the proposed plant site was not included in the reports that were provided.

FPL shall provide readable copies of:

- ***Final Environmental Impact Statement Related to Operation* of *Turkey Point Plant,* Dockets No. 50-250 and 50-251, Washington D.C. (US Atomic Energy Commission, 1972) [File name: *Final EIS Turkey Point 1972.pdf*]**
- ***Turkey Point Expansion Project SCA* (FPL, 2003) [File name: *Volume 3.pdf*]**

None of the provided reports that were readable contained information on seasonal vegetation shifts for the Units 6 and 7 plant site that might provide an identity for the vegetation that was the source of the observed flush and/or information on seasonal faunal utilization that might result from such a flush. FPL states in its response that "Short-term flushes of vegetation within the mud flat areas are unable to survive the alteration of hydroperiod and exposure to hypersaline waters, regardless of season." Without a seasonal study, it is speculation that vegetation is unable to survive local conditions. It is an equally plausible hypothesis that the flush of vegetation observed by County staff represents an annual event for vegetation that has

resistant underground biomass and that this seasonal flush could support use by a variety of other biota, which may include rare, threatened or endangered species.

None of the readable reports provided by FPL included current information on bird utilization of the proposed plant site during the April-June breeding season. County staff observed utilization of the site by juvenile birds, including but not limited to the Wilson's Plover, which is protected by the Migratory Bird Treaty Act, and the Reddish Egret, which is state-listed as Threatened. County staff considers the available habitat potentially suitable for nesting by these and other rare, threatened, and endangered species and requests an appropriate study to determine whether the proposed plant area is being utilized for nesting and if so, by which species.

Miami-Dade County reiterates its request for a seasonally-based biological survey for the proposed facility site that includes, but is not limited to, plant cover, plant species abundance, and utilization by wildlife species including but not limited to birds, insects, fish, reptiles, and amphibians, mammals, and aquatic invertebrates. Wildlife utilization information provided should include but not be limited to behavior, such as but not limited to feeding, roosting, nesting or other breeding behavior, and specific location where the behavior was observed. This information is needed in order to determine the effect of the project on rare, threatened and endangered species as per evaluation factors in Section 24-48.3 of the Miami-Dade Code and relevant policies and objectives in the CDMP.

RESPONSE:

Regarding readable copies of:

- *Final Environmental Impact Statement Related to Operation* of *Turkey Point Plant,* Dockets No. 50-250 and 50-251, Washington D.C. (US Atomic Energy Commission, 1972) [File name: *Final EIS Turkey Point 1972.pdf*]
- *Turkey Point Expansion Project SCA* (FPL, 2003) [File name: *Volume 3.pdf*]

Random copies of the CD that were distributed with the 2nd Completeness Responses were reviewed and the cited reports were “readable” for every page of the document. FPL is providing additional copies of the files on CD to MDC that have been reviewed.

As stated in the 2nd Round Completeness Response (2MDC-A-23) the hydroperiod of the Site and resulting presence or absence of common vegetation such as saltwort (*Batis maritima*), sea oxeye daisies (*Borrichia* spp.), woody glasswort (*Salicornia virginica*), and dwarf glasswort (*Salicornia bigelovii*) is directly related to operation of the existing electrical generating facilities and the cooling canals, not seasonal variations of typical wetland systems. The Site is typically completely inundated much of the year, depending upon the operation of the Turkey Point plant and associated cooling needs. Seasonal studies are not required to conclude that saltwort and glasswort cannot survive extended periods of complete inundation. Nor is a seasonal study required to conclude that sparse vegetation occurs in the mudflat areas when the Site is not inundated. The presence of listed species within the Site has been documented, therefore the purpose of the statement “this seasonal flush could support use by a variety of other biota, which may include rare, threatened or endangered species” is unclear.

EXHIBIT 23

The information provided in the SCA and Completeness Responses includes results of multi-season field surveys, past studies conducted at the Site and surrounding vicinity, anticipated species occurrence based upon availability of suitable habitat, correspondence with the US Fish and Wildlife Service (USFWS), and data from the USFWS, Florida Fish and Wildlife Conservation Commission (FWC), and Florida Natural Areas Inventory (FNAI). The assessment of potential utilization of suitable habitat provides a conservative evaluation of potential listed species occurrence. A summary of surveys conducted at the Site and associated facilities, including source, type of survey, and dates, includes the following:

Source	Type of Survey	Date
Turkey Point Units 6 & 7 SCA and Appendix 10.7.1.3	Field reconnaissance of plant, wildlife, and fish species, including T&E	August 2007, November 2007, June through September 2008
	Reconnaissance – DERM visit	August 2007
	Crocodile nest surveys	Annually - 1978 to present
Threatened and Endangered Species Surveys of Existing Transmission Corridors and Planned Transmission Corridors and Water Pipeline Corridor, Turkey Point Property Associated with Units 6 & 7	T&E species survey (pedestrian/vehicular)	April and June 2008
Threatened and Endangered Fauna Species Survey of Planned Transmission Corridors Levee to Pennsuco and Davis to Miami, Turkey Point Property Associated with Units 6 & 7	T&E wildlife survey (pedestrian/vehicular)	March 2009
Avian Surveys of the Turkey Point Property Associated with Units 6 & 7	Pedestrian and vehicular avian surveys of cooling canal system and spoil disposal areas, Units 6 & 7 Site, proposed nuclear administration/training building and parking area, radial collector well area, water treatment facility area, and portion of the proposed construction access road immediately west of the cooling canal system	March and June 2009
Mammal Trapping and Herpetology Surveys, Turkey Point Property Associated with Units 6 & 7	Small mammal live-trapping; reptile survey (minnow traps, cover boards); reconnaissance	April 2009
Fish Surveys of the Turkey Point Property Associated with Units 6 & 7	Cast net, seine, minnow trap surveys at several locations: cooling canals, mangrove wetlands, access road ditch, return canal, dead-end canal, remnant canals and shallow flats of Units 6 & 7 Site	June 2009
Turkey Point Unit 5 Expansion Project SCA	Field reconnaissance of plant, wildlife, and fish species, including T&E	April, July, and October 2003
Final Environmental Impact Statement Related to Operation of Turkey Point Plant, Dockets No. 50-250 and 50-251, Washington D.C. (US Atomic Energy Commission, 1972)	Turkey Point area - trap sampling and gill netting of fish	August 1970
	Trawl sampling in South Biscayne Bay and Card Sound	October 1970
	Terrestrial ecology surveys	February and May 1972
TP Annual Non-radiological Environmental Monitoring Report 1980	Gill nets and minnow traps in cooling canals, comparison to Biscayne Bay/Card Sound	January through December 1980

Prior to actual commencement of construction, FPL will conduct pre-clearing listed species surveys during the nesting season; if any nests of listed species are observed, construction in those areas will be scheduled outside of the nesting season. The surveys will be conducted in consultation with MDC, along with the FWC and USFWS. FPL will comply with the FWC and USFWS regulations regarding avoidance, minimization, and mitigation of impacts to listed species, including plants that may be found within the area where construction will be undertaken.

Regarding the requested CEIS, FPL reasserts the response submitted in 1st Round Completeness (October, 2009). Under the PPSA, the SCA is the procedural vehicle for addressing the applicable substantive requirements of the MDC code the procedural requirements of local ordinances are superseded by PPSA procedures and submittal requirements under Section 403.510, F.S. FPL will therefore not prepare a CEIS in support of the SCA.

3MDC-A-24 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

FPL shall clarify the statement that "Wetland impacts ... will be mitigated at the Everglades Mitigation Bank, which will include seagrass enhancement/restoration". Are seagrasses being restored in the EMB, or is FPL proposing mitigation other than in kind mitigation for impacts to seagrasses?

RESPONSE:

A mosaic of habitats have been and are currently being enhanced within the Everglades Mitigation Bank (EMB), including the creation of seagrass providing Essential Fish Habitat within the eastern coastal area adjacent to Card Sound, reconnection of tidal creeks' freshwater headwaters to benefit hypersaline mangrove parcels, and removal of berms and roads that have isolated parcels of historically contiguous mangrove wetlands. Planned coastal restoration in the EMB includes de-grading a bermed area on the eastern side of the Card Sound Canal and connecting it to the eastern coastal area to promote seagrass recruitment. Seagrass within the remnant cooling canals of the Units 6 & 7 Site do not provide the typical ecosystem functions of seagrass communities, primary production and nursery habitat needed to support commercial and recreational fisheries, as they are contained within a closed industrial wastewater treatment facility. Nevertheless, wetland impacts associated with the Units 6 & 7 Site, including seagrasses, will be mitigated through purchase of credits from the EMB.

3MDC-A-25 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

EXHIBIT 23

Miami-Dade County notes that opportunistic observations should not be the sole basis for a determination of which habitats are utilized by wildlife and which of those habitats are critical to wildlife, including threatened and endangered species. Miami-Dade County has continued to request comprehensive, seasonal studies on both wildlife utilization and plant occurrence for the region within and surrounding the proposed locations for the plant and associated nontransmission facilities. Such studies are needed to properly document the use and value of the habitat in order to understand the potential impacts of the proposed project on flora and fauna of the region. Miami-Dade County notes that FPL has continued to dismiss the County's request for comprehensive information for flora and fauna, including seasonal utilization, or any other information resulting from a Comprehensive Environmental Impact Statement based upon FPL's assertion that the request is procedural in nature. However, Miami-Dade County reiterates that the information regarding flora and fauna including seasonal variations is required to evaluate this project for conformance with nonprocedural requirements of Miami-Dade County. Miami-Dade County acknowledges the additional information provided by FPL in its completeness responses related to this issue; however, the information remains incomplete. Without the requested information, Miami-Dade County is unable to determine whether the proposed plant and associated non-transmission facilities meet the requirements of Chapter 24 of the Miami-Dade Code and the CDMP, and is unable to prepare the reports required by Section 403.526, F.S.

In addition, no information or data have been provided in support of FPL's statement that the southern shoreline of Biscayne Bay provides adequate shorebird habitat at low tide. The shoreline of Biscayne Bay is mostly mangroves, and very few exposed mudflats exist in the area other than the proposed development site. Clarification of this statement is also necessary. Is FPL suggesting that the shoreline habitat along Biscayne Bay is adequate to mitigate the loss of the mudflat habitat proposed for development for the numerous species of shorebirds that utilize the development site? Information is also required in support of FPL's statements that "the impact to the artificial mudflat habitat associated with Units 6 & 7 is not anticipated to result in significant adverse impact to shorebirds". In just one field visit with FPL, staff documented more than 15 species of shorebird including Long Billed Curlew, Whimbrel, American Avocet and Wilson's Plover. In addition, juvenile Wilson's Plover and Reddish Egret (a wading bird that is a listed species of special concern), were also observed, which may indicate that nesting occurs on site. Documentation of all shorebird species at the site, including any nesting species, is important and required to *evaluate* the proposed mitigation including whether it adequately offsets the loss of what appears may be significant shorebird habitat.

Miami-Dade County also reiterates its request for FPL to provide equivalent information for the other components of the project as well as an "in-kind" mitigation component to compensate for the proposed loss of shorebird habitat currently being provided at the site. Furthermore, we note that creation of this in-kind habitat would not necessarily require impact to other sensitive environmental resources in the vicinity. For example, former agricultural lands now dominated by species such as Brazilian pepper and owned by FPL could be appropriate for this type of mitigation as shore bird habitat need not be located directly along the shoreline.

EXHIBIT 23

RESPONSE:

Question 2MDC-A-25 requested information regarding the use of saline mitigation credits from the EMB and "in-kind" mitigation for shorebird habitat. The second paragraph of this question appears to request the same information as 3MDC-A-23; please see Response 3MDC-A-23 above.

Regarding the requested CEIS, FPL reasserts the response contained in our 1st Round Plant and non-Transmission response (October, 2009). Under the PPSA, the SCA is the procedural vehicle for addressing the applicable substantive requirements of the MDC code the procedural requirements of local ordinances are superseded by PPSA procedures and submittal requirements under Section 403.510, F.S. FPL will therefore not prepare a CEIS in support of the SCA.

As to the adopted non-procedural requirements, as stated in the SCA, the potential for threatened and endangered species occurrence is based upon evaluation of the availability of suitable habitat, field surveys, previous studies, agency consultation, and data from the USFWS, FWC, and FNAI, and not upon "opportunistic observations." FPL has provided a thorough analysis of the potential utilization of the Site and associated facilities by threatened and endangered species, based upon presence of habitat, field surveys, agency consultation, and over three decades of data collected at the Turkey Point plant.

Information to support the statement "the impact to the artificial mudflat habitat associated with Units 6 & 7 is not anticipated to result in significant adverse impact to shorebirds" includes the following:

- No loss of individual shore birds will occur as a result of construction at the Site;
- No nesting has been observed at the Site;
- Pre-clearing listed species surveys during the nesting season will be conducted; if any nests are observed, construction will be scheduled in those areas outside of the nesting season;
- The regional population of shorebirds is not dependent upon the industrial wastewater treatment system at Turkey Point;
- Large areas of sparsely-vegetated habitat with exposed substrate occur east of the cooling canal system that will not be disturbed by the Project; and
- While the majority of the coastline of Biscayne Bay supports mangroves, areas that provide exposed substrate (mudflat) habitat at low tide occur in close proximity to the Site, directly east of the Scout Lagoon area and adjacent to Card Sound where mitigation was performed for Unit 5.

While shorebird habitat mitigation is not required, FPL will work with MDC and other interested agencies to explore development of additional regional shorebird habitat on available lands owned by FPL.

3MDC-A-26-1 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time

frames prescribed in the "Fifth Revised Schedule for *Review* of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

FPL's response is not adequate. All of the requested information is necessary including but not limited to that information sufficient to determine whether the spoil to be stockpiled as depicted in Figure 5.1-1 meets the definition of clean fill of Chapter 24 of the Code of Miami-Dade County. Also please provide an aerial view of the cooling canals identifying those areas used by crocodiles for ingress and egress to the CCS and the surrounding areas including but not limited to the C-107 canal; please include all supporting data and documentation relied upon in the identification of these ingress and egress areas.

Please also see MDC's response MDC-G-46

RESPONSE:

All spoils material to be stored will meet the definition of *clean fill* in Chapter 24. Chapter 24-5, MDC Code defines *Clean Fill* as “Clean fill shall mean material consisting of soil, rock, earth, marl, clay stone and/or concrete rubble.” As described in Response -G-46 below, FPL will continue to work with MDC on the details of the earthwork and materials management plan.

Ingress/egress points utilized by crocodiles are clearly evident in the field through the resulting tail drags; locations are illustrated in the attached Figure 3MDC-A-26-1 on CD #1 at 3MDC-A-26-1. These crossing points have been documented by FPL biologists during crocodile monitoring efforts over the past 3 decades. As previously stated, the spoil disposal areas shown in SCA Figure 5.1.1 have been selected to avoid crocodile ingress/egress areas.

Note: FPL is not filling wetlands with spoils material. Best management practices (BMPs) are in place to prevent slumping and runoff. Spoils will not be deposited in identified crocodile ingress and egress areas.

With respect to satisfaction of Conditions 7 and 14 of the Zoning Resolution, FPL recognizes that the zoning approval is an independent authorization and that the conditions of zoning are independent requirements. FPL is committed to satisfying all conditions of zoning. FPL has met with the County and agreed to a submittal framework through which this zoning Condition, and the remainder of the conditions, will be addressed such that the County can determine the application complete and prepare an agency report addressing which conditions are satisfied and which conditions remain to be satisfied post-certification, during construction or during the operation of the Project.

3MDC-A-26-2 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application

for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

The FPL Turkey Point Threatened and Endangered Species Evaluation and Management Plan, submitted as part of the SCA (Appendix 10.7.1.3), continues to fail to fulfill the requirements of Condition 2 of MDC Zoning Resolution Z-56-07 nor is it consistent with either Chapter 24 of the Miami-Dade Code or the Miami-Dade County CDMP. Sections 24-48, 24-49 and 24-50 of the Code of Miami-Dade County relate to the preservation and protection of the County's natural resources including but not limited to wetlands, trees, Natural Forest Communities (NFCs), Environmentally Endangered Lands (EELs) and rare, threatened and endangered species. Similarly, Objective CM-1, Policy CM-1 E, Objective CM-4, Policy CM-4A, Policy, Objective CON-7 Policy CON-7A, Objective CON-9, Policy CON-9A, Policy CON-98, Policy CON-9C and Policy LU38, of the County's CDMP require the protection of these natural resources.

The information presented in FPL's Second Completeness Response fails to adequately address comments raised by Miami-Dade County in its second completeness review. Miami-Dade County has concluded from the response that FPL may misunderstand the purpose of the threatened or endangered species management plan required under Condition 2 of Z-56-07 and hereby provides clarification. The intent of this plan is to provide sufficient information for Miami-Dade County to determine whether the proposed project, including ancillary non-transmission facilities, meets the substantive requirements of Chapter 24 of the Miami-Dade Code and the CDMP. FPL has submitted a plan, however, that only covers the "area within which nonlinear project facilities will be constructed and operated, which encompasses the 365-acre Project site where Units 6 and 7 will be located". In addition, FPL has provided information that was primarily gathered from existing sources, when Miami-Dade County has been clear in its request for seasonally-based studies that thoroughly document occurrence of flora and fauna, including listed species of plants and animals, within and adjacent to the proposed plant site. These seasonally-based studies must also document utilization by flora and fauna of habitats found within and adjacent to the proposed plant site and associated non-transmission facilities. Such information is needed to evaluate the short and long-term impacts of the proposed plant and associated non-transmission facilities and determine whether the proposed plant and associated non-transmission facilities are consistent with the requirements of Chapter 24 of the Miami-Dade Code or the Miami-Dade County CDMP.

Examples of more specific deficiencies in the information provided by FPL include, but are not limited to the following: FPL states in its response that "Indirect impacts of construction, such as noise, may potentially reduce the nesting suitability of the berms directly adjacent to Units 6 & 7." FPL shall clarify whether the proposed impacts to this nesting habitat would result in potential abandonment of the significant crocodile nesting area shown in Figure 5 of Appendix 10.7.1.3 as located immediately south of the proposed development site. Please provide information as to the location and nature of any specific project/s proposed to mitigate indirect impacts to crocodile nesting habitat as a result of this project. Please also explain how these mitigation projects will be distinguished from mitigation projects proposed for impacts to crocodile habitat as a result of the Units 3 & 4 Uprate project. FPL has stated that "The primary cooling water intake for Units 6 & 7 will be located within the makeup water reservoir; therefore entrainment of any biota is extremely unlikely" but FPL has failed to provide information on how biota will be kept out of the makeup water reservoir, which is a freshwater pool situated within one of the richest wetland systems in the County. Elevation of the reservoir

EXHIBIT 23

will not be a deterrent for crocodile or other wildlife access, and this freshwater pool will likely support biota within a short period of operation. FPL shall provide information on how FPL will address possible entrainment of crocodiles and other wildlife in the intakes for the new plants. FPL's information on the Florida panther is incomplete because it only takes into account Florida panther occurrence data within 2 miles of the proposed access road network. Florida panthers are known to travel at least 5 miles in a day, and have a home range of more than 100 square miles. FPL shall provide all available Florida panther occurrence information within a minimum of 10 miles of the proposed plant and access road network and, given that there have been 2 such documented occurrences within the past 3 years plus several recent anecdotal occurrences, shall provide an assessment of the likelihood that a Florida panther that is neither radio-collared nor microchipped (i.e. undocumented, untracked) could reappear within 10 miles of the proposed plant site (including non-transmission linear facilities) during the construction phase of the project. FPL states that "The roadways are not intended to be used as or to become major public thoroughfares comparable to heavily traveled highways passing through occupied panther habitats, such as 1-75 in Collier County" but has not provided specific information on how public access to the proposed access roads will be restricted. FPL states that "speed limits will be set to minimize the likelihood of future panther collisions with motor vehicles" but the information is incomplete because FPL does not provide information on what speed limits will be used or how speed limits on the proposed access roads will be enforced. FPL states that "Recent observations of Eastern indigo snakes have occurred within upland areas of the Everglades Mitigation Bank ... " and "The proposed roadway improvements are primarily surrounded by freshwater marsh wetlands, and will not result in significant impacts to upland habitats preferred by the Eastern indigo snake." The information is incomplete because it inaccurately assesses the area through which the proposed access roads will travel. Miami-Dade County staff experience indicates that the proposed construction access roads will traverse a complex of upland and wetland habitats similar to those in the Everglades Mitigation Bank where the Eastern indigo snake has already been documented. FPL shall provide a corrected analysis of the likelihood for Eastern indigo snake occurrence in this region, including the results of a detailed survey for Eastern indigo snake burrows along the proposed access corridor and adjacent and interconnecting upland road corridors, along with information on what protective measures will be taken once the proposed construction access roads are operational to limit Eastern indigo snake mortality. FPL has also failed to provide detailed information on how potential impacts will be addressed for other federally and state-listed species (including plants) that could potentially be encountered during construction or operation of the facilities, including the proposed access roads. FPL has provided documented occurrence data for federally and state-listed species (including plants), other than crocodiles, that is primarily derived from outside sources and has failed to provide the requested flora and fauna studies that would address the likelihood that these species may be encountered where similar habitat types occur within the proposed site for the plant and associated facilities. This information is needed to determine whether this project is consistent with Chapter 24 of the Miami-Dade Code and relevant objectives and policies of Miami-Dade County's Comprehensive Development Master Plan that protect critical habitat for endangered or threatened species.

EXHIBIT 23

RESPONSE:

The scope of the FPL Units 6 & 7 Threatened and Endangered Species Evaluation and Management Plan (SCA Appendix 10.7.1.3) is not limited to the Site, but includes the associated linear and non-linear facilities.

The information provided in the SCA and Completeness Responses includes results of multi-season field surveys, past studies conducted at the Site and surrounding vicinity, anticipated species occurrence based upon availability of suitable habitat, correspondence with the USFWS, and data from the USFWS, FWC, and FNAI. The assessment of potential utilization of suitable habitat provides a conservative evaluation of potential listed species occurrence.

With regards to the crocodile, the indirect impact of construction noise may reduce the suitability of berms directly adjacent to the Units 6 & 7 Site for crocodile nesting. FPL will create additional nesting habitat both within and adjacent to the industrial wastewater treatment system to mitigate for this potential indirect impact. As described in SCA Appendix 10.7.1.3 and the previous response (2-MDC-A-26-2), crocodile habitat enhancement activities within the industrial wastewater treatment system include substrate enhancement activities upon selected berms that have not historically supported crocodile nesting due to lack of preferred soil conditions, creation of additional juvenile freshwater refugia areas upon selected berms, and vegetative restoration. The location of proposed crocodile habitat creation adjacent to the industrial wastewater treatment facility was provided in SCA Appendix 10.4, Section 2, Attachment E, Figure 18. The area will be restored following the design of the successful crocodile sanctuary constructed immediately south of the industrial cooling canal system (see SCA Appendix 10.4, Section 2, Attachment E, Appendix C, Photographs 2 and 3). The proposed creation of additional crocodile nesting habitat within or adjacent to the industrial wastewater treatment system is not associated with the Units 3 & 4 Uprate Project.

With regards to the potential for entrainment of crocodiles associated with the makeup water reservoir, the potential for a crocodile to access the cooling tower reservoir is very low. FPL disagrees with the statement "elevation of the reservoir will not be a deterrent for crocodile or other wildlife access." To access the reservoir, a crocodile would have to scale a 20-24 foot vertical wall or cross a bridge to the Site. It is highly unlikely that crocodiles would be attracted to an elevated, paved, active industrial site. The screened intake structures will be located within the makeup water reservoir and with an anticipated typical average intake velocity of 0.15 ft/second (1.5 ft/second maximum) make it extremely unlikely that any entrainment of biota would occur.

MDC can access all available Florida panther occurrence information within the State through the FWC. FPL has utilized this data in preparation of the attached report (*Estimated Impacts to the Florida Panther Habitat Turkey Point Units 6 & 7 Project*) on CD#1 at 3MDC-A-26-2. Please see SCA Appendix 10.7.1.3, Figure 10, which identifies all panther telemetry data from 1981 to 2008 within >10 miles of the Project. Due to the location of the Site and associated non-transmission facilities outside of the panther consultation area with the exception of a portion of the temporary construction access roadway improvements, coupled with the increase in development associated with Homestead and Florida City since the last telemetry points were recorded within the vicinity of the Site and associated non-transmission facilities (1988), it is unlikely that panthers would reappear within the area during construction. As previously stated, FPL will enforce speed limits of 45 MPH upon the temporary construction access roads to reduce the potential of impacts to panthers, based on consultation with FWC.

EXHIBIT 23

FPL will comply with the USFWS Standard Protection Measures for the Eastern Indigo Snake to avoid any adverse impacts to Eastern Indigo snakes. As previously stated, FPL will conduct pre-clearing listed species surveys following selection of final rights-of-way for associated linear facilities, to include the requested Eastern indigo snake survey. The surveys will be conducted in consultation with the FWC and USFWS, and results will be forwarded to MDC. FPL will comply with agency regulations regarding avoidance, minimization, and mitigation of impacts to listed species, including plants. Please also see Response 3MDC-D-21 below.

3MDC-A-27 (Third Round)

Please see MDC response MDC-A-26-1 (Third Round)

RESPONSE:

Please see Response 3MDC-A-26-1 above.

3MDC-A-29 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Please also see MDC response MDC-A-26-2 (Third Round).

RESPONSE:

Please see Response 3MDC-A-26-2 above.

3MDC-A-30 (Third Round)

Miami-Dade County acknowledges receipt of the requested reports. Please see MDC's responses MDC-A-23 (Third Round) and MDC-A-26(b) (Third Round).

RESPONSE:

Please see Responses 3MDC-A-23 and 3MDC-A-26-1above.

3MDC-A-31 (Third Round)

This item remains incomplete. Historical data indicate that manatees are found in the Turkey Point area and utilize this area for a number of behaviors. A reference in the FPL response states that the existing "Manatee Protection Plan for the Turkey Point Power Plant" will continue to be used during the operational phase of the facility; however, this plan was not

provided for review. Furthermore, it is not clear from the application whether the construction of the barge unloading area is proposed to include the required fendering system for barges over 100 feet in length, which provide at least 4 feet of standoff from the bulkhead under maximum compression. Based on the information that has been provided, it appears that large barges with potentially deeper drafts will be utilizing this mooring area, as well as the access channel into the barge turning basin. FPL shall provide information regarding the size of the barges and tugs including length, beam and draft of the vessels and barges that will be utilizing the facility in order for the agencies to be able to determine whether there will be adequate clearance between the vessels and the bay bottom.

RESPONSE:

The previous response included a reference to the location of the FPL Turkey Point Units 6 & 7 Project Manatee Protection Plan (SCA Appendix 10.7.1.2), and also attached the Plan. Please revisit the SCA 2nd Round Plant and non-Transmission Completeness Round Part A (April 2010) CD No. 1, where this was included as attachment 2MDC-A-31-2 at Attachments\2nd Round Attachments\Attachment 2MDC-A-31-2_MDC_manatee_protection_plan.pdf. The Plan is consistent with the FWC's Standard Manatee Conditions for In-Water Work (2009).

The final design for construction of the barge unloading areas will include the proposed fendering system for barges over 100 feet in length, to provide at least 4 feet of standoff from the bulkhead under maximum compression.

Please see SCA Appendix 10.7.1.2 for information regarding the maximum length, beam, and draft of the barges that will be utilizing the equipment barge unloading facility for equipment delivery. The maximum size barge for equipment delivery will not exceed the typical dimensions for the existing oil barges servicing the plant (230 feet long by 55 feet wide with a maximum draft of 6.5 feet).

3MDC-A-32 (Third Round)

Please see MDC's response MDC-A-33 (Third Round)

RESPONSE:

Please see Response 3MDC-A-33 below.

3MDC-A-33 (Third Round)

This item remains incomplete. FPL has identified that benthic resources, specifically *Halodule wrightii,* is located within the turning basin at a density of 5 to 10 %, over area equal to 0.002 acres. Furthermore, FPL has indicated that no additional mitigation will be provided to offset the dredging of this area of seagrasses. It is not clear from this statement whether or not mitigation has already been proposed for the dredging of the turning basin or this statement is referring to other mitigation being proposed for the Units 6 & 7 project. The MDC Code requires that mitigation be provided for all unavoidable adverse environmental impacts. DERM requires mitigation for the dredging of vegetated and unvegetated substrate, as well as mitigation for potential water quality impacts. Although FPL has indicated that they will be using BMPs to help alleviate secondary impacts to resources, FPL shall identify appropriate

mitigation for the direct impacts to both the vegetated and unvegetated benthic communities associated with the dredging of the tidal substrate in the turning basin.

RESPONSE:

The existing FPL Turkey Point turning basin was authorized under U.S. Army Corps of Engineers Permit 79*-0146, and DER Permit No. DF-13-16293 (March, 1979). Dredging within the permitted basin qualifies for an exemption under 403.813(1), F.S. and 62-312.050, F.A.C., performance of maintenance dredging of existing manmade canals, channels, basins, berths, and intake and discharge structures. No mitigation is proposed in association with dredging of approximately 0.1 acre within the existing basin. Expansion of the equipment barge unloading area will involve excavation of adjacent uplands, which will increase the area of tidal substrate in the turning basin, which may also provide areas of substrate for colonization by seagrasses.

SECTION B - WASTEWATER REUSE

3MDC-B-2 (Third Round)

FPL's response is incomplete and does not demonstrate that the proposed alignment adequately avoids or minimizes wetland impacts. For purposes of clarification, Miami-Dade County is not suggesting the removal of SW 107 Avenue and also is not suggesting that the work should be conducted outside the ROW, rather that temporary impacts to the public ROW may be appropriate if the large amount of impacts proposed to mangrove wetlands can be reduced. Elimination of avoidable impacts and minimization of unavoidable impacts are important regulatory requirements where large amounts of mangrove wetland impacts are proposed. Chapter 24-48.4 Miami-Dade Code requires projects to maximize preservation of existing natural resources. The proposed route is described by FPL as the "least environmentally damaging alternative". However, information is needed to support this assertion since there is neither presentation nor discussion of how the proposed route maximizes preservation of existing wetlands resources, when compared with potential alternatives located west of jurisdictional wetlands in areas south of the C-102 Canal. The routes evaluated as shown in Figure SCA P9.0.9-3 are all in areas with little or no wetlands north of the C-102 Canal, however, similar alternatives do not appear to be considered in the large wetland expanses south of SW 256 Street. Information is needed on the locations and environmental impacts for these alternatives, including an explanation and documentation that demonstrates how the selected route "is the least environmentally damaging" alignment in the area south of SW 256 Street.

FPL shall also clarify the accuracy of the following statement "This co-location avoids the impacts of developing a new route for this linear facility", in light of the fact that a new route is required for the area north of the C-102 Canal in any case. FPL should also explain why this would be preferable since as a consequence of co-locating south of this canal, excavation of a 75 foot wide trench though mangrove wetlands would be required through much if not the entire portion of the co-located alignment along more than 5 miles of the corridor. Information is also needed in support of the stated 75 foot excavation width and whether the proposed alignment would minimize wetland impacts within the existing transmission corridor. Is the same width required in the upland areas and/or in public ROW or does this estimate apply only to work in wetlands within the transmission corridor? An explanation shall also be provided to explain whether the impact width can be reduced through construction practices such as sheet pile

EXHIBIT 23

containment which have been used successfully in sensitive environmental areas with other pipeline projects in Miami-Dade County. In addition, information is needed to describe the improvements to sheet flow across this corridor that would be necessary pursuant to condition 17 of Z-56-07. Per this condition, proposed upgrades within the transmission corridor shall not impede the flow of ground or surface water.

RESPONSE:

The proposed route south of SW 256th Street allows for use of the existing, previously disturbed upland transmission line patrol road for installation of the pipeline, thus avoiding and minimizing impacts to wetlands as well as avoiding impacts to public rights-of-way. As explained previously, the public right-of-way along SW 107th Avenue is approximately 50 feet in width, with approximately 24 feet occupied by the existing roadway. There is insufficient area to allow installation of the reclaimed water pipeline within the public right-of-way without removal of SW 107th Avenue. Work outside of the SW 107th Avenue right-of-way would impact adjacent ditches and wetlands, which occur along the entire length of the roadway. Utilization of the SW 107th Avenue right-of-way would also increase the total length of pipeline installation, thereby potentially increasing the total area of impact.

The installation of the reclaimed water pipeline will not involve excavation of a 75-foot wide trench. The temporary construction area will require a maximum width of 75 feet, while the actual excavation will be approximately 28 feet in width as illustrated in SCA Figure P9.3.2-3. It should be noted that the 28 foot wide excavation will include approximately 16 feet of existing transmission access road, while the remaining 12 feet will be adjacent to the proposed FGT Phase VIII Expansion Project. Thus, the proposed route within the transmission line right-of-way will utilize previously-disturbed areas to the greatest extent practicable.

Temporary wetland impacts resulting from pipeline installation will be mitigated through restoration of the excavated trench with native wetland soils to allow the natural regeneration of the vegetative community. Additional mitigation to offset time lag and risk factors associated with in-situ restoration of temporary wetland impacts will be provided, as stated previously in 2nd Round Plant and non-Transmission Response 2MDC-G-18. The restoration of temporarily impacted wetlands will result in no net loss of wetland acreage or wetland functions following pipeline installation.

The statement that “co-location avoids the impacts of developing a new route for this linear facility” refers to the decreased impact associated with placing a pipeline underneath or adjacent to an existing linear facility when compared to a new “cross-country” route. The statement is valid for the area north of the C-102 Canal, where the pipeline will be co-located with existing roadways.

FPL will evaluate the potential for use of sheet pile containment or trench boxes in order to reduce the width of disturbance within wetlands, as requested. Regarding Condition 17, the installation of an underground reclaimed water pipeline will not impede the sheetflow.

3MDC-B-3 (Third Round

The references to information in the FDEP and SFWMD completeness responses are acknowledged, however, the information remains incomplete. In addition, FPL must provide further clarification. FPL states in FDEP-II-B-85 that the area where the potential impact from deposition to freshwater vegetation is greatest is the area west of the L-31 E Canal. FPL

EXHIBIT 23

concludes that no adverse impacts to the wetland vegetation will occur in this area as these species are salt tolerant. However, much of this area is dominated by freshwater species such as sawgrass which have only limited salt tolerance in comparison to other species present in the area such as buttonwood. In addition, the sawgrass in the area of potential impact is likely already under stress, and may not be able to tolerate additional chronic stress from airborne deposition. Miami-Dade County field staff have observed for many years that the sawgrass in this region is more sparse and lower in stature than other freshwater wetlands either farther west or farther south. FPL must provide a revised analysis based on an assessment of the current vegetation in the area of potential impact, the current physiological condition of that vegetation, and testing to determine the limits of tolerance of the current vegetation for aerial deposition of total dissolved solids similar in composition to that projected for the radial-collector- wells-saltwater scenario.

The summary of FPL's analysis in FDEP-II-B-53 appears to indicate that total dissolved solids (TDS) under the predicted radial-collector-wells-saltwater scenario would increase in this area about 47% over natural atmospheric background deposition levels. Given the projection of elevated levels of TDS and chlorides in this area, it is not at all clear that the receiving waters would continue to meet the standards contained within Section 24-42(4) of the Miami-Dade County Environmental Protection Ordinance or whether the projected increase in TDS or chlorides would cause prohibited water pollution as defined in Section 24-5 of the aforementioned ordinance. In addition, it is not clear that species such as sawgrass could persist in these freshwater wetlands under such conditions. FPL must provide sufficient information to demonstrate that applicable standards will be met by the operation of the cooling towers, including Miami-Dade County numeric and narrative standards.

RESPONSE:

FPL met with MDC Director of Planning and Zoning on June 7, 2010. In that meeting the respective positions regarding the status of ancillary facilities in general, and the reclaimed water treatment facility specifically, were discussed. The Director indicated that he had yet to make a formal determination. FPL offers the following for consideration, and maintains that the FPL reclaimed water treatment facility is an ancillary facility of the power plant and that Zoning Resolution Z-07-207 provides the necessary approvals.

FPL has already provided information demonstrating that deposition associated with cooling tower operation will not adversely affect water quality or vegetation in the area west of the L-31E Canal referenced in the above comment. While the deposition rate resulting from operation of the Project cooling towers is projected to increase in the area west of the L-31E Canal, the resulting increase in the concentration of TDS in those areas due to the Project is predicted to be very low, resulting in negligible impacts to vegetation in that area. The information provided in 1st Round Plant and non-Transmission Completeness Response FDEP-II-B-85 recognized that sawgrass was located west of the L-31E Canal. This area is comprised of sawgrass marsh with strands of forested wetlands classified as mixed wetland hardwoods that are comprised of a variety of native and exotic canopy species, including buttonwood, Australian pine, cocoplum, red mangrove, Brazilian pepper, and cabbage palm. The conclusion that the species in this area would not be adversely impacted was based on the predicted concentrations provided in the completeness responses (FDEP-II-B-53) and the overall salt tolerance of the species located in this area.

EXHIBIT 23

While 1st Round Completeness Response FDEP-II-B-53 (October 2009) provides a predicted deposition rate increase above the conservative background deposition rate, the resultant concentration of increased TDS is over two orders of magnitude lower than the existing TDS concentration in the surface waters in the area west of the L-31E Canal. Specifically the information supplied with Response FDEP-II-B-53 demonstrated that the average resultant increase in TDS concentration from Project-related atmospheric deposition (drift deposition and rainfall) when using saltwater for Plant cooling would be 0.84 milligram per liter (mg/L) in this area. By comparison, SFWMD-collected data on existing TDS concentrations in surface water in this same area range from 200 to 271 mg/L. Similarly, available water quality data for the Florida City Canal has ranges in average salinity from 0.28 practical salinity units (PSU) at a station near U.S. Highway 1 to 0.32 PSU at a station nearer to Biscayne Bay, with the average estimated TDS between 280 and 320 mg/L at these stations. The TDS concentrations resulting from project-related salt deposition when using saltwater for Plant cooling therefore would not be distinguishable from the ambient ranges currently observed in this area west of the L-31E Canal. When the plant uses reclaimed water (the primary source of cooling water) the Project-related predicted increase in TDS in surface waters in this area will be 12.5 times lower than the predicted increase in TDS when saltwater is used for cooling in the Project.

In addition, the background deposition rate of 4.5 kilograms per hectare per month (kg/ha/month) used for comparison is for an inland site located near the northern portion of the Everglades National Park and obtained from Florida Acid Deposition Study (FADS) (Florida Electric Power Coordinating Group, Inc., 1986). As discussed in SCA Section 6.1.4, (Rev. 0) the background deposition rate of TDS in southern Florida ranges from 4 to 6 kg/ha/month. Areas near the coast, like the Turkey Point Plant property, experience deposition at the higher end of this range due to the marine environment and predominant southeast trade winds.

It is important to note that the analyses presented in FPL's response to FDEP-II-B-53 and further discussed above, assume that FPL will use saltwater for plant cooling even though saltwater is the backup cooling water supply and would only be used when reclaimed water is not available. , When the plant uses reclaimed water (the primary source of cooling water) the Project-related TDS deposition rate will be approximately two orders of magnitude *below* the natural salt deposition rates

The information provided in response to FPL-II-B-3 and discussed further above demonstrates that the atmospheric deposition resulting from operation of the Project's cooling towers will not contravene any numerical or narrative water quality standards to the extent those standards apply in this context.

Reference

Florida Electric Power Coordinating Group, Inc. (March 1986). Florida Acid Deposition Study, Final Report: A synthesis of the Florida Acid Deposition Study, Volumes I and II, Tampa, FL.

With regard to the area immediately east of the cooling canals within Biscayne National Park and/or the Biscayne Bay Aquatic Preserve, FPL's Figure 6.1.4-1 appears to indicate that monthly deposition under the predicted radial-collector-wells-saltwater scenario would range up to about 40 to 80 kg/ha/month in a limited area with typical levels in a larger area similar to natural atmospheric background deposition levels of about 4.5 kg/ha/month. Although the projected amount of deposition in these areas is low relative to existing TDS levels, it does appear to constitute a proposed increase in an area where narrative standards, including anti-

EXHIBIT 23

degradation standards, apply and where salinities are currently already considered too high. FPL must provide sufficient information to demonstrate that applicable standards will be met by the operation of the cooling towers, including federal, state, and Miami-Dade County numeric and narrative standards.

RESPONSE:

The maximum predicted deposition rates outside of the Turkey Point plant property were presented in the SCA, assuming use of saltwater for Plant cooling. This maximum deposition rate was predicted to be approximately 65 kg/ha/month and at the property boundary south of the Turkey Point Units 6 & 7 Site. Similar to the information provided in 1st Round Plant and non-Transmission Completeness Responses FDEP-II-B-53 and FDEP-II-B-85, the predicted maximum project-related increase in TDS concentration at this location is 53.4 mg/L. This level of TDS increase is three orders of magnitude lower than the existing TDS concentrations for the surface water of the area where TDS exceeds 20,000 mg/L. This level of project-related deposition is not expected to result in any discernible impact on surface water quality in the area. Moreover, as noted above, the increase in deposition would only occur when the Project is using saltwater, the backup water supply for the circulating water cooling towers. When the Project is using the primary cooling water source, which is reclaimed water, the impacts on TDS in this area will be much lower. Thus, operation of the cooling towers will not contravene any numerical or narrative water quality standards to the extent those standards apply in this context.

Because deposition from the cooling towers is not expected to have any discernible impact on surface waters in the area, no additional analyses are required. Furthermore, atmospheric deposition does not constitute an “activity” or “discharge” subject to anti-degradation or Outstanding Florida Waters (OFW) standards.

In addition, FPL must provide additional explanation and rationale regarding the calculation of average resultant concentration using annual rainfall data as shown in the tables in FDEP-II-B-53 and B-86. Please explain how this metric is useful in the evaluation of this issue.

RESPONSE:

The average resultant predicted TDS concentration (as mg/L) is the appropriate measure of total atmospheric deposition impacts, as it accounts for the atmospheric input of rainfall and can be used as a direct comparison to concentrations in surface waters. As described in the SCA and several completeness responses, the drift particles are aerosols that contain dissolved minerals. The mineral makeup of these aerosols on a weight basis is 5 percent for drift when using saltwater and 0.4 percent when using reclaimed. The remaining portion of the drift aerosol is pure water. The drift particles are eventually deposited on solid surfaces. As the water evaporates, the minerals in the aerosols remain on the solid surfaces. Because the minerals are highly soluble, they are re-dissolved in rainwater during subsequent rainfall events.

The County does not agree with the assertion made in FPL's 2nd Round Plant and Non Transmission Completeness Responses, that no Unusual Use Approval is necessary for the proposed FPL Wastewater Reuse Plant (reclaimed water treatment facility). Resolution Z-56-07 is to approve a, "nuclear power plant (atomic reactors) and ancillary structures and equipment". The Miami-Dade County Code (Unusual Uses, Section 33-13(e) establishes that a

EXHIBIT 23

water treatment plant is a land use that shall not be permitted in any district unless approved upon public hearing. Therefore, the proposed reclaimed water treatment facility will require an Unusual Use Zoning Approval. Florida Statute 403.507(3)(a) requires that agencies 'Preliminary Statement of Issues include the following, "A notice of any nonprocedural requirements not specifically listed in the application from which a variance, exemption, exception, or other relief is necessary in order for the proposed electrical power plant to be certified." The County is hereby providing notice to FPL that all information necessary for an Unusual Use review should be supplied to the County at this time, and approval of a wastewater reuse plant as an Unusual Use is necessary prior to certification. This information shall demonstrate whether the proposed reclaimed water treatment facility would adequately avoid or minimize mangrove wetland impacts. FPL shall provide information adequate to determine whether it would be possible to relocate the water treatment facility to an area of lower quality wetlands beyond the CDMP-designated Mangrove Protection Area and/or to an area outside of wetlands jurisdictional to Miami-Dade County. Elimination of avoidable impacts and minimization of unavoidable impacts are important regulatory requirements where large amounts of mangrove wetland impacts are proposed. Chapter 24-48.4 Miami-Dade Code requires projects to maximize preservation of existing natural resources. Sufficient details about potential project impacts are needed to enable Miami-Dade County to evaluate the proposed primary and secondary impacts of the proposed facility for consistency with the aforementioned and other applicable requirements of the Miami-Dade County Code, plus relevant objectives and policies in the CDMP. FPL shall provide all necessary information demonstrating that construction and operation of this proposed facility would meet all requirements of the Z-56-07, Chapter 24 and the CDMP.

RESPONSE:

As to the assertion that the wastewater treatment facility requires further zoning approvals, FPL responds as follows:

In April of 2009, FPL provided MDC with a list of ancillary facilities included in the SCA, including the proposed reclaimed water treatment facility, and requested concurrence that no additional zoning approvals were needed for these features. We indicated at that time it was our opinion that the water treatment facility was an ancillary feature addressed in the zoning approval through the approval of the Conceptual Site Plan and that no additional zoning approvals were needed for this ancillary facility. This completeness question now suggests that the reclaimed water treatment facility requires zoning approval, specifically, an Unusual Use approval by the Board of County Commissioners, because it was not approved at public hearing. We believe it clear that this feature is an ancillary facility authorized at the public hearing approving the Unusual Use in December, 2007 by Resolution Z-56-07 (“2007 Resolution”).

The 2007 Resolution approved an unusual use for “a nuclear power plant (atomic reactors) <u>and ancillary structures and equipment</u>”. The approved Conceptual Site Plan (FPL Turkey Point Public Hearing Application Detailed Operating Facility Plan, July 2007) specifically identified “Utility/ waste stream/ storm systems”, among other ancillary facilities, as required “Support Facilities”.

Condition 5 of the Unusual Use approval specifically required the use of reclaimed water to the maximum extent possible. The Reclaimed water Treatment facility is needed to provide final treatment or “polishing” of the reclaimed water to be delivered to the site in order to maximize its use. The utility structures needed to polish the delivered reclaimed water to make it possible for use are

EXHIBIT 23

logical if not obvious “ancillary structures”, given the zoning approvals *requirements* regarding use of reclaimed water.

FPL and MDC are scheduled to go to the MDC Board of County Commissioners with our reclaimed water agreement. The utility infrastructure needed to maximize the use of reclaimed water were contemplated as ancillary facilities and approved as such under the 2007 Resolution. For this reason, no amendment to the 2007 Resolution is necessary for the reclaimed water treatment facility.

SECTION C - RADIAL WELLS

3MDC-C-1 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

Please refer to 2nd Round Plant and non-Transmission Completeness Response 2MDC-A-3.

With respect to Condition 4 of the zoning approval, FPL continues to work with the County and other agencies on the assessment of the impacts of operation of the radial collector well system as the backup water supply for Turkey Point Units 6 & 7. The back-up water supply is necessary for reliability of plant operations and allow for use of reclaimed water as a primary makeup water source. FPL designed a cooling water resource plan for the Project that we believe employs the best combination of alternative sources to maximize the use of reclaimed water and minimize impacts to the environment. In doing so, FPL proposes that the plan meets the intent of Condition 4. FPL will work with the County to clarify the language of this condition, if needed.

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

2-MDC-C-1 (Second Round)

A complete hydrologic study is required in order for Miami-Dade County to evaluate the impacts of the proposed project on surface and groundwater in accordance with the substantive requirements of Chapter 24, Miami-Dade County Code, to meet the

> **requirements of Z-56-07, and to prepare the reports required by 403.526 F.S. The aquifer performance test was of a narrow scope, was not approved by DERM, does not meet the substantive requirements of DERM and the County Code, and does not allow for an evaluation of the project's impacts. FPL's interpretation of condition 4 of Z-56-07 is incorrect. The purpose of this condition is to prevent negative environmental impacts to surface and groundwater that could be caused by pumping from the Biscayne Aquifer.**
>
> **1-MDC-C-1 (First Round)**
>
> **The land use statement in Appendix 10.5 is inaccurate and sufficient information has not been provided to make a land use/zoning consistency determination. The plant site is located in Environmental Protection Subarea F, and is consistent only if the use is deemed consistent with the goals, objectives and policies of the Comprehensive Development Master Plan (CDMP). Conditions outlined in Zoning Resolution Z-56-07 must be met to achieve land use/zoning consistency. This resolution stated that no water will be withdrawn from the Biscayne Aquifer (Condition 4) and that a hydrologic study (Condition 15) will be performed. The radial well component does not demonstrate consistency with these two conditions; therefore this component will be subject to a land use/zoning consistency determination.**

3MDC-C-2 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

With respect to Condition 4 of the zoning approval, FPL continues to work with the County and other agencies on the assessment of the impacts of operation of the radial collector well system as the backup water supply for Turkey Point Units 6 & 7. The back-up water supply is necessary for reliability of plant operations and allow for use of reclaimed water as a primary makeup water source. FPL designed a cooling water resource plan for the Project that we believe employs the best combination of alternative sources to maximize the use of reclaimed water and minimize impacts to the environment. In doing so, FPL proposes that the plan meets the intent of Condition 4. FPL will work with the County to clarify the language of this condition, if needed.

2-MDC-C-2 (second Round)

Please see response to MDC-C-1 and MDC-C-24

1-MDC-C-2 (First Round)

Application does not adequately demonstrate that the proposed radial collector wells do not violate Condition 4 of Z-56-07 which prohibits withdrawal from the Biscayne Aquifer.

3MDC-C-3 (Third Round)

This item remains incomplete and information previously requested still needs to be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

2-MDC-C-3 (Second Round)

The requested information is required to evaluate potential impacts of the project and determine if the project can be certified as proposed, or whether modification of the project is necessary for certification. Hydrogeologic information from the area of the proposed radial collector well installation is required to evaluate the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate project related impacts to wetlands resources and Biscayne Bay. Also see comments provided in MDC-C-6.

1-MDC-C-3 (First Round)

Adequate hydrogeologic data have not been presented

EXHIBIT 23

3MDC-C-4 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-4 (Second Round)**
>
> **The requested information is required to evaluate potential impacts of the project and determine if the project can be certified as proposed, or whether modification of the project is necessary for certification. Site specific aquifer characteristics from the area of the proposed radial collector well installation is required to evaluate the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. Also see comments provided in MDC-C-6.**
>
> **1-MDC-C-4 (First Round)**
>
> **Site specific aquifer characteristics have not been made available.**

3MDC-C-5 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

EXHIBIT 23

RESPONSE:

Please see 2nd Round Completeness Responses 2MDC-C-6 (July 2010) and 2SFWMD-B-3(2) (July 2010).

> **2-MDC-C-5 (Second Round)**
>
> **Please see comments provided in MDC-C-6.**
>
> **1-MDC-C-5 (First Round)**
>
> **Lithologic descriptions are contradictory. The observations from the site subsurface investigation (Section 3.3.2.2) contradict expectations that almost all the water withdrawn by the radial collector wells would be recharged from the Bay (Section 3.3.4.1). Therefore additional information is necessary to evaluate this aspect of the proposal.**

3MDC-C-6 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

With regard to the partial information related to the APT and provided by FPL as part of the second completeness response for this issue, this information should be used to inform the design of the hydrologic study required pursuant to condition 15 of Z-56-07 in order to properly evaluate baseline conditions and the effects of the proposed activities.

It should be noted that monitoring data indicate that the lens of fresher groundwater mentioned by FPL in its response (2MDC-C-6-APT-1) may cover an area much greater than the area of the APT on the Turkey Point peninsula. Please provide information on the extent of this fresher water lens and the degree to which it would be drawn into the proposed radial collector wells during pumping.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

The lens of fresher groundwater that was mentioned in 2nd Round Plant and non-Transmission Completeness Response 2MDC-C-6-APT-1 (April 2010) should not extend much past the shoreline of the Turkey Point peninsula because the source of the fresh water is infiltration of rainfall (Fetter, 1994, p.691). FPL is not aware of any monitoring data from the area around the Turkey Point peninsula that indicates the presence of a larger area of fresher groundwater.

Reference

Fetter, C. W. (1994) Applied Hydrogeology, Section 9.8.2, 3rd ed. MacMillan College Publishing New York, NY.

2-MDC-C-6 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. Miami-Dade County has determined the results of the APT and the findings of the groundwater modeling report presented as a part of the site certification application (SCA) completeness review to be incomplete. The following subsections will provide further details of the County's review of both the APT results submitted and the groundwater model referenced above:

Aquifer Performance Test (APT)

General Overview
The APT was performed using a vertical well (36 foot open interval), pumping at a rate of approximately 10 million gallons per day (mgd). However, the RWCs are proposed to be horizontal wells pumping at a rate of approximately 100 mgd. There was no discussion in the HDR report explaining how the results will be utilized to scale up for the proposed RCW pumpage. The increase in pumpage for the RCW by tenfold over the APT pumpage would be expected to result in major hydrologic effects. These hydrologic effects were not addressed in the documents provided.

Exploratory Drilling
The Biscayne Aquifer (BA) is conceptualized based on work completed by the USGS (Cunningham et al, 2009; Renken et al 2008) as a dual porosity aquifer, with stratiform beds of touching vug porosity separated by limestone beds of matrix porosity. The geologic interpretations provided by FPL (HDR *8/19/09,* Hydrologic Associates [HAJ, correspondence dated *4/14/09* and *9/16/08)* do not appear to adequately describe the complex lithology of the BA. The following is a discussion of the shortcomings found with respect to the exploratory drilling conducted as a part of the APT.

One pilot hole was drilled at monitoring well MW-1 to a depth of 75 It below land surface (bls). The base of the BA was determined by HA to be at 115 bls. The pilot hole should have been drilled to the base of the aquifer for complete lithological determination. The logging activities in the pilot hole included caliper, temperature, gamma, and fluid conductivity. In addition, video surveying was conducted in the pilot hole. Vertical borehole flow meters and a more comprehensive use of borehole fluid conductivity and temperature logs when analyzed with depth have proven to be very

EXHIBIT 23

useful to determine preferential flow zones in the BA. However, optical borehole imaging is now used instead of video surveying as it is more accurate in defining macroporosity of the BA.

Rock cuttings were used in monitoring wells MW-2 through MW-5 to determine the lithology of the area. It should be noted that preferential flow zones cannot be identified using rock cuttings. The assumption of lithology across the site based on rock cuttings may not be an accurate approach. The boreholes should have been logged to determine the vertical and horizontal extent of the preferential flow zones within the aquifer.

The HDR report describes the lithologic features of the BA as follows:

Fill:	0-9 It thick at Point
Peat:	0 to -5.5 ft NAVD 88
Miami Limestone:	top of unit -4 to -7 ft NAVD 88
Cemented Sand:	top of unit 36 - 43 ft bls and not present at MW-5. Note for Figure 2.11 - thickness of the cemented sand layer: there are not enough data points to assume the contours as indicated in the figure.
Key Largo Limestone:	top of unit -29 - -40 ft NAVD 88 base of unit - 58 feet bls

Lt Gray to white Sandy limestone:	no complete description of unit. Report notes that the cuttings were smaller than the shallower facies.

Geophysical logging results: the logs do not appear to adequately describe the complexity of the BA. It is not clear whether the zones indicated by the caliper log are flow zones, or washout due to the drilling. The temperature and conductivity logs should have been more comprehensive. The logs cannot identify preferential flow zones. The lithology described in the HDR report does not reference the 04 and 02 referenced in the HA correspondences.

Pilot Hole at *Monitoring Well MW-1*

As noted above, issues were noted with the field activities associated with the pilot hole at monitoring MW-1. The casing depth was determined based on a mud loss zone during drilling (25-26 ft bls) where the casing target was set at 22 - 24 It bls. Due to the known complexity of the BA, casing depth based on mud loss may not be the best method to determine casing depth. Based on the above referenced lithology, the casing was set in the Miami Limestone. The target production zone was selected to include the permeable portion of the Miami Limestone, but also the upper portion of the Key Largo Limestone (coralline limestone), with the rationale that this production interval would encompass the potential depth of the RCW laterals. However, this production zone also includes the cemented sand interval (which according to the HDR report indicates that it is discontinuous across the site), the Miami Limestone, and the Key Largo Limestone, which are likely in direct communication with one another.

EXHIBIT 23

According to the lithology observed in the rock cuttings described in the HDR report, the cemented sand was only absent at MW-S. Additionally, the lithologies contained in the HA correspondences noted that although the 04 (cemented sand) was observed only at two borings, they attributed the observations due to non-recoveries at most of the cores inspected. Although permeable zones were noted below the 46 It bls interval, these lower intervals were not investigated for potential production zones.

Surface Water and Surficial Aquifer Monitoring Wells
Only two surface water monitoring points were installed at the site - one at the Industrial Wastewater Facility (IWWF); the other near the mouth of the barge slip. As indicated in prior discussions during meetings with HDR and FPL, more surface water monitoring points were recommended for the APT.

Furthermore, the number, location, and intervals of the monitoring wells for the APT had been discussed with FPL and HDR in previous meetings prior to the performance of the APT. The County's comments do not appear to have been incorporated into the APT field activities. For example, monitoring well MW-S is located north of the dredged barge channel, and is close to the FPL pump operations, and these conditions may have overwhelmed any effects seen by the APT. In addition, most of the monitoring wells utilized for the field activities were completed with open holes from an approximate depth of 22 - 47 It bls. As indicated above, the County does not believe this number, location and intervals are adequate to evaluate the hydrologic behavior of the APT.

Seepage Evaluation
While seepage meters are well documented for their difficulties, data collected during the APT did not show seepage from the Bay into the subsurface (i.e. BA). Rather, a majority of the seepage meter data indicated seepage from the subsurface into the Bay. However, the seepage issue is not discussed in the report as the data was not interpreted and the results were disqualified. The County finds the absence of the seepage evaluation and discussion as a basis to find the results of the APT to be incomplete. Further investigation is required to address this issue in order to understand and quantify the seepage rate and behavior of the site with respect to the region. At a minimum, the Applicant should meet with the County to discuss the most appropriate approach to determine the seepage occurring in the environment.

Water Quality Sampling
The limited water quality data provided in the APT indicated no change in the production zone during the field activities. However, the sampling plan utilized and as discussed in prior meetings with HDR and FPL, was not sufficient.

Specifically, samples collected for the Bay at the time intervals of a week prior, Day 1, and Day 7 of the APT may not be adequate to fully capture water quality changes to the bay as a result of the pumping activities. At a minimum, sufficient samples need to be collected to address baseline conditions, conditions during the APT, and conditions after the completion of the APT to determine the time for the system to return to baseline conditions. In addition, the tidal effects were not taken into account during this time period and thus not addressed by the water quality results. For example, salinity data in MW-1 SS shows an increase in salinity after the APT, but given the limited data provided, it is not possible to distinguish the source of the salinity. In addition, no

EXHIBIT 23

groundwater samples were collected from the monitoring wells during the conductance of the APT; therefore water quality fluctuations were not captured.

Furthermore, an effort to distinguish the water sources (e.g. Biscayne Bay water versus Biscayne Aquifer) prior to the test was not provided. Based upon review of reports completed by FlU (Stalker et al, 2009), and UM (Swart, 2009), key analyses to distinguish source water was not completed. Although determining source water is not an objective of the report, the water quality does not show any significant fluctuations as a result of the APT, which could indicate water flow to the production well may be primarily BA water. However, the length of time of the APT and the limited parameters do not provide enough data to adequately determine source of water.

APT Data Analysis

The following are specific comments and inquiries that were compiled with respect to the data
presented within the APT Report and at a minimum must be addressed as a part of the application completion review:

1.) What was the salinity difference between MW-1 SS and the deep wells?

2.) Why is MW-5 water levels significantly different from the other monitoring points towards the end of February?

3.) Water Contour maps Figures 5.2 and 5.3 do not seem to match the graph in Figure 5.1 The barge slip would probably have an effect on water levels, so it may not be appropriate to interpret water contours through the slip. Additional monitoring points would be necessary. The contour maps indicate a steep (for south Florida) gradient towards the west, indicating flow towards the west at both high and low tide. This is contradictory to published regional groundwater flows. Is this an effect of the CCS and Industrial waste water facility to the west?

4.) Because the open intervals in the MW-1 wells are open to 24 - 60 ft, it may be difficult to assess the vertical hydraulic gradient.

5.) Did the rainfall graph include full monitoring period for the report? Even small amounts of precipitation have been shown to affect water levels, which would hamper data interpretation during the APT.

6.) It is not clear how tidal effects were accounted for, as there was no documentation provided for the USGS model referenced. Was this corrected solely internally in the Excel spreadsheet? It is not clear either how the Level troll and Aqua troll data were used. The HDR report indicates that there were data adjustment factors added or subtracted to the APT readings. Where was adjustment factor applied? Data was not provided to review. Was the data discrepancy consistent?

7.) Results from the USGS model RMSE clearly indicate conditions at MW-5 that would hamper APT result interpretation. Although from Table 5.1 it is not clear how the final R2 is calculated. It would appear that the model fit is most sensitive to barge water level and canal water level.

EXHIBIT 23

8.) With respect to the drawdown data, the input files were not provided for review. Turbulent conditions induced by the pumping wells were not addressed. Head losses near the production well as a result of turbulent conditions will result in lower transmissivity (T) estimates.

9.) The water quality graphs (salinity data) provided are too small to read. Linear regression on limited data points is not appropriate. In reference to Graph 6.3, are the fluctuations in salinity at MW-1 DZ Deep and MW-4 before the APT test?

Groundwater Model

General Overview and Findings

Based on a review of the groundwater modeling efforts presented in the report prepared by Bechtel Power Corporation (dated October 2009), the County finds the model unacceptable for the evaluation purposes of the radial collector well system and the effect on the surrounding environment.

While a groundwater model was produced and supplied for review, many questions with respect to the manner in which the model was calibrated and the verification process for the simulated results remain. At a minimum, the MODFLOW data files (input and output files) need to be provided for evaluation by the County. The model report only documents the model construction and analysis of the data obtained from the model runs. It is not clear the manner in which the surface waters associated with the simulations were constructed. No mention of a separate surface water module was listed to illustrate the interaction between the bay, canals, and cooling canal system with the groundwater matrix. More importantly, given the questions associated with the characterization of the groundwater and surface water quality, a separate module was not presented in the model to evaluate the solute transport aspect of the simulations. In addition, seepage from the cooling canal system is not sufficiently addressed in this document. The groundwater flow model developed for the project is a steady state, constant density three dimensional representation of the Biscayne aquifer. The model was used to evaluate origin of the water when the proposed radial collector wells are in operation, and the resultant drawdown and velocities at the bay/aquifer interface. The model is comprised of nine layers, representing the Biscayne aquifer. Boundary conditions include river boundaries (cooling canal system (CCS), L- 31E, C-107, Card Sound Canal and Florida City Canal), constant head boundary (Biscayne Bay), recharge boundary (layer 1), ET boundary (layer 1), general head boundary (model sides), and no flow boundary (bottom of model). The radial collector wells (RCWs) were simulated at a pumpage rate of approximately 124 MGD. The following are specific comments and inquiries that were compiled with respect to the data presented within the above referenced report. At a minimum, the following items should be addressed as a part of the completeness review:

1) The cooling canal system (CCS) contains warm, hypersaline water; Biscayne Bay has varying salinity, and the Biscayne Aquifer ranges from fresh to saline salinities in the model domain. Biscayne Bay and the aquifer have salinity temporal and spatial variations. There has been increasing evidence to suggest the CCS is hydrologically

EXHIBIT 23

connected to the aquifer. The salinity and temperature of the CCS are significantly greater than the natural salinities in the aquifer and bay, and these will have an effect on the hydrology of the area. All of these hydrologic conditions cannot be simulated by a steady-state constant-density model. The above referenced boundary conditions are not adequate to simulate the complex hydrology of the area.

2) The hydrogeologic framework the model is based on was found to be deficient. The BA is conceptualized as a dual-porosity aquifer; the model assumes equivalent porous media flow regimes. The aquifer contains preferential flow zones and matrix porosity, which will dictate groundwater flow. These zones must be investigated and characterized by appropriate field and geophysical methodologies, and integrated into a model that will be capable of simulating dualporosity flow regimes.

3) The model was developed as a steady state model, and per assumption 3.3.2 it appears that the model was compared to the average of the monthly averages from June and December 2008. The hydrology of the CCS, Aquifer and the Bay have significant temporal differences that will affect sources of water into the RCWs. Average conditions at the start of the wet and dry season are not adequate to assess source water of the RCWs.

4) The model found 97% of water for the RCWs to originate from the Bay. Although model documentation is not clear how this number was obtained, it appears to be an artifact of the model. The Bay is represented by a constant head boundary, with the zone budget analysis (Figure 51) limited to the Bay area itself. The top two hydrostratigraphic units were assigned an anisotropy ratio of 1:1, and assigned therefore a vertical hydraulic conductivity equal to the horizontal hydraulic conductivity, based on model calibration. This is contrary to published data referenced in the model documentation.

5) Biscayne Bay salinity varies temporally as well as spatially, and the Bay ecosystem is extremely sensitive to the changes and timing of salinity. The RCWs at 124 mgd will place significant stress on the aquifer and Bay (see above - model concludes 97% of water for RCWs comes from the Bay). The model assumes Biscayne Bay is a constant head, constant density, and at steady state, therefore it cannot assess the changes in salinity over time and space in the bay as a result of the RCWs.

Conclusions

Based on the completeness review performed on the results of the APT and the groundwater modeling report provided in the SCA, the County finds the information submitted as being incomplete. With respect to the performance of the APT, the County has determined that the following items must be addressed in order to comply with the completeness determination of this application:

1. The hydrologic effects of increasing the pumpage tenfold *over* the pumping rates utilized during the field activities associated with the APT.

2. The exploratory drilling activities associated with the lithologic classification of the BA and the identification of preferential flow zones within the subsurface need to be performed to address the shortcomings noted in the APT.

3. The inclusion of the adequate number, location, and intervals of both groundwater monitoring wells and surface water monitoring points to properly evaluate the hydrologic behavior of the APT.

4. Further investigation to understand and quantify the seepage rate and the hydrologic behavior of the site with respect to the region and the proposed RCWs.

5. An adequate water quality sampling plan that provides the collection of sufficient samples to address baseline conditions prior to, during, and after the completion of the new APT to determine the time for the system to return to baseline conditions. The water quality sampling plan shall also increase the frequency of the sample collections to take into account the tidal effects at the site.

6. Provide an adequate approach to adequately determine the source of water being pulled in by the RCWs.

With respect to the groundwater modeling report, the County finds the model unacceptable for the evaluation purposes of the radial collector well system and the effect on the surrounding environment. Regardless, it should be noted that even though issues associated with the groundwater model have been noted, the conclusions demonstrate a violation of Condition NO.4 of Z-56-07 which prohibits the withdrawal of groundwater from the Biscayne Aquifer.

At a minimum, the County requires that the deficiencies noted above to be remedied and incorporated into a single, comprehensive hydrological study for a thorough technical review to allow the County to determine compliance with the requirements of Chapter 24 Miami-Dade County and the CDMP, Condition No. 15 of Z-56-07, and to allow the County to prepare the reports required by 403.526 F.S.

1-MDC-C-8 (First Round)

FPL proposes to withdraw cooling water from the Biscayne Aquifer. Such withdrawal is specifically prohibited pursuant to Condition 4 of Z-56-07. In addition, the application does not provide sufficient information to support stated conclusions or to adequately evaluate the affect of the radial collector well system on hydrology and water quality. Specifically, the application does not provide adequate information to determine the impact of the radial collector well system on the fate and transport of the groundwater plume associated with the cooling canal system, the potential for and effect of the recharge of the radial collector well system through horizontal preferential flow zones in the aquifer, the impact of the radial collector well system on salt intrusion, and the impact on wetlands and nearshore surface and groundwater water quality in Biscayne Bay, including as it relates to CERP efforts to promote estuarine conditions in nearshore areas.

EXHIBIT 23

3MDC-C-7 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

Comment noted. Regarding radiological monitoring, FPL reasserts the federal NRC preemption in this area. Regarding use of radionuclides such as tritium as “tracers,” FPL believes that these are not suitable for use as “tracers” in proximity to a nuclear power plant, and did not use them to identify water sources for this reason.

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-7 Second Round)**
>
> **See comments provided in MDC-C-6. In addition, with regard to FPL's response on the use of radiological tracers such as tritium, there is no federal preemption for monitoring of radiological parameters to evaluate the proposed project.**
>
> **1-MDC-C-7 (First Round)**
>
> **The proposed radial collector wells would be located within or adjacent to a groundwater plume emanating from FPL's Cooling Canal System, which contains high levels of chlorides. It also contains tritium, which may be used as a tracer. In addition, portions of this plume contain heated water, although underground directional travel of the heated water has not been established. No information regarding the delineation of this plume is contained within the application and the extent to which this plume would be affected by the proposed groundwater withdrawals is not documented. In addition, no information was found in the application discussing potential effects of inducing ground water flow towards the proposed withdrawal wells. The applicant needs to provide a hydrologic study, as required under Condition 15 of Z-56-07, that shall include but not be limited to delineation of the existing plume that emanates from the Cooling Canal System and characterization of the tritium levels of the groundwater in the area of the Biscayne Aquifer where the wells are proposed. Any existing heat plume that may extend towards Biscayne Bay should also be delineated as part of the**

> **hydrologic study to determine whether warmer water would be induced into the cooling water radial collector lines or the Bay during pumping.**

3MDC-C-8 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-8 (Second Round)**
>
> **The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.**
>
> **1-MDC-C-8 (First Round)**
>
> **Neither preferential vertical nor horizontal stratigraphic flow directions have been established. Vertical hydraulic conductivity data is not presented in the application, but it is needed to properly evaluate how the horizontal screens installed in the Fort Thompson Formation 30 to 35 feet below the shallow bay bottom are expected to preferentially draw water from the less transmissive Miami Limestone above instead of from the much more transmissive Fort Thompson.**

EXHIBIT 23

3MDC-C-9 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-9 (Second Round)**
>
> **The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F .S. Also see response to MDC-C-6.**
>
> **1-MDC-C-9 (First Round)**
>
> **Cones of influence are not defined and aquifer pump-test data has not been presented to properly evaluate hydrologic conditions under which the collector wells would be operated. Neither has there been any data presented to indicate the potential cone of depression that pumping more than 120 miJIion gallons a day from a wellfield located along the shoreline would have on the movement of the salt front line. In order to evaluate the application, the results (including all the data) for all the aquifer pumping tests conducted from 2006 to present shall be provided.**

3MDC-C-10 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in

EXHIBIT 23

order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-10 (Second Round)**
>
> **The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements ·of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.**
>
> **1-MDC-C-10 (First Round)**
>
> **Water quality data summarized in Table 3.3.4-2 is not sufficient to fully assess the hydrologic characteristics of the cooling canal system.**

3MDC-C-11 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

EXHIBIT 23

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

2-MDC-C-11 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution *Z-56-07,* and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.

1-MDC-C-11 (First Round)

Data presented for Groundwater Impact assessment is not sufficient. Visual MODFLOW data files are not provided for assessment.

3MDC-C-12

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

EXHIBIT 23

2-MDC-C-12 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.

1-MDC-C-12 (First Round)

Not enough data provided to assess statement that radial collector wells are substratum collectors of saltwater that will recharge from below Biscayne Bay.

3MDC-C-13 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z -56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

2-MDC-C-13 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the COMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.

EXHIBIT 23

1-MDC-C-13 (First Round)

The applicant states that almost all the water withdrawn by the proposed radial collectors will be recharged from the Bay; however, no data to support this statement is provided in the application. The applicant shall provide all relevant data relating to recharge of the Biscayne Aquifer that would be induced by operation of the radial collectors.

3MDC-C-14 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z -56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

2-MDC-C-14 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.

1-MDC-C-14 (First Round)

The applicant has not provided sufficient geologic, hydrologic and water quality data to evaluate the application.

EXHIBIT 23

3MDC-C-15 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-15 (Second Round)**
>
> **The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.**
>
> **1-MDC-C-15 (First Round)**
>
> **The applicant has not provided sufficient information to evaluate the mixing chamber model that was used to project impacts from the radial collector wells. The applicant shall provide a modeling development report that meets all professional modeling standards and provides background information, including but not limited to the capabilities and limitations of the model, assumptions made during model construction, boundary conditions and variables (including background data) utilized, the method in which the groundwater and surface water interaction is simulated, method of calibration, and the resulting reporting outputs.**

3MDC-C-16 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed

EXHIBIT 23

project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-C-16 (Second Round)**
>
> **The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.**
>
> **1-MDC-C-16 (First Round)**
>
> **The application states "During the wet season, a seaward gradient exists and groundwater flow is southeasterly towards Biscayne Bay. This gradient tends to disappear during the dry season, where the groundwater levels are depressed below the sea level, resulting in a reverse flow direction. The groundwater at the Turkey Point Plant is classified by FDEP as Class G-III (see Appendix 10.6) that has no reasonable potential as a future source of drinking water due to the high dissolved solids." The radial wells are located so as to draw from the easterly groundwater flow. Please resolve the apparent conflict between the location of the wells and the water from which they are drawing and Condition 4 of Z-56-07, which prohibits withdrawal from the Biscayne Aquifer.**

3MDC-C-17 (Third Round)

This item remains incomplete. The revised figure (fig. 4.5-3) referenced in FPL's response must be clarified. It does not appear that the full extent of privately owned submerged land is shown as described in the legend; also, the owner of this land should be identified on the figure. It is also not clear what lands, if any, are located within the Biscayne Bay Aquatic Preserve. FPL

EXHIBIT 23

shall provide the 1925 TIFF survey documents and the navigation channel easement resolution documents referenced in the figure. Also provide information relating to the referenced "potential submerged land easements". Would these potential easements be issued by the State of Florida and if so, what coordination is required, if any, with the Biscayne Bay Aquatic Preserve? Are these lands located within the Aquatic Preserve?

RESPONSE:

This response is provided to MDC for informational purposes although this request is outside the scope of a completeness request for additional information, in accordance with Sections 403.5066 and 403.507, F.S., because it requests information about issues for which MDC has no regulatory jurisdiction.

The cross-hatching on Figure FDEP-II-B-55-1[a survey version of SCA Figure 4.5.3 (Rev. 0)] was intended to depict privately owned submerged lands within the area to be utilized for the radial collector wells, not the extent of all privately owned submerged lands in the vicinity of Turkey Point. These “privately owned submerged lands” are now owned by FPL as a result of conveyance of these lands by the Trustees of the Internal Improvement Trust Fund (“Trustees”) to a predecessor in title. The requested survey is attached to the deed from the Trustees to FPL’s predecessor in title, and a copy is provided with this response. These FPL-owned submerged lands are located within the defined boundaries of the Biscayne Bay Aquatic Preserve (BBAP). FPL does not have a copy of the navigation channel easement resolution.

The shaded portion of the Figure FDEP-II-B-55-1 shows the sovereign submerged lands under which laterals for the radial collector wells may be installed. These sovereign submerged lands are located within the BBAP. Any sovereign submerged land easements for the radial collection wells would be issued by the Trustees. Coordination by DEP State Lands staff with the staff of the BBAP would be typical in connection with such easements, but this question concerning coordination can best be answered by, and should be addressed to, DEP.

3MDC-C-18 Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness

EXHIBIT 23

RESPONSE:

This comment, which originated in the 1st Round Plant and non-Transmission Completeness, requests well construction details for the radial collector wells, including locations, designs, number and pipe sizes. These well construction details will not be available until post certification.

Section 24-43.2 of the MDC code is inapplicable to the radial collector well system proposed to supply backup cooling water supply for the operation of Turkey Point Units 6 & 7. Subsection (1) is titled “Regulation of on-site *domestic well* systems generally” [emphasis added]. A review of that code section does not reveal any provision that seeks to regulate a well other than an “on-site domestic well system.” The County’s Code, at Section 24-5, defines “domestic well system” to mean “any water supply system using a well and piping to provide potable water for human consumption.” The proposed radial collector wells will not be providing water for human consumption; the produced water will be use for cooling purposes within the Project. Potable water for use at the site will be supplied by MDWASD or from bottled water sources.

Even assuming that the remaining subsections of 24-5 apply to wells other than domestic wells, to the extent this comment suggests that these remaining subsections of establishes well construction criteria applicable to the radial collector wells, the delegation from South Florida Water Management District to the MDC Health Department of its exclusive authority to regulate water well construction is limited to water wells less than 12 inches in diameter. The radial collector wells will be larger than 12 inches in diameter.

Further, Section 373.217, F.S., grants the state of Florida (including the Siting Board for projects subject to the PPSA) “the exclusive authority . . . for consumptive use of water.” Any local regulation in conflict with that exclusive authority over consumptive use of water is preempted. As such, to the extent Section 24-43.2 of the MDC code purports to regulate consumptive use of water, it is preempted.

Subject to the foregoing, FPL will provide the County with those analyses of water use required under the various conditions of the Zoning Resolution.

2-MDC-C-18 (Second Round)

FPL is incorrect in its statements that Section 24-43.2 of the Miami-Dade County Code relates solely to domestic water supply wells. FPL's assertion that Section 24-43.2 does not apply to saltwater wells is also incorrect. Section 24-43.2 applies to all surface and groundwaters of the county including coastal waters and applies to all "on-site domestic well systems and other water supply wells" (Section 24-43.2). Miami-Dade County does not agree that the information requested relates to standards that are not applicable and notes that FPL has previously agreed pursuant to conditions 5 and 15 of Z-56-07 to demonstrate that the substantive requirements of this code section are met and to conduct a hydrologic study in compliance with Chapter 24, Miami-Dade County Code. Submittal of the requested information consistent with the Z-56-07 requirements is necessary for Miami-Dade County to evaluate the project and to prepare the reports required pursuant to 403.526 F.S.

EXHIBIT 23

1-MDC-C-18 (First Round)

Adequate hydrogeologic data have not been presented and the application does not include sufficient information to determine whether the proposed withdrawals from the radial collector wells would meet the requirements of Section 24-43.2 Miami-Dade County Code. Selection of potential locations, idealized designs, number of wells, and even the pipe sizes of the radial lines of the collector wells should be based on hydrogeologic data within the areas under Biscayne Bay that the wells would tap. Such data has not been presented in the application. The applicant shall provide information that is sufficient to determine whether the radial collector wells meet the requirements of Chapter 24 and the CDMP for this aspect of the proposed project.

3MDC-C-19 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness

RESPONSE:

As provided in FPL's 1st Round Plant and non-Transmission Completeness Response to the request for groundwater data, "Additional water quality data was collected from the test well as part of the APT conducted on Turkey Point and can be found in the report entitled *FPL Turkey Point Exploratory Drilling and Aquifer Performance Test Program Report* (HDR, 2009)." The cited report was provided with 1st Round Plant and non-Transmission Completeness Responses (October, 2009).

Reference:

HDR Engineering, Inc. (2009) *Florida Power and Light Turkey Point Exploratory Drilling and Aquifer Performance Test Program*, August 9, 2009.

EXHIBIT 23

2-MDC-C-19 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.

1-MDC-C-19 (First Round)

The application indicates that a surface water sample from Biscayne Bay was collected to characterize the water from the radial collectors. Providing a surface water sample as a surrogate for groundwater data is inappropriate. The applicant shall provide a characterization of groundwater based on actual data from the area in which the radial collector wells are proposed.

3MDC-C-20 (Third Round)

This item remains incomplete. The scale of SCA Figure 3.1.3-1 is inadequate to provide the necessary level of detail to be able to clearly identify the wetland areas that may be impacted during the radial well delivery pipeline installation. FPL shall provide a detailed map clearly delineating the jurisdictional wetland areas as well as the existing mangrove mitigation areas and the areas to be impacted by the installation of the radial well delivery pipeline. The scale of this figure must be appropriate to allow for a clear differentiation of all these areas.

RESPONSE:

A survey of jurisdictional wetland boundaries associated with the radial collector well delivery pipeline are contained in SCA Appendix 10.4, Section 2, Attachment G, Sheets 3.00 through 3.08 and can be found on attached CD#1 at 3MDC-C-20. A drawing illustrating the existing mangrove mitigation area, jurisdictional wetlands boundary and proposed radial collector well pipeline route is attached as Figure 3MDC-C-20 on CD#1 at 3MDC-C-20. The radial collector well delivery pipeline will avoid the existing mangrove mitigation area and minimize wetland impacts within the remainder of the route through installation within and adjacent to the existing onsite internal roadway.

3MDC-C-21 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. Will any impacts to wetlands or wetland vegetation, such as mangroves, in the in situ restoration areas, be required for maintenance, repair or other activities after restoration is complete? If so, FPL shall provide details of such impacts and shall also provide corrected UMAM scores that account for these future impacts.

EXHIBIT 23

RESPONSE:

Following installation of the radial collector well delivery pipeline, no maintenance is required, nor is any requirement for repair of the radial collector well delivery pipeline anticipated. If any disturbance of the restored areas becomes necessary, the areas will be returned to the pre-disturbance condition to avoid any loss of wetland functions.

3MDC-C-22 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

With respect to satisfaction of conditions of the Zoning Resolution, FPL recognizes that the zoning approval is an independent authorization and that the conditions of zoning are independent requirements. FPL is committed to satisfying all conditions of zoning. FPL has met with the County and is developing a submittal framework through which these zoning conditions will be addressed such that the County can determine the application complete and prepare an agency report addressing which conditions are satisfied and which conditions remain to be satisfied post-certification, during construction or during the operation of the Project.

> **2-MDC-C-22 (Second Round)**
>
> **The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, *movement* of the hyper-saline plume associated with the cooling canal system, and to *evaluate* potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.**

EXHIBIT 23

1-MDC-C-22 (First Round)

Please provide adequate analysis in support of the conclusion made that the Biscayne Aquifer is not affected by the Radial Collector wells. A fully three dimensional mathematical model should be used to detemine the boundary conditions (influence cones) of the proposed radial collector well. These boundary conditions should be simulated in the overall ground water model, which was described in the Cooling Canal/Industrial Wastewater Treatment and Disposal Facility.

3MDC-C-23 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

2-MDC-C-23 (Second Round)

The information provided is not sufficient for evaluation of the potential impact of the project on groundwater, surface water, salt intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. In addition, the information is not sufficient for evaluation of the project with requirements of Chapter 24, Miami-Dade County Code, the CDMP, requirements of conditions of Resolution Z-56-07, and it is not sufficient in comprehensiveness of data or in quality of information to allow the County to prepare the reports required by 403.526 F.S. Also see response to MDC-C-6.

1-MDC-C-23 (First Round)

A fully three dimensional mathematical model is needed in support of the conclusion made that the Biscayne Aquifer would not be affected by operation of the radial collector wells. This shall assist in the determination of the boundary conditions (influence cones) of the proposed radial collector wells. These boundary conditions

EXHIBIT 23

> **should be simulated in the overall ground water model, which was described in the Cooling Canal/Industrial Wastewater Treatment and Disposal Facility. Whether the extraction of water from the Biscayne Bay system will change or reduce the freshwater inflow to the bay and/or increase salinity at least seasonally shall be examined through additional modeling as part of the application**

3MDC-C-24 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Miami-Dade County acknowledges the information provided in response to the specific questions regarding the March 2008 HDR report. However, without the information required by conditions 5 and 15 of Z-56-07 and the additional outstanding information that has been requested relating to these matters, Miami-Dade County will be unable to complete the evaluation of the issues raised in this item. In addition, FPL has not demonstrated that the radial collector well alternative would be appropriate given the requirement of condition 4 of Z-56-07.

RESPONSE:

With respect to satisfaction of conditions of the Zoning Resolution, FPL recognizes that the zoning approval is an independent authorization and that the conditions of zoning are independent requirements. FPL is committed to satisfying all conditions of zoning. FPL has met with the County and is developing a submittal framework through which these zoning conditions will be addressed such that the County can determine the application complete and prepare an agency report addressing which conditions are satisfied and which conditions remain to be satisfied post-certification, during construction or during the operation of the Project.

As provided in FPL's 1st Round Completeness Response MDC-C-24 (October 2009) to this question related to Condition 5:

> "The information requested is presented in the following five reports:
>
> - *Analysis of Baseline Water Source Technical Review Report* (HDR, December 2007);
> - *Initial Water Source Alternative Screening Technical Review Report* (HDR, March 2008);
> - *Water Source Alternative Characterization and Scope Technical Review Report* (HDR, March 2008);

> - *Conceptual Engineering of Cooling Water Supply and Disposal for Turkey Point Units 6 & 7* (HDR, June 30, 2008); and
> - *Cooling Water Supply and Disposal Design Report* (HDR, March 2009).
>
> These reports were summarized in SCA Appendix 10.9, Water Supply Alternative Analysis and Water Conservation Plan."

FPL believes that the information provided in our responses fully describes FPL's water supply alternative analysis conducted in accordance with the water use Basis of Review (BOR) and is sufficient to demonstrate compliance with the applicable, adopted non-procedural requirements of the Miami-Dade County Code and satisfies Condition 5 as well as the relevant aspects of Condition 15 of the zoning approval.

With respect to the water supply alternatives analysis required under Condition 5, this Condition provides: "Should WASD be unable to provide the applicant with sufficient quantity or quality or consistency in water delivery as required by FPL for its cooling system, *alternative sources may be proposed to satisfy such deficiencies*. FPL will provide the County with an Alternative Water Sources Plan, which will outline *all sources of water not supplied by WASD* through reuse." FPL is proposing only one source of water not supplied by WASD through reuse – the use of water withdrawn from a saltwater aquifer, which will be recharged by saltwater from Biscayne Bay as a backup to reuse. FPL has addressed that source of water and is modeling that source. No other sources are proposed. FPL believes this Condition does not require detailed examination, modeling and other permitting level requirements for sources that FPL does not propose to use. However, FPL will continue to work with the County to ensure satisfaction of the requirements of Condition 5.

With respect to Condition 4 of the zoning approval, FPL continues to work with the County and other agencies on the assessment of the impacts of operation of the radial collector well system as the backup water supply for Turkey Point Units 6 & 7. The back-up water supply is necessary for reliability of plant operations and allow for use of reclaimed water as a primary makeup water source. FPL designed a cooling water resource plan for the Project that we believe employs the best combination of alternative sources to maximize the use of reclaimed water and minimize impacts to the environment. In doing so, FPL proposes that the plan meets the intent of Condition 4. FPL will work with the County to clarify the language of this condition, if needed.

SECTION D - ACCESS ROAD

3MDC-D-1(a) (Third Round)

FPL's response is incomplete because they fail to provide the information requested in the first Completeness Response, which is required to evaluate whether the access roads, as currently proposed, fulfill the substantive requirements of Sections 24-48.3, 24-48.4, and 24-49 of the Miami-Dade Code. This is a separate substantive requirement from whether the proposed use is consistent with the CDMP and detailed information is required in order to evaluate the proposed use as temporary construction access roads and prepare the agency reports required by Section 403.526, F.S. FPL shall provide the requested information, which consists of an evaluation of impacts that "include but are not limited to disruption of ecological corridors, altered hydrogeology in surrounding wetlands (e.g. via barriers to sheetflow), increased invasion rate of non-native species, increased road-kill, impacts to listed species and their habitat, including but not limited to Florida panthers and Eastern indigo snakes, and increased

EXHIBIT 23

access that may facilitate illegal dumping, A TV riding, poaching, and other activities that may directly or indirectly impact surrounding wetlands. The applicant shall also address how road construction and operation would compromise the ability of the EEL Program and other agencies to appropriately manage public lands. FPL shall provide an analysis of these impacts on the hydrologic and ecological values of the surrounding lands, including information on how these impacts will be minimized and avoided to the maximum extent possible and how unavoidable impacts will be mitigated." (Miami-Dade County Completeness Response, question MDC-D-1).

Miami-Dade County acknowledges FPL's provision of information on federally and state-listed species (including plants), including Florida panthers and Eastern indigo snakes under response 2MDC-A-26-2, however, considers this information still incomplete because of limitations and inaccuracies detailed in Miami-Dade County's response to 2MDC-A-26-2.

Miami-Dade County hereby clarifies that the ability of the EEL Program and other agencies to appropriately manage public lands is the result of several factors, only one of which, access across FPL-owned lands, has been partially addressed by FPL in its response. Information must be provided to allow for a review of these additional factors including but not limited to: 1) impact to access such as the availability of safe pull-out areas for transport vehicles that may be towing trailered [*sic*] equipment and other types of motorized vehicles on the access roads plus elevation differences and/or slopes between the roads and surrounding lands that may preclude accessing the surrounding publicly-owned wetlands with wetland-compatible vehicles, and 2) impact to management costs due to degradation of the wetlands adjacent to the roads that are the result of a) the increased level of disturbance from construction and operation of the roads, which includes an elevated opportunity for the spread of invasive plant species and b) increased access by the general public to an area that has previously been difficult to access by street-compatible vehicles. FPL must address all of these factors in its response.

FPL states that several alternative access roadway configurations were reviewed, but failed to include the information that supported that review with its response. Figure W9.3.1-1 shows only the SW 359 Street corridor alternative in the region immediately around the Turkey Point complex. FPL shall provide all available access road alternatives that were considered and any supporting analyses that resulted in their conclusion that SW 359 Street corridor was the "least environmentally damaging practicable alternative".

RESPONSE:

The proposed temporary construction access roads are improvements to existing public and private roadways. These are not new roadways. Therefore, it is unclear how improvements to existing linear features would disrupt ecological corridors.

There will be no barriers to sheetflow. All roads improvements will be designed in coordination with DERM, as required by Condition 21 of Resolution Z-56-07, to address proposed wetland restoration projects. Following coordination with DERM staff, FPL will prepare and submit under separate cover a conceptual plan to address the maintenance of sheet flow. Final road design will be coordinated with DERM post-certification. FPL will work with DERM to develop the appropriate conditions of certification.

EXHIBIT 23

Exotic vegetation infestation that may occur adjacent to project features will be managed according to the Exotic Species Management Plan. FPL will coordinate with DERM staff to revise the Exotic Species Management Plan to include the approximate areas surrounding each project feature that will be managed for exotic vegetation removal as well as the timing and frequency of maintenance activities. The revised plan will be submitted under separate cover for review and monitoring for compliance with conditions of certification by DERM.

Prior to construction, FPL will conduct pre-clearing listed species surveys. The surveys will be conducted in consultation with the FWC and USFWS, and results will be forwarded to MDC. FPL will comply with the FWC and USFWS regulations regarding avoidance, minimization, and mitigation of impacts to listed species, including plants. FPL will consider design features, such as lighting, controlled speed, and signage, to minimize impacts to listed species as far as practicable.

The following conditions of the CDMP Amendment approved by the Miami-Dade County Board of County Commissioners on April 28, 2010 and agreed to by FPL are provided regarding public access restrictions on the construction access roads:

> "Temporary roadway improvements on privately owned property shall not be open to the general public. Miami-Dade County and other agencies with needed access shall, after providing proper notification to FPL, be granted access to this private roadway. At FPL's expense, all temporary roadway improvements south of SW 344th Street shall be patrolled by security personnel when in active use. In addition, FPL shall maintain security gates or other appropriate security measures during inactive periods on privately owned roadway improvements. To the greatest extent possible, FPL shall deter access by the general public on temporary roadways south of SW 344th Street."

Any restrictions in accessing EEL lands by County staff during road construction will be temporary. Access to EEL lands by County staff after road construction will be provided as referenced above pursuant to the CDMP conditions. It is premature to request design-level details for these linear facilities, including the access facilities, which are proposed as part of FPL's transmission corridors. FPL does not intend to modify the design of the private roadway to include "pull-out" areas; FPL does not believe separate "pull-out" areas will be needed because the proposed access roads and structure pads can be used for the types of access explained in the County's question.

Although other roadway alignment and lane configuration options were reviewed in the process of determining the most appropriate roadway alignment for construction access, many were discounted due to safety, security, traffic or construction issues. FPL conducted a thorough evaluation of the County's proposed New Canal Road Option. FPL provides the following documents on CD# 1 (at 3MDC-D-1) reflecting the analysis of the New Canal Road Option that was reviewed during the CDMP Modification process:

- New Canal Road Option Analysis Memo (dated 2/8/10)
- New Canal Road Option Figures (dated 2/8/10)
- New Canal Road Option Wetland Summary Tables (dated 2/8/10)
- PTN 6&7 Project Memorandum (dated 3/15/10)

3MDC-D-1(b) (Third Round)

The item is still incomplete because complete information has not been provided and clarification is needed on a statement that FPL made in its response. FPL stated in its response that, "After construction is complete, public access to SW 359'h Street will be restricted by locked gates." FPL shall clarify whether "after construction is complete" refers to construction of the access roads or construction of the plant. If FPL meant that the roads will be restricted after construction of the plant, FPL shall provide information on what specific features and actions will be taken to restrict public access to the access roads after the roads have been constructed but before the plant construction is complete. In addition, FPL shall provide information on how often the gates will be inspected for integrity and repaired, if necessary, during the foreseeable life of Units 6 and 7.

RESPONSE:

The statement “after construction is complete” refers to the completion of Units 6 & 7. After the road improvements have been made, the roadways will be utilized continually during construction of Units 6 & 7. The following conditions of the CDMP Amendment approved by the Miami-Dade County Board of County Commissioners on April 28, 2010 are provided regarding public access restrictions:

> “Temporary roadway improvements on privately owned property shall not be open to the general public. Miami-Dade County and other agencies with needed access shall, after providing proper notification to FPL, be granted access to this private roadway. At FPL's expense, all temporary roadway improvements south of SW 344th Street shall be patrolled by security personnel when in active use. In addition, FPL shall maintain security gates or other appropriate security measures during inactive periods on privately owned roadway improvements. To the greatest extent possible, FPL shall deter access by the general public on temporary roadways south of SW 344th Street.”

Following the completion of Units 6 & 7, the gates will be checked and repairs made as needed to maintain public access restrictions on SW 359th Street east of SW 137th Avenue. It is premature to request design-level details for the maintenance of these access facilities, which are proposed as part of FPL’s transmission corridors.

3MDC-D-1(c) (Third Round)

Miami-Dade County acknowledges the information provided by FPL, but considers this item still incomplete. FPL has stated, "SW 359th Street will be reduced to a transmission line patrol road after construction is complete" but has not provided specific information on the future configuration of this road, nor has FPL explicitly stated whether this stretch of transmission line patrol road will continue to be *paved* or not. FPL shall provide clarification on the pavement status of the future transmission maintenance road within the SW 359 Street corridor, from east of SW 137 Avenue to the plant, once construction of the plant has been completed, and shall provide a cross-sectional figure for the future configuration of this transmission maintenance road. Miami-Dade County acknowledges FPL's commitment that all public roads will be returned to their previous 2-lane configuration, however, it should be noted that SW 117 *Ave* south of SW 344 St. is presently a single lane roadway. FPL shall provide an explanation whether this road will be returned to a single lane road following construction.

EXHIBIT 23

RESPONSE:

The following conditions of the CDMP Amendment approved by the Miami-Dade County Board of County Commissioners on April 28, 2010 provided removal of road improvements as follows:

> "Within 2 years following the construction of Turkey Point Units 6 & 7 (a) all temporary roadway improvements on publicly owned rights-of-way will be returned to the status of the roadway(s) prior to the commencement of construction of the temporary roadways and roadway improvements, and, (b) any privately owned roadway will be returned to the minimum roadway width required to provide maintenance to FPL facilities; and shall not be more than two lanes."

SW 359th Street will not be paved after the road is restored to two lanes for the transmission patrol road. A typical cross section of the transmission patrol road is included in SCA Figure W9.3.4-1 (Rev. 0). FPL has committed to returning public roadways to the status existing before roadway improvements. Therefore, SW 117th Avenue south of SW 344th Street would be returned to a single lane roadway.

3MDC-D-9 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for *Review* of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Miami-Dade County has concluded from the response that FPL may misunderstand the purpose of the exotic vegetation management plan required under Condition 12 of Z-56-07 and hereby provides clarification. The exotic vegetation management plan is not intended solely for areas where construction of buildings and infrastructure will eliminate existing exotic vegetation, but instead is intended for nearby areas which may be invaded or further invaded by exotic species as a result of construction and operation of the plant site and associated facilities including nontransmission linear facilities. Such areas may include, but are not limited to locations within the plant site that currently have or are likely to have invasive exotic plant species colonize. Such areas may also include, but are not limited to areas near current or future non-transmission linear facilities, because such areas currently have or are likely to have invasive exotic plant species colonize, facilitated by vehicle traffic utilizing the linear facility .. This information is required to determine whether the substantive requirements of the Miami-Dade County Code relating to the removal of exotic vegetation would be met by the proposed project.

EXHIBIT 23

RESPONSE:

On June 18, 2010, FPL met with the County and agreed to schedule a meeting with the DERM and EEL management staff to review the limits of exotic vegetation management adjacent to project features. FPL will provide a Conceptual Exotic Vegetation Management Plan providing details of the timing and frequency of management activities. FPL will draft a Condition of Certification under the PPSA addressing this condition to provide a final plan prior to construction.

3MDC-D-10 (Third Round)

Please see MDC's Response MDC-D-9 (Third Round).

RESPONSE:

Please see Response 3MDC-D-9 above.

3MDC-D-11 (Third Round)

Miami-Dade County acknowledges that FPL has provided a portion of the information, however, the response remains incomplete because FPL has not provided the requested tree survey for the proposed plant site and associated facilities, including non-transmission linear facilities. Protected tree resources may occur on any upland portion of the proposed plant site and associated facilities, including non-transmission linear facilities. Miami-Dade County staff, for example, observed a spiny black olive *(Bucida molinetii,* fka *Bucida spinosa)* adjacent to one of the roads near the proposed plant site during a site visit. This rare hardwood species is protected under Section 24-49 of the Miami-Dade County Code and is an example of why such a tree survey is needed. This information is needed to determine whether the project fulfills the substantive requirements of Chapter 24 of the Miami-Dade County Code, including but not limited to Section 24-49, and to prepare the agency reports required by Section 403.526, F.S.

RESPONSE:

FPL will avoid impacts to protected tree resources located within the Site and associated facilities to the greatest extent practicable, and will comply with the tree replacement requirements specified in Section 24-49.4 of the MDC Code for any unavoidable removal of protected trees. As mentioned previously, the vast majority of the Project's proposed impacts occur in wetlands or disturbed areas such as spoils areas and previously-filled areas/roadways. No tree removal permit is required from the County when the subject property is wetlands in accordance with MDC Code Section 24-49(2)(h). Previously disturbed upland areas typically include those exotic invasive species of trees identified as exempt from tree removal permits as listed in MDC Code Section 24-29(4)(f), although the potential for protected tree species is acknowledged. Tree surveys will be conducted within applicable Project areas, including final rights-of-way for the access roads and other linear facilities, post-certification, pursuant to Chapter 24 of the MDC Code. Any protected tree resources on any upland portion of the proposed Site or associated facilities, including non-transmission linear facilities, will be identified. The results of the tree survey and tree mitigation plan (if applicable) will be available during the post-certification review process authorized by Section 403.5113(2), F.S., and Rule 62-17.191, F.A.C. FPL will work with the agencies to develop the appropriate conditions of certification for the tree survey.

EXHIBIT 23

3MDC-D-12 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Miami-Dade County has concluded from the response that FPL may misunderstand the request for information. Construction and operation of non-transmission linear facilities, including but not limited to construction access roads, may have an adverse impact on adjacent and nearby EEL lands, including but not limited to disruption of ecological corridors, disruption of sheetflow patterns, degradation of environmental quality due to disruption of management activities from access limitations, increased mortality of wildlife that utilizes EEL lands for some portion of their life cycle, increased invasive exotic plant colonization due to increased traffic, increased dumping and ATV/ORV use due to improved access for unauthorized parties, and other changes that may occur as a direct or indirect result of constructing and operating construction access roads located in a large, contiguous wetland system. FPL has not provided sufficient information on any of these issues and Miami-Dade County reiterates the need for such information in order to evaluate direct and indirect impacts of access road construction and operation and prepare the reports required by 403.526 F.S

FPL shall provide specific information relating to potential impacts to wildlife associated with access road/wildlife corridor overlap. Without the requested information, Miami-Dade County is unable to determine whether the proposed access roads cross through commonly used migration routes, travel corridors between feeding and breeding or resting areas, and any other types of travel corridors. The locations of such overlap, the types of species that would be affected, and the nature of the impacts need to be identified at this time. The information should ensure that information is included on rare, threatened or endangered species including state listed and federally listed species. Miami-Dade County has previously requested additional information on wildlife impacts that may result from the project in order to evaluate the potential adverse and cumulative adverse environmental impacts of the proposed work pursuant to Chapter 24, Miami-Dade County Code and the Miami-Dade County Comprehensive Development Master Plan. Miami-Dade County also notes that FPL has continued to dismiss the County's request for information resulting from a Comprehensive Environmental Impact Statement based upon FPL's assertion that the request is procedural in nature. However, Miami-Dade County reiterates that the information is required to evaluate this project for conformance with nonprocedural requirements of Miami-Dade County. Miami-Dade County acknowledges additional information provided by FPL in its completeness responses related to this issue, including limited information regarding invasive plant control within the nontransmission linear features; however, the County reiterates that the information remains incomplete.

EXHIBIT 23

RESPONSE:

The second paragraph is a restatement of Round 1 question MDC-D-1; please see the response to MDC-D-1. Non-transmission linear facilities include water pipelines installed underground and temporary construction access roadway improvements. The installation of pipelines adjacent to or underneath existing roadways and addition of temporary construction access lanes to existing roadways will not result in significant adverse impacts to adjacent or nearby EEL lands, or limit access for management activities upon EEL lands.

As to specific information relating to potential impacts to wildlife associated with the temporary construction access roadway improvements, FPL has provided this information in 1st Round Plant and non-Transmission Completeness Responses MDC-D-18 and MDC-D-2 (October 2009), 2nd Round Responses 2-MDC-A-26-2, and 2-MDC-D-21 (April 2010). Please also see 3rd Round Response 3MDC-A-26-2 above.

With regard to potential increased exotic plant colonization due to construction traffic, FPL will comply with the requirements associated with the management of exotic pest plant species in accordance with Section 24-49.9(1) of the MDC Code. FPL will identify all species of exotic vegetation occurring within the Site and associated facilities, as described in the *Florida Exotic Pest Plant Council 2009 List of Invasive Plant Species*. The exotic vegetation management plans will focus upon the removal of those species identified within the Site and associated facilities, including treatment area boundaries, protection of surrounding habitat, season of treatment, frequency of treatment, and variation in treatment techniques to suit site-specific conditions. The exotic vegetation management plans will be available during the post-certification review process authorized by Section 403.5113(2), F.S., and Rule 62-17.191, F.A.C. FPL will work with the agencies to develop the appropriate conditions of certification for the exotic vegetation management plan.

Regarding the requested CEIS, FPL reasserts the response contained in our 1st Round Response (October, 2009) Under the PPSA, the SCA is the procedural vehicle for addressing the applicable substantive requirements of the MDC code the procedural requirements of local ordinances are superseded by PPSA procedures and submittal requirements under Section 403.510, F.S. FPL will therefore not prepare a CEIS in support of the SCA.

3MDC-D-13 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

FPL states that several alternative access roadway configurations were reviewed, but failed to include the information that supported that review with its response. Figure W9.3.1-1 shows only the SW 359 Street corridor alternative in the region immediately around the Turkey Point complex. FPL shall provide all available access road alternatives that were considered and any

supporting analyses that resulted in their determination that "the best course of action is to pursue the roadway improvements described in the SCA."

RESPONSE:

Please see Response 3MDC-D-1(a) above.

2-MDC-D-13 (Second Round)

FPL's response is incomplete and is not sufficient in comprehensiveness of data or quality of the information to allow Miami-Dade County to prepare the reports required by Section 403.526, F.S. Miami-Dade County is requesting information that is needed to determine compliance with Sections 24-48 and 24-49 of the Miami-Dade Code, which require demonstration of avoidance and minimization of impacts to protected resources, and consistency with objectives and policies in the CDMP that protect sensitive resources such as wetlands and habitat for endangered and threatened species, protect surface water connectivity and flow, and require consistency with CERP.

In addition, the Mitigation Plan required under Condition 9 of Z-56-07 must include information on replacement tree canopy required under Section 24-49 of the Miami-Dade Code. The wetlands in the areas south of SW 344 Street also include mitigation areas (folios 10-7926-001-0020, 10- 7927-001-0010 and 30-7927-001-0150) that lie adjacent to the proposed improvements.

FPL has not provided information on possible impacts from the proposed roadway improvements to adjacent properties and the existing mitigation lands.

The information presented in SCA Appendix 10.7.4 is not sufficient to demonstrate compliance with the requirements for avoidance and minimization; in Chapter 24, Miami-Dade Code.

In addition, the response and the SCA application does not adequately address potential access road alternatives along SW 344th Street currently under review with Miami-Dade County.

1-MDC-D-13 (First Round)

Application fails to provide an alternatives analysis for the proposed access road network, both for construction access to the plant and access to the transmission line corridors, and to adequately demonstrate that impacts to resources are minimized and avoided. Please provide an analysis of alternatives for the access roads that considers and compares the benefits and impacts of all feasible alternative routes for ingress-egress, and demonstrates minimization and avoidance of impacts including but not limited to wetlands, impacts to state and federally protected species, impacts to existing water management features, impacts to Environmentally Endangered Lands projects, Natural Forest Communities and tree resources protected by Chapter 24, Miami-Dade Code. Alternatives evaluated for ingress-egress to Turkey Point should include but not be limited to utilization of the existing Palm Drive (SW 344 Street) corridor with and without shift change modifications, and alternative construction entrances including but

EXHIBIT 23

not limited to utilizing the existing plant entrance with shift change modifications or making improvements to the L-31 East levee for use as a temporary construction entrance by backfilling a section of the L-31 E borrow canal.

3MDC-D-14 (Third Round)

Please see MDC's responses MDC-D-1 (Third Round), MDC-D-9 (Third Round), and MDC-D-12 (Third Round).

RESPONSE:

Please see Responses 3MDC-D-1, 3MDC-D-9 and 3MDC-D-12 above.

3MDC-D-15 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

RESPONSE:

The specific mitigation to offset the loss of wetland functions associated with the temporary construction access temporary roadway improvements will involve in-kind enhancement, restoration, and preservation of wetlands located between SW 344th St and SW 328th St, adjacent to the L-31E Canal (Northwest Restoration Site) as discussed in the Wetland Mitigation Plan contained in SCA Appendix 10.4, Attachment E (Rev. 1, May 2010). It should be noted that FPL intends to restore the temporary construction access roadways following completion of construction; however, wetland mitigation will be provided to offset the impacts as if permanent. FPL is in the process of meeting with DERM and other appropriate agency staff to discuss the mitigation plan in greater detail.

FPL is refining the mitigation plan in accordance with input from MDC, USACE, FDEP, and the SFWMD to identify a final plan of wetland enhancement, restoration, and preservation that will offset the loss of wetland functions. A revised mitigation plan will be available prior to agency reports. The final mitigation plan, including details of proposed restoration activities, monitoring, and success criteria, will be available during the post-certification review process authorized by Section 403.5113(2), F.S., and Rule 62-17.191, F.A.C.

3MDC-D-16 (Third Response)

Please see MDC's responses MDC-D-1 (Third Round), MDC-D-9 (Third Round), MDC-D-12 (Third Round), MDC-D-14 (Third Round), and MDC-D-15 (Third Round).

EXHIBIT 23

RESPONSE:

Please see Responses to 3MDC-D-1, 3MDC-D-9 and 3MDC-D-12 above.

3MDC-D-17 (Third Round)

FPL's response is incomplete because the response failed to provide all of the requested information. FPL states that several alternative access roadway configurations were reviewed, but failed to include the information that supported that review in the response. Figure W9.3.1-1 shows only the SW 359 Street corridor alternative in the region immediately around the Turkey Point complex. FPL shall provide all available access road alternatives that were considered and any supporting analyses that resulted in their conclusion that SW 359 Street corridor was the "the least environmentally damaging practicable alternative that meets the Project needs". In addition, FPL shall clarify whether any other access road options were considered, including but not limited to options that would result in reduced or redistributed traffic to avoid the need for additional roadways or options that would limit the number of additional lanes needed to maintain an appropriate level of service or options that would route the additional capacity needed past more highly disturbed wetland areas or non-wetland areas. If such options to avoid and minimize impacts were not considered, FPL shall provide an explanation for why not. Such information is needed to evaluate the mitigation proposed for construction of the access roads, as per Section 24-48.4 of the Miami-Dade Code, and is needed in order for Miami-Dade County to prepare the reports required by 403.526, F.S.

FPL shall also clarify statements made in the response. FPL states that the total difference in wetland impacts between the original proposal and the MDC alternative to maximize utilization of SW 344 Street was only one acre. FPL shall clarify what specific impacts were considered in the analysis, how those impacts were classified (direct or secondary), and whether FPL's analysis included consideration of factors such as disruption of ecological corridors and subsequent effects such as an increased risk for roadkill.

FPL also stated that an insufficient amount of land exists within the road ROW on the north side of New City Canal, and additional easements and/or condemnation would be necessary. FPL shall provide maps showing where New City Canal is located, where the proposed road alignment is projected to be located relative to the existing ROW, and where the need for additional easements and/or condemnation occurs. FPL shall also identify the 19 private property owners over whose lands easements are projected to be needed, and provide justification for why there are no other alternatives using the same general concept for access to the proposed plant site that would further minimize the number of private property owners affected. For example, was expansion to the south of the SW 344 Street ROW considered to avoid the need to acquire 19 private properties?

FPL stated that the MDC alternative would result in an additional $40 million cost to the Project aside from easement acquisition. FPL shall provide a specific breakdown of how the $40 million cost was derived.

RESPONSE:

Please see Response 3MDC-D-1(a) above.

The attached survey on CD#1 (at 3MDC-D-17) (SW 344th Street Route Survey by Ford, Armenteros & Manucy, Inc. dated 3/4/10) provides the location of the New City Canal and the amount of land within the existing 50 ft. ROW north of the canal. The New City Canal encroaches into the 50-ft. road right-of-way by varying amounts along the entire route surveyed.

The 19 private properties that would be affected by constructing a two-lane road north of the New City Canal are shown on the attached figure from BBCW and found on CD#1 at 3SFWMD-D-17. As described in Response 2MDC-D-17 (April 2010), many factors were reviewed in determining the proposed temporary roadway improvement alignment. These factors include environmental impacts, safety, security, traffic patterns, evacuation routes, costs, and impacts to existing plant operations and construction schedules. Based upon all of those factors, FPL determined that the route proposed in the SCA was the least environmentally damaging practicable alternative that met the needs of the Project.

The $40 million additional cost associated with the New Canal Road Option was calculated by $9.3 million in additional road construction costs (more lane miles and an additional bridge), $1.6 million to relocate the existing daycare center on SW 344th Street, and $30 million in costs resulting from 16 additional months necessary to construct the roadways due to the additional time during which Units 6 & 7 construction and existing plant operations traffic would be required to share roads.

These estimates do not include the costs related to acquisition of property rights.

3MDC-D-19 (Third Round)

This item remains incomplete. The document referenced in page 2 of appendix 10.7.1.3 (Tucker et al., 2004) was requested by Miami-Dade County in the first and second completeness responses; said document has not been provided by FPL in either of its completeness responses to date. Therefore, the County reiterates its request that a copy of this document be submitted with the next completeness response to this item.

Miami-Dade County acknowledges FPL's submittal of The American Crocodile Monitoring Program for the Turkey Point Uprate 2009 Annual Report (Mazotti et al., 2009) and the 2009 Turkey Point American Crocodile Report. For the first report, FPL must provide an explanation of how the surveys conducted in January and May, for Task 1, account for nest success, hatchling sex ratios, and survivorship given that these two surveys were conducted prior to the period that crocodile eggs usually hatch, typically late July early August. FPL shall provide an explanation of why salinity is not being monitored in a continuous manner, like temperature.

RESPONSE:

The unpublished document by Tucker et al. (n.d.) referenced in page 2 of SCA Appendix 10.7.1.3 is attached to the current response on CD #1 at 3MDC-D-19.

The primary purpose of the *American Crocodile Monitoring Program for the Turkey Point Uprate* (Mazzotti et al., 2009) is to determine growth and survival of crocodiles at the Turkey Point site, as

EXHIBIT 23

well as spatial patterns of crocodiles at Turkey Point in relation to temperature and salinity, as stated on Page 2 of the report. Task 1 specifically states that capture surveys are conducted for *growth and survival of crocodiles* [emphasis added].

Information regarding nest success and hatchling sex is provided in the *Turkey Point Plant Annual American Crocodile Report*, submitted in accordance with Federal Permit TE092945-1 and State Permits WS06468a and WX06467a. The 2009 annual report was provided with Response 2-MDC-D-19 (April 2010) and is attached on CD#1 at 3MDC-D-19.

Salinity is being monitored regularly. The frequency of salinity measurements (monthly) is in accordance with the requirements of the existing Turkey Point Condition of Certification XVI, Cooling Canal System Crocodile Population Protection.

References:

Mazzotti, F.J., M. D. Cherkiss, J. B. Beauchamp (2009). *Annual Report: American Crocodile Monitoring Program for the Turkey Point Uprate*; prepared for Florida Power & Light Company, Juno Beach, FL.

Tucker, W.A., J. Wasilewski, E. Zillioux, A.B. Shortelle, and J. Lindsay (n.d.). *Assessment of American Crocodile Populations of Southern Florida: Trends in Population and Reproduction Rates, unpublished.*

3MDC-D-20 (Third Round)

Miami-Dade County stated in comments on the Completeness Response that staff has observed crocodiles outside the designated critical habitat. FPL has stated in the response that "It would be beneficial if County staff would document all observances of listed species with the USFWS, FWC, and FNAI, as well as the appropriate landowners, to facilitate applicants' ability to fulfill the requirements of Chapter 24, Miami-Dade County Code and the Endangered Species Act." Miami-Dade County notes that opportunistic observations should not be the sole basis for a determination of which habitats are utilized by wildlife and which of those habitats are critical to wildlife, including threatened and endangered species. Miami-Dade County has continued to request comprehensive, seasonal studies on both wildlife utilization and plant occurrence for the region within and surrounding the proposed locations for the plant and associated non-transmission facilities. Such studies are needed to properly document the use and value of the habitat in order to understand the potential impacts of the proposed project on flora and fauna of the region. Miami-Dade County notes that FPL has continued to dismiss the County's request for comprehensive information on flora and fauna, including seasonal utilization, or any other information resulting from a Comprehensive Environmental Impact Statement based upon FPL's assertion that the request is procedural in nature. However, Miami-Dade County reiterates that the information regarding flora and fauna including seasonal variations is required to evaluate this project for conformance with nonprocedural requirements of Miami-Dade County. Miami-Dade County acknowledges the additional information provided by FPL in its completeness responses related to this issue; however, the information remains incomplete. Without the requested information, Miami-Dade County is unable to determine whether the proposed plant and associated non-transmission facilities meet the requirements of Chapter 24 of the Miami-Dade Code and is unable to prepare the reports required by Section 403.526, F.S.

EXHIBIT 23

Miami-Dade County acknowledges the information provided by FPL on proposed wildlife protection measures within the roadway improvement corridor, however, this information remains incomplete. Please refer to comments in MDC-D-21 (Third Round).

RESPONSE:

As stated in the SCA, the potential for threatened and endangered species occurrence is based upon evaluation of the availability of suitable habitat, field surveys, previous studies, agency consultation, and data from the US Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC), and Florida Natural Areas Inventory (FNAI), and not upon "opportunistic observations." FPL has provided a thorough analysis of the potential utilization of the Site and associated facilities by threatened and endangered species, based upon presence of habitat, field surveys, agency consultation, and over three decades of data collected at the Turkey Point plant.

Prior to actual commencement of construction, FPL will conduct additional pre-clearing listed species surveys following selection of final rights-of-way for associated linear facilities. The surveys will be conducted in consultation with the FWC and USFWS, and results will also be forwarded to MDC. FPL will comply with the FWC and USFWS regulations regarding avoidance, minimization, and mitigation of impacts to listed species, including plants that may be found with area where construction will be undertaken.

Regarding the requested CEIS, FPL reasserts the response contained in our 1st Round Response (October, 2009). Under the PPSA, the SCA is the procedural vehicle for addressing the applicable substantive requirements of the MDC code the procedural requirements of local ordinances are superseded by PPSA procedures and submittal requirements under Section 403.510, F.S. FPL will therefore not prepare a CEIS in support of the SCA.

Please also see Response 2-MDC-A-23 (April 2010).

3MDC-D-21 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Miami-Dade County continues to consider the application incomplete because FPL omitted information on Eastern indigo snake habitat preferences that was provided as part of the information submittals for the proposed transmission corridors, which has resulted in an inaccurate assessment of the likelihood that the Eastern indigo snake occurs within or near the plant site or associated linear and non-linear features, including the proposed construction access roads. The County continues to request the following information:

EXHIBIT 23

- **FPL shall provide a revised assessment of the likelihood for occurrence of the Eastern indigo snake that accurately addresses the similarity between nearby habitat where the snake has been documented and habitat available within the boundaries of the proposed plant site and associated linear and non-linear non-transmission features.**

- **FPL shall also provide information on wildlife protection measures to be incorporated into the design for the access roads, in accordance with requirements under Condition 9 of Z-56-07 that will provide protection for the Eastern indigo snake from mortality due to road kill.**

The County has been clear in expressing concern about the potential impact of the proposed construction access roads on wildlife that occupy the upland and wetland habitats near the proposed roads, and has presented information indicating that reptiles, and especially snakes, are disproportionately represented in a roadkill survey for a multilane road, US Highway 1, that passes through habitat similar to where the proposed construction access road will be located. Miami-Dade County wishes to clarify that the County did not claim that there were Eastern indigo snakes represented in the roadkill survey, but instead stated that "reptiles, and particularly snakes, are disproportionately represented in road-kill surveys for other paved roads that have wetlands on both sides of the road, such as US Highway 1". This information may be obtained directly from the Florida Department of Transportation, District 6.

FPL has continued to dismiss the County's concerns, stating in its Second Completeness Response that "The majority of the roadway improvement corridor traverses shallow hydroperiod freshwater marsh wetlands, tree nurseries, exotic wetland hardwoods, mixed wetland hardwoods, and existing roadways. Based on the lack of suitable habitat for Eastern indigo snakes within the roadway improvement corridor, it is highly unlikely that this species would be at risk of adverse impact associated with the proposed roadway improvements." This statement is not consistent with information provided for the transmission corridors, which stated, "In response to Miami-Dade County's request for acknowledgement that indigo snakes could occur in and around wetland habitats along the corridors similar to those found in the FPL Everglades Wetland Mitigation Bank, FPL, in the submittals referenced above, has indicated the snake uses a wide variety of habitats. As Moler (1992)* also indicates, the snake can be found in "habitats ranging from mangrove swamps and wet prairies to xeric pinelands and scrub." Moler also reports the snake favors wetland edges for foraging, preying on frogs and other snakes. FPL has recorded indigo snake sightings within the Everglades Mitigation Bank, but they are typically found on tree islands and spoil berms or roads. In fact, FPL has created an upland indigo snake habitat area within the Crocodile Preserve portion of the Bank. Therefore FPL does concur that the indigo snake could utilize wetland habitats along the corridors similar to those within the Everglades Wetland Mitigation Bank." (FPL's Turkey Point Units 6 & 7 Supplemental Analysis, Transmission Lines, Third Completeness and Supplemental Analysis CD of SCA Information Submitted by FPL Regarding Turkey Point Transmission Line Corridors, Response MD(3)-09) Given that the construction access roads overlap with the proposed West Transmission Corridor for approximately 3 miles and includes the same habitat, FPL must correct its assessment to provide consistency with information and conclusions that were drawn with respect to the transmission corridors.

In addition, FPL must provide detailed information on how public access will be restricted from the construction access roads (including areas where those access roads occupy a public

rightof- way), what steps FPL will take to enforce and/or maintain the means for restricting access, along with a schedule for enforcement/maintenance of those means, what speed limits will be posted, how and how often speed limits will be enforced, language/graphics for any wildlife crossing signage, locations where wildlife crossing signage will be posted and how those locations were selected, locations where the road crosses wildlife travel corridors but wildlife crossing signage will not be posted along with justification for why not, and information on what schedule of maintenance for the signage will be followed.

RESPONSE:

Please refer to the USFWS South Florida Multi-Species Recovery Plan for a detailed discussion of habitat preferences of Eastern indigo snakes in the region (U.S. Fish and Wildlife Service, 1999). The analysis provided by FPL is consistent with the USFWS information, and provides the basis for the opinion that it is possible that indigo snakes may occur within the area of the proposed temporary construction access roadway improvements, but it is unlikely that the proposed temporary addition of lanes to existing roadways to facilitate construction traffic will adversely affect the Eastern indigo snake.

Nevertheless, as stated previously, FPL will conduct additional pre-clearing listed species surveys following selection of final rights-of-way for linear facilities, to include surveys for the Eastern indigo snake. The surveys will be conducted in consultation with the agencies. FPL will comply with the regulations regarding avoidance, minimization, and mitigation of impacts to listed species, including plants.

All construction personnel will receive mandatory wildlife training to include identification of protected species potentially occurring within the construction areas/access roads and notice to stop work and notify FPL environmental managers if protected species are observed within the work area, including panthers, Eastern indigo snakes, and American crocodiles. In addition, FPL will comply with the USFWS Standard Protection Measures for Eastern Indigo Snakes, including posting of informational signs along the access roads to contain the following information, at a minimum:

a. a description and photograph of the eastern indigo snake, American crocodile, and Florida panther, their habits, and protection under Federal Law;
b. instructions not to injure, harm, harass or kill these species;
c. directions to cease clearing activities and allow the species sufficient time to move away from the site on its own before resuming clearing; and,
d. telephone numbers of pertinent agencies to be contacted if a dead individual is encountered. The dead specimen should be thoroughly soaked in water and then frozen.

The exact location of wildlife crossing and protected species information signage has not been determined; FPL will consider locations proposed by DERM if provided. The signs will be maintained as needed to ensure visibility and legibility of information.

Please see response to 3MDC-D-1(a) and (b) regarding public access restrictions. Speed limits will remain as they currently exist on public roadways. The speed limit on SW 359th Street between SW 137th Avenue and the plant site will be at 45 miles per hour. As previously discussed in Response 2MDC-D-1(b) (April 2010), public access will be restricted from SW 359th Street by locked gates. The other roadways included in FPL's proposed temporary roadway improvements alignment are

EXHIBIT 23

designated as Miami-Dade County public right-of-ways. FPL proposes to enforce a 45-mile speed limit upon temporary construction access roads; compliance by FPL contractors will be mandatory.

Reference:

U.S. Fish & Wildlife Service (1999). USFWS South Florida Multi-Species Recovery Plan, “Eastern Indigo Snake” retrieved July 2010 from http://www.fws.gov/verobeach/images/pdflibrary/eisn.pdf pp. 4-567-582.

3MDC-D-22 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Please also see MDC's responses MDC-A-23 (Third Round), MDC-A-26-2(Third Round), MDCD-1(a) and MDC-D-1(b) (Third Round), MDC-D-9 (Third Round), MDC-D-12 (Third Round), MDC-D-13 (Third Round), MDC-D-21 (Third Round), MDC-D-23(Third Round).

RESPONSE:

FPL has met with the County and agreed to schedule a coordination meeting with MDC staff and the USFWS to determine the appropriate wildlife protection features necessary for the construction access roads. Upon consultation with MDC and USFWS, FPL will revise the Threatened and Endangered Species Management Plan as necessary to address management and preservation of listed species and their critical habitats.

2-MDC-D-22 (Second Round)

The Threatened and Endangered Species Evaluation and Management Plan presented in Appendix 10.7.1.3 of the SCA and the SCA sections referenced in FPL's response do not satisfy the requirements of Condition 11 of Z-56-07.

- **FPL shall provide additional information on how this plan satisfies the requirements of Condition 11 of Z-56-07, including but not limited to when and how FPL fulfilled the requirement for consultation with DERM and the US Fish and Wildlife Service (USFWS), how the plan provides for management of all federal and state listed threatened or endangered species, documented within the proposed access area, and how the plan provides for preservation, to the maximum extent possible, of all habitat identified as critical to these species.**

EXHIBIT 23

- **FPL shall address short-term and long-term measures necessary to protect all critical habitats.**

- **FPL shall detail how the plan was reviewed and interpreted by DERM for compliance with the substantive requirements of applicable statutes and regulations and how FPL has modified the management plan as needed to satisfy compliance with such applicable statutes and regulations.**

1-MDC-D-22 (First Round)

The application does not include the management plan for all federal and state listed threatened and endangered species documented within the proposed access area, as required under Condition 11 of Z-56-07. Please provide the required plan.

3MDC-D-23 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution *l-56-07* is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

FPL's response stated, "Co-location of the temporary access roadways with these existing disturbed linear features [existing roadways and linear facilities, including existing FPL transmission line access roads] reduces the probability of adverse impacts to sensitive resources that are discovered at a later date." Miami-Dade County respectfully disagrees with this assertion and requires additional detailed information in order to assess the probability of adverse impacts to sensitive resources. FPL is proposing to convert the existing disturbed linear features south of SW 344 Street, which are unpaved, unmaintained, single or double lane roads that traverse otherwise contiguous and connected wetland habitats and whose use is generally limited to ORV, car, truck, and moderate-duty equipment, into multilane paved access roads that will be continuously used by heavy haul equipment. Impacts to wildlife resources are likely, which is why Condition 9 of Z-56-07 requires the use of wildlife protection features to address this issue.

FPL shall provide information on wildlife protection features that is sufficient to determine whether the requirements of Miami-Dade County Code and the CDMP as well as Condition 9 of Z-56-07 have been met. Pursuant to Condition 9 of Z-56-07, FPL shall provide locations, details, and descriptions of all wildlife protection features, including but not limited to location of any fencing and wildlife underpasses that will be provided for the construction access roads, how public access will be restricted from the construction access roads (especially for areas where those access roads occupy a public right-of-way), what steps FPL will take to enforce

EXHIBIT 23

and/or maintain the means for restricting access, along with a schedule for enforcement/maintenance of those means, what speed limits will be posted, how and how often speed limits will be enforced, language/graphics for any wildlife crossing signage, locations where wildlife crossing signage will be posted and how those locations were selected, locations where the road crosses wildlife travel corridors but wildlife crossing signage will not be posted along with justification for why not, and information on what schedule of maintenance for the signage will be followed.

RESPONSE:

FPL has met with the County and agreed to schedule a coordination meeting with MDC staff and the USFWS to determine the appropriate wildlife protection features necessary for the construction access roads. After consultation with MDC and USFWS, FPL will revise the Threatened and Endangered Species Management Plan to include the necessary protection features.

All construction personnel will receive mandatory wildlife training to include identification of protected species potentially occurring within the construction areas/access roads and notice to stop work and notify FPL environmental managers if protected species are observed within the work area, including panthers, Eastern indigo snakes, and American crocodiles.

Please see Responses 3MDC-D-1(a), 3MDC-D-1(b) and 3MDC-D-21 above. Although FPL will patrol the construction access roads, FPL cannot restrict public access to public roadways.

3MDC-D-24 (Third Round)

FPL states in its response that "FPL acknowledges the requirement pursuant to Condition 9 of Resolution Z-56-07 to maintain sheetflow across roadways and to coordinate with DERM to develop a conceptual plan for the roadway elevations to account for increased water elevations resulting from planned restoration activities in the area adjacent to the roads." No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

FPL's submittal shall include information on how this conceptual plan meets the requirements of Condition 17 of Z-56-07. Those proposed construction access roads that fall within the boundaries of the West Preferred Transmission Corridor qualify as "transmission corridor upgrades to this area" *[i.e.* "within the Biscayne Bay Coastal Wetlands CERP Project study boundaries"] and "improvements to sheet flow such that the corridors do not impede the flow of ground or surface waters" are required.

EXHIBIT 23

RESPONSE:

Please see Response 3MDC-D-1(a) above.

> **2-MDC-D-24 (Second Round)**
>
> **The requested information is not outside the scope of a completeness request for additional information. FPL's response is incomplete because it fails to provide details on how multilane road construction will be made compatible with restoration features planned by CERP. FPL shall provide details including but not limited to road elevation, location and details on whether any segments of the proposed roads will be elevated, placement within the available right of way, reservations (if any) for planned CERP features including but not limited to Pump PU-M3 and the north-south spreader canal planned for the Tallahassee Road alignment, existing features (natural and man-made) that would be impacted by road construction, total acres of wetlands that will specifically be impacted by the installation of the access roads, and size and location of culverts intended to maintain hydrologic connectivity across the road, The information requested is required to evaluate whether the proposed project is consistent with Condition 9 of Z-56-07, Section 24-48.3 of the Miami-Dade County Code and objectives and policies in the CDMP that require consistency with CERP.**
>
> **1-MDC-D-24 (First Round)**
>
> **Most of the lands adjacent to the proposed roadway segment improvements occur within the boundaries of the Biscayne Bay Coastal Wetlands CERP Project, and several segments would be located where this CERP project proposes infrastructure for restoration of the surrounding wetlands and Biscayne Bay. These road improvements would directly interfere with CERP features associated with the Biscayne Bay Coastal Wetlands Project, including pumps and spreader canals. A pump station is proposed on the south side of the Florida City Canal at the Tallahassee Road (SW 137 Avenue) alignment. The purpose of this pump station is to transfer water south into the Model Lands Basin via a north/south spreader canal that would be constructed within the SW 137 Avenue road right of way. The CDMP requires that the FPL project be consistent with CERP, yet the lands that would be impacted by the FPL roadway improvement feature are the same lands that would be restored under CERP. Please address how the proposed roadway features would be constructed to be consistent with the proposed CERP features.**

3MDC-D-25 (Third Round)

See MDC's response MDC-D-24(Third Round).

RESPONSE:

Please see Response 3MDC-D-1(a) above.

EXHIBIT 23

3MDC-D-26 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the timeframes prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

Please see Response 3MDC-D-1(a) above.

> **2-MDC-D-26 (Second Round)**
>
> **The requested information is not outside the scope of a completeness request for additional information. The information requested is required to evaluate whether the proposed project is consistent with Condition 9 of Z-56-07, Section 24-48.3 of the Miami-Dade County Code, and objectives and policies in the CDMP that require preservation of natural drainage and other wetland functions. As requested and pursuant to Condition 9 of Z-56-07, please provide locations, details and descriptions of all features that are intended to maintain sheetflow across the roadways.**
>
> **1-MDC-D-26 (First Round)**
>
> **Pursuant to Condition 9 of Z-56-07, "Sheet flow shall be maintained across roadway alignments by elevating portions of the roadway and through the installation of culverts in other areas." The application does not contain sufficient information to determine whether the requirements of Condition 9 of Z-56-07 have been met. Pursuant to Condition 9 of Z-56-07, please provide locations, details and descriptions of all features that are intended to maintain sheetflow across the roadways.**

3MDC-D-27 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

EXHIBIT 23

RESPONSE:

Please see Responses 3MDC-D-1(a), 3MDC-D-1(b), and 3MDC-D-21 above.

2-MDC-D-27 (Second Round)

The requested information is required to evaluate potential impacts of the project and determine if the project can be certified as proposed, or whether modification of the project is necessary for certification. Drainage plans and associated calculations for the proposed access roads are needed to evaluate the project for compliance with requirements of the CDMP and Miami-Dade County Code. Including but not limited to Section 24-48.3 of the Miami-Dade Code, which addresses potential adverse environmental impact and cumulative adverse environmental impact of the proposed work, including but not limited to the effect upon hydrology, water quality, water supply, wildlife habitats, floral and faunal values, rare, threatened and endangered species, wetland values, and any other environmental values, affecting the public interest.

1-MDC-D-27 (First Round)

Please provide drainage plans and associated calculations for the proposed access roads.

3MDC-D-29 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Miami-Dade County reiterates the request for " ... a detailed map identifying areas where roads or road improvements would not be completely contained within the boundaries of either FPL-owned land or an existing public right-of-way. The applicant must also identify adjacent property owners whose land may need to be obtained to accommodate the road or road improvements, including but not limited to the Miami-Dade Environmentally Endangered Lands, Program, and ex[plain the process by which the additional property will be obtained.".

RESPONSE:

FPL is certifying a corridor for these roadways and therefore, this information will not be available until post-certification. FPL will work with the agencies to develop an appropriate condition of certification for submittal of the final roadway designs. The roadway improvements along SW 359th Street will be completely contained within FPL property. Although specific details of roadway improvements have yet to be determined, it appears that significant right-of-way exists along SW 328th Street to accommodate the roadway improvements with no impact to private landowners. Depending upon the final design width of the roads along SW 137th Avenue and SW 117th Avenue, some impacts to adjacent property owners outside of the right-of-way may be necessary. If additional property is needed outside of public rights-of-way, FPL will obtain the necessary property interests.

SECTION G - MISCELLANEOUS

3MDC-G-1 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03- 45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

With regard to the additional information required relating to Z-56-07, Condition 6 of the Unusual Use approved by the BCC (Resolution Z-56-07) states 'That FPL shall prepare and submit a wastewater discharge plan ... ". It further states that "... The plan shall be developed in accordance with the substantive requirements of Chapter 24, Miami-Dade County Code and shall be reviewed by DERM for compliance with Chapter 24 as interpreted by DERM based upon the impacts of this application ... " To date FPL has not submitted the required report to Miami-Dade County. FPL shall submit to Miami-Dade County the required plan in order to allow the County to determine completeness of this particular issue. The plan shall include all data and supporting documentation evaluated by FPL in order to arrive at the determination that " *... using water after it passed through the cooling towers was not* a *feasible alternative for regional wetland rehydration project, ...* ". In addition, the same information needs to be provided to Miami-Dade County relating to wastewaters other than the blow down waste. The complete results of the required wastewater discharge plan as well as the associated feasibility study for potential rehydration of CERP wetlands are needed at this time.

Miami-Dade County acknowledges the information provided in FPL's response 2MDC-A-6. However, this response is inadequate and does not provide information in answer to the questions contained in MDC-G-1. FPL states that industrial wastewaters will not be acceptable for land application pursuant to Chapter 62-610 FAC. Has FPL concluded that the use of wastewater to rehydrate wetlands is not technically feasible based on Chapter 62-610? Has FPL concluded that other uses such as canal or aquifer recharge would not be acceptable under the applicable portions of Florida Administrative Code given appropriate treatment? If so, information is needed to demonstrate this including code references. What "other constituents", as mentioned by FPL, are proposed to be added that would render the water unacceptable from a technical perspective? Has FPL concluded that it is technically infeasible to remove any of these constituents prior to rehydration of wetlands? If so, information is needed including the specific constituents that cannot be feasibly removed.

EXHIBIT 23

RESPONSE:

Please see Response 3MDC-A-6 above.

3MDC-G-3 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

Please see Responses 3MDC-C-6 and 3MDC-A-21 above.

> **2-MDC-G-3 (Second Round)**
>
> **Please see response to MDC-C-6 and MDC-A-21**
>
> **1-MDC-G-3 (First Round)**
>
> **The application predicts the potential for additional salinization throughout the area as a result of the project by drawing salty water landward via the radial collector wells and from deposition of salts as a result of cooling tower operations. In contrast, the CERP BBCW project seeks to reduce salinity levels in and adjacent to Biscayne Bay to restore more natural estuarine conditions. No documentation is provided to examine the specific impacts to the area from additional salinization generally and for CERP consistency specifically. A study is needed that includes a salt budget and an examination of the cumulative effects of existing and proposed operations at Turkey Point including but not limited to the existing chloride plume created by the cooling canal system and the additional salts that would be added to the area as a result of the proposed project. The study shall also be sufficient to determine the extent to which the radial collector wells would capture, redirect, or otherwise affect groundwater from the existing plume emanating from FPL's Cooling Canal System.**

3MDC-G-4 (Third Round)

Please see MDC's response MDC-C-24 (Third Round)

EXHIBIT 23

RESPONSE:

Please see Response 3MDC-C-24 above.

3MDC-G-5 (Third Round)

Please see MDC's response MDC-C-24 (Third Round)

RESPONSE:

Please see Response 3MDC-C-24 above.

3MDC-G-6 (Third Round)

This item remains incomplete because FPL did not provide any new information that is relevant to the County's request for information. Regarding the reports cited as provided on CD-1, please see MDC's response MDC-A-23 (Third Round).

FPL states in its response that the "proposed Units 6 & 7 Site is isolated and wholly contained within FPL's industrial wastewater treatment facility, a previously impacted area", however, in just one field visit with FPL in 2007, Miami-Dade County staff documented more than 15 species of shorebirds including Long Billed Curlew, Whimbrel, American Avocet and Wilson's Plover, which are rarely seen in Miami-Dade County. In addition, juvenile Wilson's Plover and Reddish Egret (a wading bird that is a state-listed species of special concern), were also observed, which may indicate that nesting occurs on site. The potential for nesting/breeding activity by shorebirds *and/or* other species protected at state or federal levels on a site considered by FPL to be "impacted" is one example of why Miami-Dade County is requesting seasonal biological surveys for all lands likely to be impacted by the proposed plant and associated nontransmission facilities. Information on wildlife breeding is not likely to be complete without a study whose timing is designed for this purpose.

FPL also states in its response that the "native upland tree resources protected by Chapter 24 of the Miami-Dade County Code are uncommon", however, the response remains incomplete because FPL has not provided the requested tree survey for the proposed plant site and associated facilities, including non-transmission linear facilities. Protected tree resources may occur on any upland portion of the proposed plant site and associated facilities, including nontransmission linear facilities. Miami-Dade County staff, for example, observed a spiny black olive *(Bueida molinetii,* fka *Bueida spinosa)* adjacent to one of the roads near the proposed plant site during a site visit. This rare hardwood species is protected under Section 24-49 of the Miami-Dade County Code and is an example of why such a tree survey is needed. This information is needed to determine whether the project fulfills the substantive requirements of Chapter 24 of the Miami-Dade County Code, including but not limited to Section 24-49, and to prepare the agency reports required by Section 403.526, F.S.

FPL also states in its response that the "SCA includes results from existing databases such as Florida Natural Areas Inventory (FNAI), consultation with FWC and USFWS, reconnaissance surveys of the area, ... surveys within the Site and surrounding areas were conducted in June 2009 (fish survey utilizing minnow traps, seines, and cast nests) and April 2009 (small mammal survey utilizing 345 trapnights with Sherman live traps)". Miami-Dade County acknowledges

EXHIBIT 23

FPL's provision of this information, but the item remains incomplete because the number and type of recent studies that have been conducted to document flora and fauna for this area are inadequate to properly characterize the diverse habitats that are likely to be impacted by the proposed project. For example, Appendix 10.4 of the SCA cites FNAI-provided data as the source for a single occurrence of the golden leather fern *(Aerostiehum aureum,* state-listed Threatened) near Black Point. Miami-Dade County staff, in contrast, has spent extensive time in the coastal wetlands surrounding the presumed site for the proposed plant and associated non-transmission facilities, and regularly encounters golden leather fern in the forested wetlands and mangrove swamps in this area. One recently discovered occurrence on public land was less than 3 miles from the proposed access roads in forested wetlands that are similar to those found along the access road corridor. This is a difficult species to distinguish from leather fern *(Acrostichum danaeifolium)* unless the individual is reproductive, which occurs during the late wet season. Table 3 in Appendix 10.4 of the SCA lists the likelihood as low for occurrence of the bracted colic root *(Aletris braeteata,* state-listed Endangered) near the West Preferred/Secondary Transmission Corridor, which overlaps with the construction access roads. Miami-Dade County staff, in contrast, has documented several populations on public land in the region, including one that is located in mixed graminoid prairie approximately 2 miles southwest of the proposed access roads. This species is difficult to identify without a seasonal study, since it consists of a basal rosette of leaves that is inconspicuous when the tall flower spike is not present.

Comprehensive information about flora and fauna within and surrounding the proposed plant site and associated non-transmission facilities, including the construction access roads, is needed to enable Miami-Dade County to evaluate the proposed primary and secondary impacts of the proposed plant and associated non-transmission facilities for consistency with the requirements of Sections 24-48.3 and 24-49 of the Miami-Dade County Code, plus relevant objectives and policies in the CDMP.

RESPONSE:

The statement that the proposed site for Units 6 and 7 is considered “impacted” by FPL is consistent with the November 28, 2007 MDC Department of Planning and Zoning Recommendation to the Developmental Impact Committee regarding FPL Unusual Use request (Application Z07-207), “the area in which the proposed facility is to be located has already been highly disturbed and de-graded. As a result, the mangroves in the plant expansion area have been significantly replaced by coastal salt and mud flats.”

Questions regarding shorebird use of the proposed Units 6 & 7 Site, protected tree resources, evaluation of probability of occurrence of threatened and endangered species, and as to the number and type of recent studies to document flora and fauna for this area, are restatements of questions contained in 3MDC-A-23, 3MDC-A-25, 3MDC-A-26-2, 3MDC-D-11, 3MDC-D-20, and 3MDC-D-21. Please see the referenced responses.

As stated previously, FPL will conduct additional pre-clearing listed species surveys of the plant and associated linear facilities following selection of final rights-of-way. The surveys will be conducted in consultation with the agencies. FPL will comply with the agency regulations regarding avoidance, minimization, and mitigation of impacts to listed species, including plants.

EXHIBIT 23

3MDC-G-7 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

RESPONSE:

Please see Response 2MDC-G-7 (July 2010).

> **2-MDC-G-7 (Second Round)**
>
> **The response is insufficient. Please provide complete and detailed water quality information on the treatment methodology, the resulting quality, volume, and timing of the discharge sufficient to determine whether the water quality of the proposed discharge water is sufficient to prevent degradation of the receiving wetlands and meet applicable restoration standards/targets such that mitigation credit would be appropriate. As mentioned in FPL's response, this shall include FPL's evaluation of the reclaimed water from the perspective of nutrients and in comparison with ambient water quality of the Florida City Canal.**
>
> **1-MDC-G-7 (First Round)**
>
> **The mitigation plan proposes to discharge wastewater into the Model Lands and to seek mitigation credit for this discharge. Since the area proposed for discharge is a sawgrass wetland, pollutant levels, including but not limited to nutrient levels, would need to be very low (e.g. less than 10 ppb phosphorous). The application, however, provides insufficient information on the treatment methodology, the resulting quality, volume, and timing of the discharge. The applicant shall provide complete and detailed water quality information for the proposed discharge water that is sufficient to determine whether the water quality of the proposed discharge water is sufficient to prevent degradation of the receiving wetlands.**

3MDC-G-9 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised

EXHIBIT 23

Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

RESPONSE:

Based on a meeting with DERM on June 18, 2010, FPL understands that an acceptable approach to addressing this question would be to define culvert inverts in a Condition of Certification, such that the inverts would account for planned water level increases associated with regional restoration projects, along with normal seasonal variations in surface water levels. FPL understands that from DERM's perspective this would provide for consistency with CERP.

In addition, as provided in FPL's 1st Round Plant and non-Transmission Completeness Response MDC-G-9 (October 2009),

> "FPL has already provided the level of detail that is currently available regarding the project features in the SCA and has provided additional information within these completeness responses. FPL has designed the associated facilities to account for water level increases. SCA Sections R9.3.4 and W9.4.1.2 present information on elevations. These elevations were based on the planned higher water levels in this area as well as sea level rise pursuant to Policy CM-9H of the MDC CDMP. Those associated facilities will also be based on higher water levels."

> **2-MDC-G-9 (Second Round)**
>
> **See response to MDC-G-8.**
>
> **1-MDC-G-9 (First Round)**
>
> **Pursuant to Condition 21 of *Z-56-07,* FPL has agreed to allow water level increases on the project site on the order of one foot or more, pursuant to regional restoration projects, and will design the project to accommodate these water level increases at FPL's expense. Information in the application is not sufficient to determine whether the requirements of this condition have been met. The applicant shall provide detailed information on all project design elements that must be modified to meet Condition 21 of *Z-56-07* that is sufficient to determine whether this requirement is being met.**

3MDC-G-10 (Third Round)

Please see MDC's response MDC-D-12 (Third Round)

RESPONSE:

Please see Response 3MDC-D-12 above.

EXHIBIT 23

3MDC-G-11 (Third Round)

Please see MDC's responses MDC-G-6 (Third Round), as well as comments MDC-D-1 (Third Round), MDC-D-9 (Third Round), MDC-D-12 (Third Round), MDC-D-14 (Third Round), and MDC-D-16 (Third Round).

RESPONSE:

Please see referenced responses 3MDC-G-6, 3MDC-D-1, 3MDC-D-9, 3MDC-D-1, 3MDC-D-12, 3MDC-D-14, and 3MDC-D-16 above

3MDC-G-12 (Third Round)

No additional information has been provided specific to any other variances needed for this project. It is not possible for Miami-Dade County to provide a comprehensive determination of all aspects of FPL's project that would be prohibited by the Miami-Dade County Code until all information requested by Miami-Dade County under the SCA completeness reviews have been provided. However, based on a preliminary review of the information submitted thus far, it appears that the proposed wastewater treatment plant is prohibited pursuant to the Miami-Dade County Code in addition to the proposal to discharge to the boulder zone in lieu of connection to the sanitary sewer system. With regard to the proposed mitigation project involving the discharge of wastewater to the Model Lands wetlands, it appears that the effluent would not meet the water quality standards or criteria that Miami-Dade County has advised FPL are necessary for wetlands rehydration. FPL has also been advised by Miami-Dade County that the proposal to construct a well field in the Biscayne Aquifer for cooling water purposes would be in noncompliance with Z-56-07, most specifically with condition 4. With regard to the modeling that FPL has performed to date related to this proposed well field, condition 5 of Z-56-07 requires the approval of Miami-Dade County. However, this model has not been approved by Miami-Dade County and FPL has been advised that this model is inadequate and inappropriate to address the requirements of Z-56-07, Chapter 24 and the CDMP.

Please also see MDC's response MDC-A-7 (Third Round)

RESPONSE:

FPL acknowledges the County's comment. However, FPL believes it has either demonstrated its satisfaction of the requirements for the requested variance for sanitary sewer connection, or otherwise is in compliance with the cited County regulatory requirement for which a variance is not required. Please see Responses 3MDC-A-6 and 3MDC-B-3 above, 2MDC-G-7 (July 2010), and 2MDC-A-3 (July 2010). If the County believes variances or other relief from the cited regulations are required, that is a matter the County can address in its agency report under Section 403.507(3)(a), F.S.

With regard to FPL's requested variance from the sanitary sewer connection requirement, FPL reasserts the response contained in our first round response to MDC-A-6 that under Section 403.511(2), F.S., the County will not be issuing a variance. Nonetheless, the information provided in this and our first and second round responses affirmatively demonstrates why a sewer connection is not technically feasible or economically reasonable and has demonstrated entitlement to a variance from sewer connection requirements pursuant to Section 25-12(1) of the MDC code. The information provided is sufficient for MDC to make a recommendation to the Siting Board that a variance from sewer connection requirements of the MDC code should be granted by the Siting Board.

Information relating to the technical infeasibility of sending a relatively small volume of domestic wastewater from Turkey Point to the MDWASD South District Waste Water Treatment Plant was presented in 1st Round Plant and non-Transmission Completeness ResponsesMDC-A-6 and 2MDC-A-6 in request for additional information. In addition, FPL met with MDC on March 8, 2010 to discuss this issue. To aid in reviewing the variance information, attached to Response 3MDC-A-6 above is a technical memorandum entitled Turkey Point Plant: On-Site Sanitary Wastewater Treatment Plant. The objective of this technical memorandum is to provide a description of the treatment processes, design and regulatory criteria proposed for a new Turkey Point Plant on-site sanitary wastewater treatment plant.

For information regarding the water quality standards necessary for wetlands rehydration associated with the proposed discharge of reclaimed water to the Model Lands Basin, please see 2nd Round Plant and non-Transmission Response 2-MDC-G-7.

With respect to the comments regarding the proposed radial collector wells and modeling, and the requirements of zoning Conditions 4 and 5, please see response 3MDC-C-1 and 3MDC-C-24.

3MDC-G-13 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will review that information in a subsequent round of completeness.

Please see also MDC's response MDC-C-6 (Third Round)

RESPONSE:

FPL continues to work with the reviewing agencies to address questions about the hydrologic impacts of the Project as they pertain to the proposed back-up cooling water supply and/or dewatering. Due to the complexity and duration of additional groundwater modeling necessary to respond to some of the agency comments and questions, additional time is necessary to provide the full response to this completeness question. FPL will provide the response to this question at a later date.

> **2-MDC-G-13 (Second Round)**
>
> **The application and response does not contain sufficient information to adequately evaluate the potential impact of the project on groundwater, surface water, salt**

EXHIBIT 23

intrusion, movement of the hyper-saline plume associated with the cooling canal system, and to evaluate potential project related impacts to wetlands resources and Biscayne Bay. Furthermore, Miami-Dade County does not agree that the information provided satisfies Condition 15 of Z-56-07. FPL shall provide information detailing how the various reports and comments provided in the SCA and in the Completeness Responses document were developed in accordance with the substantive requirements of Chapter 24, Miami-Dade County Code. FPL shall also provide documentation on how and when the information comprising the study was reviewed by DERM for compliance with Chapter 24 as interpreted by DERM based upon the impacts of this application. Please see comments provided in MDC-C6.

1-MDC-G-13 (First Round)

Pursuant to Condition No. 15 of the Unusual Use Approval Resolution Z-56-07, included in Appendix 10.3, a DERM approved hydrologic study and its results shall be provided that evaluates all impacts to surface and groundwater. This study should include consideration of seasonal differences in groundwater flow cited in Section 3.3.3.2 and determine the extent to which these differences are due to current operations at Turkey Point.

3MDC-G-18 (Third Round)

FPL shall clarify the response provided in 2MDC-G-18. Will any impacts to wetlands or wetland vegetation, such as mangroves, in the in situ restoration areas, be required for maintenance, repair or other activities after restoration is complete? If so, FPL shall provide details of such impacts and shall also provide corrected UMAM scores that account for these future impacts.

RESPONSE:

Following installation of the reclaimed, potable, and radial collector well delivery pipelines, no maintenance is required, nor is any requirement for repair of the pipelines anticipated. If any disturbance of the restored areas becomes necessary, the areas will be returned to the pre-disturbance condition to avoid any loss of wetland functions.

3MDC-G-20 and MDC-G-21 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. Miami-Dade County requires a detailed Mitigation Plan at this time to *evaluate* completeness of the application. The plan must identify the specific mitigation for each of the specific impacts proposed in order for the County to *evaluate* the mitigation and to prepare the reports required by Section 403.526 F.S. and shall include categorization of each specific mitigation type (i.e. direct, secondary, temporary, etc). In addition, as per Miami-Dade County's First Round Completeness comment for MDC-G-35, "the time lag associated with the proposed mitigation projects must be calculated from the initiation of the impacts to the time in which the mitigation reaches the proposed "with mitigation" score". FPL shall also clarify the

comment that "some mitigation activities may be initiated prior to the time of impacts. Is FPL proposing to do "up-front" mitigation? If so, FPL shall provide details, including time frames relative to each specific impact.

RESPONSE:

As described in 2nd Round Plant and non-Transmission Response 2-MDC-A-25 (April 2010), the ERP application form (SCA Appendix 10.4, Rev. 1, May 2010), Section E, includes a Project Impact Summary (Table 1), which details the amount of wetland impact associated with each project feature and the proposed mitigation to offset those impacts. In the case of the Units 6 & 7 Site, impacts are proposed to be mitigated through the Everglades Mitigation Bank. In the case of the transmission lines, impacts are proposed to be mitigated through the Hole in the Donut Mitigation Bank. These two project features comprise approximately 70 percent of the total project wetland impact. Please see wetland impact totals below:

UNITS 6 & 7 PROJECT WETLAND IMPACT SUMMARY

Area	Wetland Impacts (acres)			Functional Loss (UMAM Credits)
	Direct	Secondary[a]	Temporary	
Units 6 & 7 Site	250.2			128.3[b]
Associated Non-Linear Facilities	70.2	3	6.4[c]	53.5
Access Roads	81.6	45		80.6
Reclaimed Water Pipelines			41.9[c]	5.7
Transmission Line Corridors	308[d]			241[d]
TOTAL	710	48	48	509

[a] Secondary wetland impact calculated as 25-foot zone surrounding areas of wetland fill; functional loss for secondary impacts calculated as 60 percent of direct impact.

[b] Functional loss calculated via W.A.T.E.R. functional assessment methodology for the Units 6 & 7 Site = 148.4 W.A.T.E.R. credits.

[c] Loss of functional value for temporary impacts associated with pipeline installation will be replaced through in-situ restoration. Mitigation credits to offset time lag associated with in-situ restoration are provided.

[d] Transmission line impacts approximated utilizing conservative estimates regarding road and pad design layout within corridor and average functional assessment scores within the corridor segments; actual wetland impacts will be reduced upon completion of detailed engineering design. Acreage of clearing/conversion of forested to herbaceous wetlands will be calculated upon completion of detailed engineering design.

For the remaining project features, including the temporary construction access roadway improvements, water delivery pipelines, reclaimed water treatment plant, and the administration and training buildings and parking area, FPL is refining the mitigation plan in accordance with input from MDC, USACE, FDEP, and the SFWMD to identify a final plan of wetland enhancement, restoration, and preservation that will offset the loss of wetland functions.

EXHIBIT 23

FPL is refining the mitigation plan in accordance with input from MDC, USACE, FDEP, and the SFWMD to identify a final plan of wetland enhancement, restoration, and preservation that will offset the loss of wetland functions. A revised mitigation plan will be available prior to agency reports. The final mitigation plan, including details of proposed restoration activities, monitoring, and success criteria, will be available during the post-certification review process authorized by Section 403.5113(2), F.S., and Rule 62-17.191, F.A.C.

In accordance with 62-345.600, F.A.C., FPL will initiate mitigation activities simultaneously or prior to the time of wetland impacts in order to address the time lag associated with the proposed mitigation relative to the time of impacts.

3-2-MDC-G-23 (Third Round)

Please see MDC's response MDC-G-11 (Third Round)

RESPONSE:

Please see Response 3MDC-G-11 above.

3MDC-G-26 (Third Round)

This item remains incomplete because FPL did not provide the requested information. Please see MDC's responses MDC-D-1 (Third Round), MDC-D-9 (Third Round), MDC-D-12 (Third Round), MDC-D-13 Third Round), MDC-D-21 (Third Round), and MDC-D-23 (Third Round).

RESPONSE:

Please see Responses 3MDC-D-1, 3MDC-D-9, 3MDC-D-12, 3MDC-D-13, 3MDC-D-21 and 3MDC-D-23 above.

3MDC-G-27 (Third Round)

This item remains incomplete. FPL' s response indicates that the acreages derived for the functional lift are estimates based on anticipated *volumes* of water, size of receiving wetlands, and past modeling for the Everglades Mitigation Bank Weir constructed in Card Sound Road Canal. FPL proposes to perform detailed hydrologic modeling post certification to refine the projected estimates. However, Miami-Dade County requires a detailed Mitigation Plan at this time. The plan must identify the specific mitigation (with finalized functional lift calculations, not estimates) for each of the specific impacts proposed in order for the County to *evaluate* the mitigation and to prepare the reports required by Section 403.526 F.S. Please also see MDCD-15 (Third Round)

RESPONSE:

As described in 2nd Round Plant and non-Transmission Response 2-MDC-A-25, the ERP application form (SCA Appendix 10.4, Rev. 1, May 2010), Section E, includes a Project Impact Summary (Table 1), which details the amount of wetland impact associated with each project feature and the proposed mitigation to offset those impacts. In the case of the Units 6 & 7 Site, impacts are proposed to be mitigated through the Everglades Mitigation Bank. In the case of the transmission lines, impacts

EXHIBIT 23

are proposed to be mitigated through the Hole in the Donut Mitigation Bank. These two project features comprise approximately 70 percent of the total project wetland impact.

For the remaining project features, including the temporary construction access roadway improvements, water delivery pipelines, reclaimed water treatment plant, and the administration and training buildings and parking area, FPL is refining the mitigation plan in accordance with input from MDC, USACE, FDEP, and the SFWMD to identify a final plan of wetland enhancement, restoration, and preservation that will offset the loss of wetland functions. The amount of functional lift associated with the proposed hydrologic enhancement mitigation projects has been conservatively calculated, as described in SCA Appendix 10.4, Attachment E. A revised mitigation plan will be available prior to agency reports. The final mitigation plan, including details of proposed restoration activities, monitoring, and success criteria, will be available during the post-certification review process authorized by Section 403.5113(2), F.S., and Rule 62-17.191, F.A.C.

3MDC-G-28 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. Miami-Dade County acknowledges the UMAM score sheets for the hydrologic improvement mitigation projects. However, the initial information provided by FPL regarding risk and uncertainty remains inadequate (please refer to MDC-G-27 (Third Round) above).

RESPONSE:

It is not clear what aspect of the risk factor analysis associated with potential hydrologic enhancement projects remains inadequate to MDC. FPL has provided the risk factors for each potential mitigation alternative in SCA Appendix 10.4, Section 2, Attachment E, determined in accordance with Chapter 62-345, F.A.C. The estimated risk of uncertainty in hydrologic improvement and ecosystem response associated with the potential hydrologic enhancement projects ranges from 1.25 to 1.5, in accordance with 62-345.600(2) F.A.C. Please see 1st Round Plant and non-Transmission Completeness Response MDC-G-28 (October 2009) for a description of each individual parameter of the overall risk factor evaluation, in accordance with Chapter 62-345, F.A.C.

FPL is refining the mitigation plan in accordance with input from MDC, USACE, FDEP, and the SFWMD to identify a final plan of wetland enhancement, restoration, and preservation that will offset the loss of wetland functions. The final mitigation plan, including details of proposed restoration activities, monitoring, and success criteria, will be determined through ongoing discussions with the agencies.

3MDC-G-30 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for *Review* of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-

EXHIBIT 23

EPP". The County acknowledges FPL's desire to provide information towards the completeness of this item at a later date and the County will *review* that information in a subsequent round of completeness.

RESPONSE:

Please see response 2MDC-G-7 (July 2010).

> **2-MDC-G-30 (Second Round)**
>
> **The requested information is required to evaluate proposed project mitigation prior to certification.**
>
> **1-MDC-G-30 (First Round)**
>
> **Please provide additional information on the quality, quantity, timing and reliability of the proposed reclaimed water for hydrologic improvements.**

3MDC-G-31 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP". FPL shall clarify the statement regarding modification of HID to UMAM. Since HID has not been modified to UMAM, the relevance of this statement is unclear. Miami-Dade County is trying to verify FPL's proposed mitigation ratios based on the current applicable Basis of Review requirements as they relate to use of the HID. The proposed ratios do not appear to be consistent with applicable Basis of Review requirements, which call for a minimum of 1.5/1. FPL shall provide information to reconcile the discrepancy between the proposed mitigation ratios and the minimum ratios required under State and County law.

RESPONSE:

The statement regarding modification of HID to UMAM is related to a statement from the FDEP in the 1st Round of Plant and non-Transmission Determination of Incompleteness, question FDEP-II-B-80 (October 2009).

> "It should be noted that the HID Mitigation Bank is currently being reviewed for conversion to UMAM. If this modification to the HID Mitigation Bank is accomplished in the near future, the mitigation calculations for any use of this bank can be reevaluated."

The use of the HID is proposed to offset impacts to similar wetland types occurring within the linear facility corridors. The mitigation ratios for HID were selected based upon consultation with the USACE, the HID managers, and are consistent with other applicants' use of the HID.

EXHIBIT 23

The HID was permitted prior to adoption of 62-345.100(6), F.A.C., with cost per credit equivalent to offset 1 acre of impact. The HID managers indicate that the bank currently uses a ratio of 1:1. Review of recent USACE permits indicate 1:1 ratio. The recent USACE public notice issued for the HID:

> “GP-74 Expiration/Revised Mitigation Procedures at Hole-in-the-Donut (HID)”, states: “the existing ratio system established under the Special Area Management Plan (SAMP) will be maintained for the HID ledger. Mitigation will be calculated using the existing ratio of 1.5:1 established under the SAMP to off-set unavoidable wetland impacts for the Bird Drive and North Trail Basins. For the remainder of the Mitigation Service Area (Miami-Dade County) the HID will comply with the minimum ratio score of 1:1 as required by the Federal Mitigation Rule.”

3MDC-G-32 (Third Round)

This item remains incomplete. Miami-Dade County acknowledges FPL's statement that they have submitted Revised Figure 2MDC-G-32 (Rev. 1) titled FPL Lands Proposed for Preservation/Restoration & Development within the Biscayne Bay Coastal Wetlands & Model Lands Basin, however, the item remains incomplete because the requested figure could not be found, either in hard copy or in electronic format (File name: Figure2MDC-G-32_09387652C014_Rev1_BBCW_ ModelLands.pdf). FPL shall resubmit this map.

RESPONSE:

Revised Figure 2MDC-G-32 was provided with the 2nd Round of Plant and non-Transmission Completeness Responses on CD #1, in the PDF named 2nd Round Figures.pdf.

The figure is attached here and found on attached CD#1 at 3MDC-G-32.

3MDC-G-35 (Third Round)

This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. Miami-Dade County requires a detailed Mitigation Plan at this time to evaluate completeness of the application. The plan must identify the specific mitigation for each of the specific impacts proposed in order for the County to evaluate the mitigation and to prepare the reports required by Section 403.526 F.S. In addition, as per Miami-Dade County's First Round Completeness comment for MDC-G-35, "the time lag associated with the proposed mitigation projects must be calculated from the initiation of the impacts to the time in which the mitigation reaches the proposed "with mitigation" score". FPL shall clarify the comment that "some mitigation activities may be initiated prior to the time of impacts". Is FPL proposing to do "upfront" mitigation, and if so, provide details, including time frames relative to each specific impact.

Please also see MDC-D-15 (Third Round).

EXHIBIT 23

RESPONSE:

Please see Responses 3MDC-G-20 and 3MDC-G-21above for discussion of time lag associated with mitigation activities. Please see response 3MDC-D-15 above for discussion of specific mitigation for each of the specific impacts.

3MDC-G-40 (Third Round)

Please see MDC's responses MDC-A-26-1 (Third Round) and MDC-A-26-2 (Third Round).

RESPONSE:

Please see Responses 3MDC-A-26-1 and 3MDC-A-26-2 above.

3MDC-G-41 (Third Round)

This item remains incomplete. The reference to MDC-C-26 is a typographical error. In the first round of Completeness Responses, FPL disagreed with assertions made by Miami-Dade County that water is migrating from the Cooling Canal System (CCS). Miami-Dade County reiterates that the application provides insufficient information with regard to MDC-G-41. FPL shall submit data and information to demonstrate that the water is not migrating from the CCS.

RESPONSE:

FPL did not disagree with Miami-Dade County that water is migrating from the cooling canal system. In fact, the existing industrial wastewater facility was designed and permitted to allow for migration of water from the cooling canal system into the groundwater. However, due to its higher density, water from the industrial wastewater facility does not impact surface waters. Consequently, FPL cannot provide data to demonstrate that water is not migrating from the cooling canal system. Turkey Point Units 6 & 7 operation will result in the discharge of stormwater to the industrial wastewater facility, which will have negligible impact on the quantity or quality of the water in the cooling canals.

As discussed in 1st Round Plant and non-Transmission Completeness Response SFWMD-B-40 (October 2009), however, there is no evidence that water from the industrial wastewater facility flows to surface waters, including Biscayne Bay. Furthermore, sound reasons were provided in SFWMD-B-40 to demonstrate that water flowing out of the industrial wastewater facility to groundwater will move down toward the base of the aquifer. There is no reason to expect that water flowing out of the industrial wastewater facility will flow back up to Biscayne Bay, or to any other surface water. As discussed in 2nd Round Response 2SFWMD-B-40(32) (April 2010), the only known groundwater exchange between Biscayne Bay and the industrial wastewater facility is from the Bay into the industrial wastewater facility. There is no hydraulic basis for expecting flow in the opposite direction.

3MDC-G-42 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

RESPONSE:

All fill material will meet the clean fill definition found in Chapter 24-5 of the MDC Code.

With respect to satisfaction of Condition 14 of the Zoning Resolution, FPL recognizes that the zoning approval is an independent authorization and that the conditions of zoning are independent requirements. FPL is committed to satisfying all conditions of zoning. FPL has met with the County and agreed to a submittal framework through which this zoning Condition, and the remainder of the conditions, will be addressed such that the County can determine the application complete and prepare an agency report addressing which conditions are satisfied and which conditions remain to be satisfied post-certification, during construction or during the operation of the Project.

Based on a meeting with MDC on June 18, 2010, FPL understands that an acceptable approach to addressing this question would be for FPL to submit an initial earthwork and materials disposal plan. The plan would include, but not be limited to, management/control practices, soil sampling protocols as necessary, avoidance of listed species (e.g. crocodile nesting habitat and ingress/egress routes), and clearly state that no wetlands will be filled for spoil storage. In addition, the plan will provide information on whether the disposal of spoil in the referenced upland locations will be permanent or temporary, expected slopes and elevations for the piles, what measures will be taken to address stormwater runoff from the spoil piles, and potential impacts to surrounding coastal wetlands.

For fill that would come from a source other than an approved quarry, the plan would include a statement that FPL will work with MDC to develop an appropriate material sampling protocol, sample the material, and obtain approval from MDC for use of the material.

2-MDC-G-42 (Second Round)

Please see comments provided in MDC-A-26.

1MDC-G-42 (First Round)

The application does not provide sufficient information to determine whether all construction operations involving earthwork, including disposal, are limited to clean fill. Further, it is not clear that disposal of materials will meet the clean fill definition in Chapter 24 as required pursuant to Condition 14 of Z-56-07. Please provide the required information necessary to demonstrate consistency with Condition 14 of Z-56-07 and Chapter 24, Miami-Dade Code. This shall include, but not be limited to

EXHIBIT 23

characterization of materials proposed for disposal to demonstrate that they are free of contaminants.

3MDC-G-44 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

In addition, FPL has not provided to the County the earthwork and materials disposal plan required pursuant to condition 7 of Z-56-07. The plan is required and shall include but not be limited to a description of how the fill material will be characterized in terms of its chemical composition, sampling methodologies proposed to be used to sample the fill material, a list of parameters proposed to be sampled, list of analytical methods including MDls and POls of the proposed analytical methods, how the materials will be stored to prevent storm water runoff from entering adjacent water bodies and wetlands. The aforementioned plan must be submitted to the County for review and approved by DERM.

Please see MDC's response MDC-A-26-1 (Third Round)

RESPONSE:

Please see Responses 3MDC-G-42 and 3MDC-A-26-1 above.

2-MDC-G-44 (Second Round)

Please see comments provided in MDC-A-26.

1-MDC-G-44 (First Round)

Proposed Spoil Areas: Please submit the earthwork and materials disposal plan required under Condition 7 of Z-56-07. The plan should include, but not be limited to plans and sketches pertaining to the proposed Spoil Areas including elevation details and slope stabilization. The applicant should also provide the management plan for listed species required under Condition 2 of Z-56-07, which should include but not be limited to identifying the plans established to protect endangered or threatened species from impacts resulting from the proposed work.

3MDC-G-45 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPl's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Please also see MDC's response MDC-A-26-1 (Third Round)

RESPONSE:

Please see Response 3MDC-26-A-1 above.

> **2-MDC-G-45 (Second Round)**
>
> **Please see comments provided in MDC-A-26.**
>
> **1-MDC-G-45 (First Round)**
>
> **The application does not include the listed species management plan, as required under Condition 2 of Z-56-07. Please provide the required plan. Pursuant to Condition 2 of Z-56-07, the plan shall include but not be limited to identification, location, and description of features such as permanent physical barriers, visual buffers, and the establishment of development setbacks necessary to prevent both direct and indirect impacts to adjacent critical habitat and disruption of sensitive behaviors such as breeding, nesting and foraging within the adjacent critical habitat.**

3MDC-G-46 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Please also see MDC's response MDC-A-26-1 (Third Round)

RESPONSE:

Please see Responses 3MDC-G-42 and 3MDC-A-26-1 above. Also, please see Response 2SFWMD-B-29(23)-1 (July 2010).

> **2-MDC-G-46 (Second Round)**
>
> **Please see comments provided in MDC-A-26.**
>
> **1-MDC-G-46 (First Round)**
>
> **The application states that muck removed from several construction sites will be stored in the spoil disposal site identified in Figure 5.1-1. It is not possible to determine from the information provided in the SCA whether the spoil disposal site meets the requirements of Chapter 24, Miami-Dade Code and the requirements of Condition 7 of Z-56-07. The applicant must provide the earthwork and spoil disposal plan required under Condition 7 of Z-56-07, which should include but not be limited to information on whether the disposal of spoil in the referenced location will be permanent or temporary, final slopes and elevations for the piles, what measures will be taken to address stormwater runoff from the spoil piles, characterization of the material including but not limited to contamination levels, potential impacts to threatened and endangered species including but not limited to potential impacts to critical habitat, and potential impacts to surrounding coastal wetlands.**

3MDC-G-47 (Third Round)

No additional information has been provided. This item remains incomplete and information previously requested must be provided to allow the County to determine whether the proposed project meets the substantive requirements of Miami-Dade County Code and the CDMP in order to prepare the reports required by 403.526 F.S. FPL's reference to a proposed plan that may be submitted to Miami-Dade County in the future to achieve compliance with the requirements of Resolution Z-56-07 is not responsive to this application completeness request. The requested information is required within the time frames prescribed in the "Fifth Revised Schedule for Review of Site Certification Application for Florida Power and Light Company's Turkey Point Units 6 & 7 Power Plant Siting App. PA03-45A3; DEP OGC Case No. 09-3107 DOAH Case No. 09-3575-EPP".

Please also see MDC's response MDC-A-26-1 (Third Round)

> **2-MDC-G-47 (Second Round)**
>
> **Please see comments provided in MDC-A-26.**
>
> **1-MDC-G-47 (First Round)**
>
> **The application states that "FPL will prepare and submit an earthwork and materials disposal plan prior to the start of construction." It is not possible to evaluate whether the spoil disposal proposed in the application meets the requirements of Chapter 24 and**

Condition 7 of Z-56-07 without evaluating the earthwork and materials disposal plan required under Condition 7 of Z-56-07. The applicant must submit the required plan.

RESPONSE:

Please see Response 3MDC-G-46 above.

EXHIBIT 23

INTRODUCTION

In response to extensive agency questions, comments and data requests in the completeness process related to operational impacts of FPL's proposed backup cooling water supply for the Project, FPL is continuing to perform additional and more refined groundwater modeling of the radial collector wells to address these completeness questions.

For purposes of the Site Certification Application (SCA), in order to be conservative, FPL modeled and included the results for the radial collector well system operating 24 hours per day, 365 days per year. However, in actuality, and as stated in the SCA, the radial collector well system is proposed as a backup cooling water supply which would be required only during periods when reclaimed water (the primary cooling water supply source) is not delivered to the Site in sufficient quality or quantity. FPL is currently conducting a reliability study to quantitatively characterize the expected reliability of the reclaimed water treatment and delivery systems to Turkey Point Units 6 & 7. The results of this study will enable a more accurate assessment of expected annual use of the radial collector well system.

The South Florida Water Management District (SFWMD) water use regulatory program recognizes that when reclaimed water is proposed as a source, a limited duration backup or secondary water supply may be authorized. FPL's West County Energy Center (WCEC) provides an example of a recently licensed power plant that uses reclaimed water as its primary water source. The WCEC certification allows withdrawals from the Floridan Aquifer for up to 90 days per year as a temporary secondary water supply source. FPL is prepared to accept a similar water use restriction for the backup water supply for Turkey Point Units 6 & 7 that would allow for operational reliability in the event that reclaimed water is not available. FPL proposes, for discussion purposes, that a durational restriction be applied to use of the radial collector wells for Turkey Point Units 6 & 7. An example of language for such a condition, based on the WCEC condition, is provided below.

"Although reclaimed water will be the primary water source for Turkey Point Units 6 & 7, there may be temporary interruptions in the delivery, quantity, or quality of reclaimed water supply to the Site. Consequently, authorizing a reliable, secondary water supply source for the Project is in the public interest. Therefore, this Certification authorizes withdrawals from the radial collector wells as a temporary secondary water supply source for up to 90 days during any calendar year."

FPL requests that Florida Department of Environmental Protection (FDEP), SFWMD, and Miami-Dade County (MDC) advise whether this type of restriction would be acceptable and allow a recommendation of approval for the radial collector wells or whether such a restriction would alter the information necessary to prepare the Project Analysis Reports pursuant to Section 403.507, Florida Statutes (F.S.).

FPL has endeavored to work with the reviewing agencies with remaining completeness questions to clarify the requests and to provide the information sought, where available. Although not stated for each 3RD Round Part B plant and non-transmission response, FPL maintains its objections to those incompleteness questions identified in the 1st and 2nd Round Part A plant and non-transmission completeness responses.

EXHIBIT 23

QUESTIONS AND RESPONSES

The City of Miami ("CITY"), still has concerns, questions, and objections after responses received from Florida Power and Light ("FPL") related to the power plant and transmission line corridor. The CITY advises that questions related to the power plant and transmission lines still remain unanswered to the satisfaction of the CITY, though counsel for FPL and the Department for Environmental Protection feel that these questions are outside the scope of the application. Thus, the CITY recommends that the application is <u>not</u> complete at this time for the following reasons.

The CITY still incorporates all its questions and issues from its Completeness filings of July 30, 2009, September 3, 2009, October 15, 2009, January 6, 2010, and April 20, 2010, and states, specifically:

A) POTABLE WATER. We have still not received enough information to assess the effects on the water supply. Per our Comprehensive plan and Part II of Florida Statutes 163, we need to address the water supply effects of the plant to our area.

RESPONSE:

FPL's first and second round responses have addressed the City's comments regarding potable water issues. The third round question essentially repeats the prior round questions without explanation as to the alleged deficiencies in the information already provided.

Further, pursuant to section 403.503(10), F.S., the purpose of "completeness" review is "to allow the department to determine whether the application provides the reviewing agencies adequate information to prepare the reports required by s. 403.507." Section 403.507, F.S., in turn, provides that local governments "<u>in whose jurisdiction</u> the proposed electrical power plant is to be located shall prepare a report as to consistency of the proposed electrical power plant with all applicable local ordinances, regulations, standards or criteria . . . ." [emphasis added]. The proposed electrical power plant is not within the jurisdiction of the City of Miami, and the city has no applicable regulations or authority that it can exert through its comprehensive plan or chapter 163, F.S., over the proposed electrical power plant over facilities to be constructed outside of its geographical boundaries. As such, the information requested by the City is not necessary for the City to prepare its agency report as to the plant and non-transmission portion of the SCA and, therefore, are outside the statutory scope of completeness review.

For these reasons, in accord with FDEP's direction in its Third Determination of Incompleteness regarding the power plant and non-transmission line portion of the SCA that FPL is not required to respond to questions "that go beyond the statutory purpose for completeness review," FPL respectfully declines to provide any further technical response to this question.

B) DEWATERING. Sufficient information is not provided to make a determination of dewatering impacts. Please provide a description of all required dewatering activities and the techniques that will be used to ensure that all surface and groundwater quality standards will be met. We have still not received enough information to assess the effects. Per our Comprehensive plan and Part II of Florida Statutes 163, we need to address the water supply effects of the plant to our area.

RESPONSE:

EXHIBIT 23

FPL's first and second round responses have addressed the City's comments regarding dewatering water issues. The third round question essentially repeats the prior round questions without explanation as to the alleged deficiencies in the information already provided.

Further, pursuant to section 403.503(10), F.S., the purpose of "completeness" review is "to allow the department to determine whether the application provides the reviewing agencies adequate information to prepare the reports required by s. 403.507." Section 403.507, F.S., in turn, provides that local governments "in whose jurisdiction the proposed electrical power plant is to be located shall prepare a report as to consistency of the proposed electrical power plant with all applicable local ordinances, regulations, standards or criteria . . . ." [emphasis added]. The proposed electrical power plant is not within the jurisdiction of the City of Miami, and the City has no applicable regulations or authority that it can exert through its comprehensive plan or chapter 163, F.S., over the proposed electrical power plant over facilities to be constructed outside of its geographical boundaries. As such, the information requested by the City is not necessary for the City to prepare its agency report as to the plant and non-transmission portion of the SCA and, therefore, are outside the statutory scope of completeness review.

For these reasons, in accord with FDEP's direction in its Third Determination of Incompleteness regarding the power plant and non-transmission line portion of the SCA that FPL is not required to respond to questions "that go beyond the statutory purpose for completeness review," FPL respectfully declines to provide any further technical response to this question.

C) WASTEWATER. Will the plant cause wastewater to drain into our Biscayne Bay? We have still not received enough information to assess the effects of wastewater to the Bay. Per our Comprehensive plan and Part II of Florida Statutes 163, we are entitled to this information.

RESPONSE:

FPL's first and second round responses have addressed the City's comments regarding wastewater issues, including, among others, response 2COM-C-4, related to concerns regarding affects on Biscayne Bay. The third round question does not provide explanation as to any deficiencies in the information already provided.

Further, pursuant to section 403.503(10), F.S., the purpose of "completeness" review is "to allow the department to determine whether the application provides the reviewing agencies adequate information to prepare the reports required by s. 403.507." Section 403.507, F.S., in turn, provides that local governments "in whose jurisdiction the proposed electrical power plant is to be located shall prepare a report as to consistency of the proposed electrical power plant with all applicable local ordinances, regulations, standards or criteria . . . ." [emphasis added]. The proposed electrical power plant is not within the jurisdiction of the City of Miami, and the City has no applicable regulations or authority that it can exert through its comprehensive plan or chapter 163, F.S., over the proposed electrical power plant over facilities to be constructed outside of its geographical boundaries. As such, the information requested by the City is not necessary for the City to prepare its agency report as to the plant and non-transmission portion of the SCA and, therefore, are outside the statutory scope of completeness review.

EXHIBIT 23

For these reasons, in accord with FDEP's direction in its Third Determination of Incompleteness regarding the power plant and non-transmission line portion of the SCA that FPL is not required to respond to questions "that go beyond the statutory purpose for completeness review," FPL respectfully declines to provide any further technical response to this question.

D) VEGETATIVE AND ECOLOGICAL IMPACTS. Impacts to submerged aquatic vegetation and marine mammals, such as the manatees and birds and other animals that live close to the plant. How will the plant affect those creatures and plant species? How will that affect the ecological balance of animals that migrate toward the City, via water or land?

RESPONSE:

FPL's first and second round responses have addressed the City's questions regarding vegetative issues. The third round question has inappropriately expanded the scope of this comment.

Further, pursuant to section 403.503(10), F.S., the purpose of "completeness" review is "to allow the department to determine whether the application provides the reviewing agencies adequate information to prepare the reports required by s. 403.507." Section 403.507, F.S., in turn, provides that local governments "in whose jurisdiction the proposed electrical power plant is to be located shall prepare a report as to consistency of the proposed electrical power plant with all applicable local ordinances, regulations, standards or criteria . . . ." [emphasis added]. The proposed electrical power plant is not within the jurisdiction of the City of Miami, and theCity has no applicable regulations or authority that it can exert through its comprehensive plan or chapter 163, F.S., over the proposed electrical power plant over facilities to be constructed outside of its geographical boundaries. As such, the information requested by the City is not necessary for the City to prepare its agency report as to the plant and non-transmission portion of the SCA and, therefore, are outside the statutory scope of completeness review.

For these reasons, in accord with FDEP's direction in its Third Determination of Incompleteness regarding the power plant and non-transmission line portion of the SCA that FPL is not required to respond to questions "that go beyond the statutory purpose for completeness review," FPL respectfully declines to provide any further technical response to this question.

E) GENERAL. The application does not address biological, hydrological, and ecological impacts resulting from its construction and operation. There is not enough information presented as to the effects of the plant itself to the environment.

RESPONSE:

FPL's first and second round responses have addressed the City's questions regarding biological, hydrological and ecological issues resulting from road construction and operation. The third round question has inappropriately expanded the scope of the comment.

Further, pursuant to section 403.503(10), F.S., the purpose of "completeness" review is "to allow the department to determine whether the application provides the reviewing agencies adequate information to prepare the reports required by s. 403.507." Section 403.507, F.S., in turn, provides that local governments "in whose jurisdiction the proposed electrical power plant is to be located shall prepare a report as to consistency of the proposed electrical power plant with all applicable local ordinances, regulations, standards or criteria . . . ." (emphasis added). The proposed electrical power

EXHIBIT 23

plant is not within the jurisdiction of the City of Miami, and the City has no applicable regulations or authority that it can exert through its comprehensive plan or chapter 163, F.S., over the proposed electrical power plant over facilities to be constructed outside of its geographical boundaries. As such, the information requested by the City is not necessary for the City to prepare its agency report as to the plant and non-transmission portion of the SCA and, therefore, are outside the statutory scope of completeness review.

For these reasons, in accord with FDEP's direction in its Third Determination of Incompleteness regarding the power plant and non-transmission line portion of the SCA that FPL is not required to respond to questions "that go beyond the statutory purpose for completeness review," FPL respectfully declines to provide any further technical response to this question.

F) GROUND STUDIES. Please provide analysis to support the conclusion that the Biscayne Aquifer is not affected by the radial collector wells. . This is of great importance to the City and Countywide pursuant to our Comprehensive plan and per Part II of Florida Statutes 163, as it may affect the potable water.

RESPONSE:

FPL's first and second round responses have addressed the City's comments regarding the radial collector wells. The third round question essentially repeats the prior round questions without explanation as to the alleged deficiencies in the information already provided.

Further, pursuant to section 403.503(10), F.S., the purpose of "completeness" review is "to allow the department to determine whether the application provides the reviewing agencies adequate information to prepare the reports required by s. 403.507." Section 403.507, F.S., in turn, provides that local governments "<u>in whose jurisdiction</u> the proposed electrical power plant is to be located shall prepare a report as to consistency of the proposed electrical power plant with all applicable local ordinances, regulations, standards or criteria . . . ." [emphasis added]. The proposed electrical power plant is not within the jurisdiction of the City of Miami, and the City has no applicable regulations or authority that it can exert through its comprehensive plan or chapter 163, F.S., over the proposed electrical power plant over facilities to be constructed outside of its geographical boundaries. As such, the information requested by the City is not necessary for the City to prepare its agency report as to the plant and non-transmission portion of the SCA and, therefore, are outside the statutory scope of completeness review.

For these reasons, in accord with FDEP's direction in its Third Determination of Incompleteness regarding the power plant and non-transmission line portion of the SCA that FPL is not required to respond to questions "that go beyond the statutory purpose for completeness review," FPL respectfully declines to provide any further technical response to this question.

H) If the construction portion of the Plant has been suspended, the City would request that all applications associated with the plant be suspended as well in the interest of judicial economy. More information as to the status of construction is requested.

RESPONSE:

The construction of the Project has not been suspended. FPL remains committed to creating an option to build clean and cost-effective generation for its customers. FPL continues to pursue the necessary

EXHIBIT 23

federal, state, and local licenses and permits while also monitoring the economic and regulatory environment. FPL will employ a deliberate, stepwise process throughout as the most effective way to manage the pace and position of the project. A decision on construction would occur after state and federal licensing of the proposed facility is completed and all approvals issued.

The CITY establishes with the foregoing that FPL's Siting Certification Application is still incomplete. The CITY is unable to properly evaluate the impact the proposed transmission line corridor and plant will have upon the CITY, based on the information received thus far. The CITY requests that FPL provide additional information and materials.

EXHIBIT 23

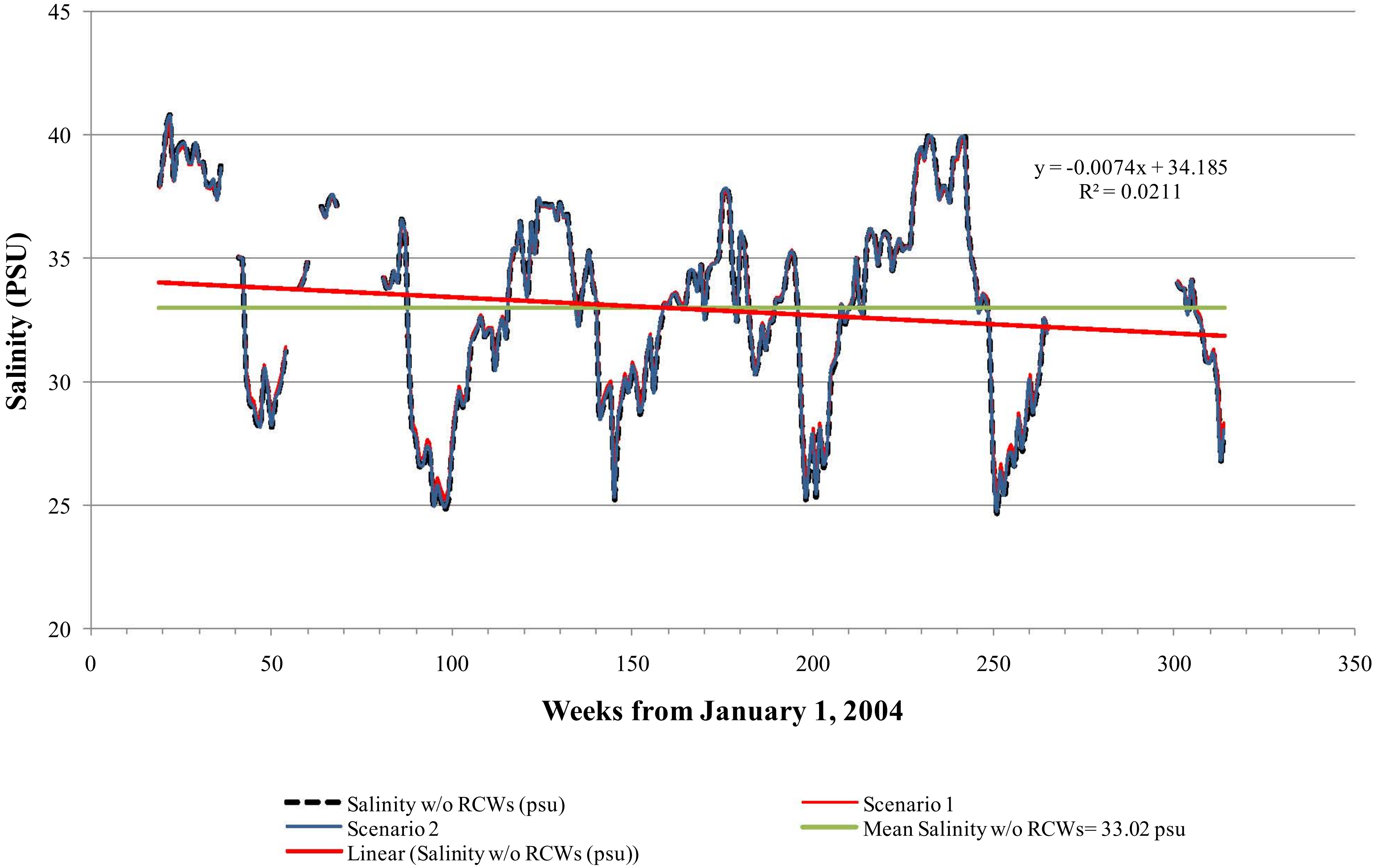


Figure 3FDEP-VI(CAMA)-6-1
Time History Plot – BNP Site 12 Bottom – Weekly Average Salinity, 2004-2009

Figure 3FDEP-VI(CAMA)-6-1.docx

Source: Golder, 2010.

FPL

EXHIBIT 23

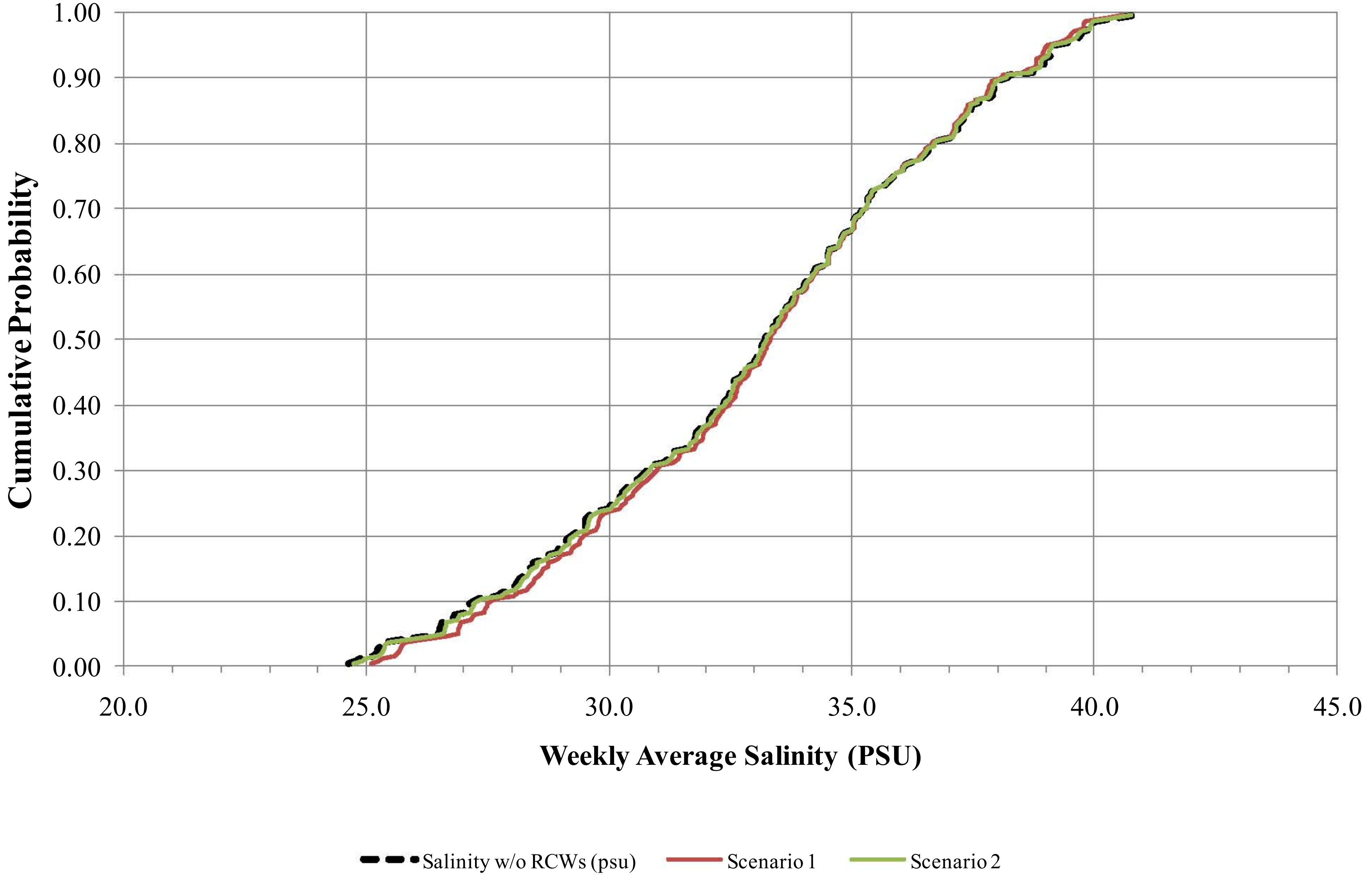


Figure 3FDEP-VI(CAMA)-6-2
Cumulative Probability of Salinity – BNP Site 12 Bottom

Figure 3FDEP-VI(CAMA)-6-2.docx

Source: Golder, 2010.

FPL.

EXHIBIT 23

DUE TO VARIOUS FILE TYPES OTHER THAN PDF,

THE ATTACHMENTS TO THE FPL RESPONSES

HAVE BEEN INCLUDED SEPARATELY ON THIS CD.

Environmental Impacts of the Annual Agricultural Drawdown in Southern Miami-Dade County

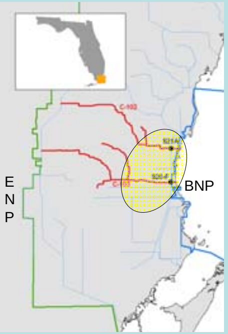
E.J. Kearns[1], A. Renshaw[1], and S. Bellmund[2]
[1]South Florida Natural Resource Center, Everglades National Park, 950 N. Krome Ave, Homestead, FL
[2]Biscayne National Park, 9700 SW 328 St, Homestead, FL 33033
amy_renshaw@nps.gov

Introduction to Biscayne Bay

Biscayne Bay is located on the southeastern coast of Florida. Prior to urban development, Biscayne Bay had an estuarine environment, and was a nursery ground for a variety of fish and invertebrates The bay supported many active fisheries under these conditions, including shrimp, blue crabs, and many different species of fish.

Urbanization and accompanying water management practices have changed the physical characteristics of the bay, which has substantially altered the ecology throughout Biscayne Bay.

The natural system of numerous small creeks that drained through the coastal ridge to the Bay have been gradually replaced by manmade canals. There are now 8 major drainage canals that discharge into Central and Southern Biscayne Bay. These canals drain both urban and agricultural areas, and are the only major source of freshwater to the Bay. Groundwater discharges are kept small by active management of stages in the urban area. Discharge form these canals occurs primarily during the wet season (June-October). There is currently very little discharge during the dry season, allowing marine and hypersaline conditions to dominate for half of the year.



What is the "annual agricultural drawdown"?

Farmers in Southern Miami-Dade County have a long and successful history of farming in the coastal prairies and shallow sloughs of the area. In the East Glades, defined as the area south and east of the coastal ridge and west of Biscayne Bay, row crop production of potatoes, tomatoes, and corn stretches back to the early 1900s. The local drainage canals built by the farmers were enhanced and connected to the Central & South Florida water management system in the 1960's.

A common practice at the end of the rainy season was to rapidly lower groundwater levels throughout Southern Miami-Dade County via the drainage canals so that crops could be planted sooner in the now dry marl soils of the East Glades. The modern discussion of this drawdown amongst water managers dates back to at least 1981 (SFWMD Governing Board minutes, 1981), and the practice was institutionalized soon thereafter (SFWMD Structure Book). Currently, the canal stages are lowered in three coastal canals by 0.8 ft below nominal rainy season limits starting on October 15, and after Dec 30 are held 0.4 ft below rainy season groundwater levels until Apr 30.

The agricultural drawdown has contributed to the chronic damage to the ecology of Biscayne Bay by suddenly reducing the already limited groundwater flows to the bay, rapidly inducing marine and hypersaline conditions in the estuary. At a time when row crop production has largely given way to horticulture and suburban developments, managers may wish to re-evaluate this practice in light of the changing agricultural landscape, increasing urban water demands, droughts, and the ongoing state and federal restoration efforts in the area.

EXHIBIT 24

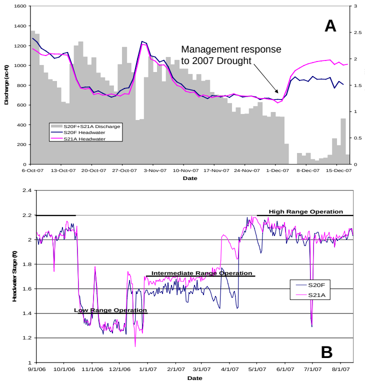


Figure A (top) and **Figure B** (bottom): time series of groundwater level and canal discharge from S20F and S21A

Figure C (bottom): the surface elevation in Miami-Dade as derived from a LIDAR survey. The East Glades (circled) are located in the coastal plain under the coastal ridge.

How much water is being released to lower the water table during the Agricultural Drawdown?

63,000 ac-ft
21 billion gallons
8×10^7 m^3

is the average amount that is annually discharged during the early agricultural drawdown period (October 15- Dec 30) from S-20F on C-103 and S-21A on C-102. In the discharge volume table below, blue highlights indicate wet years, red highlights indicate dry years.

Year	S20-F (ac-ft)	S21A (ac-ft)	Total (ac-ft)
1995	59,272	25,032	84,304
1996	36,797	13,077	49,874
1997	29,295	16,114	45,408
1998	33,712	17,361	51,072
1999	56,778	42,200	98,978
2000	39,389	23,442	62,831
2001	46,387	34,607	80,994
2002	47,328	19,228	66,555
2003	46,534	24,737	71,271
2004	43,400	28,432	71,832
2005	29,255	20,985	50,241
2006	29,781	15,364	45,146
2007	30,007	15,058	45,065
Average	40,610	22,741	63,352

What are the nearby impacts of this drawdown activity?

1. **Contributes to loss of estuarine habitat & function via poor timing of freshwater input**
   - **Poor habitat for pink shrimp, juvenile seatrout, redfish, snook, etc. (Figure G)**
   - **Promotes salinities at marine or higher levels (Figure E) that hurt juveniles & allow marine predators inshore**
2. **Removes protection against saltwater intrusion into the Biscayne Aquifer in the region**
   - **Lowering groundwater when sea levels are at their seasonal maximum enhances intrusion (Figure H)**
3. **Loss of freshwater storage in the Biscayne Aquifer**
   - **Longer residence time would provide for consumptive uses and flow to the bay further into the dry season**

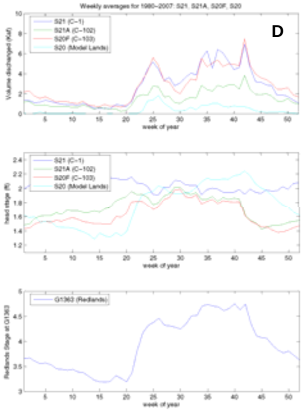
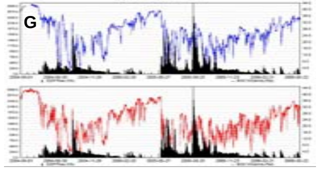


Figure D: (left) A 27 year average of discharges (top) and stages (middle) at the coastal flow control structures, and the groundwater stage (bottom) in the Redlands (western Miami-Dade). S-20 and S-21 are typically not operated under seasonal Ag drawdown rules.

Figure G: (right) Sites BISC 14 and BISC 16 show the same pattern in 2004 and 2005 years. Lowest monthly salinity is in October (12.21-16.17). Highest salinity in May/June (32.08-38.04).



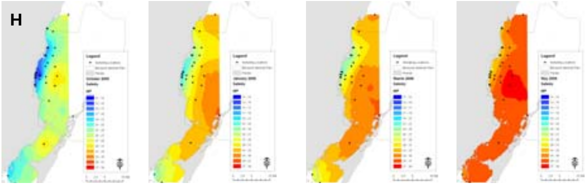


Figure H: (top) Oct 2005 – Nearshore Biscayne Bay has salinity <15ppt due to Late wet season conditions, Ag drawdown discharges (9,740 ac-ft). (left center) Jan 2006 – Only small area on western shoreline remains <20ppt. (right center) March 2006 – All areas are >20ppt. (right) May 2006 – Only very small area remains <30ppt.

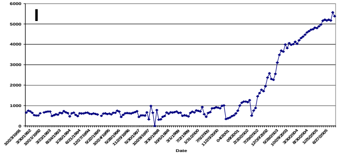


Figure I: (top) The increase in chlorides in a well (G-1264) just south of the East Glades agricultural area, which is typical of the effects of salt water intrusion which is induced by inadequate groundwater levels.

Figure K: (bottom) Restoration features of Alternative O. The effectiveness of many of these features will be impaired by the agricultural drawdown.

Figure J: (right): the statistical correlation between groundwater levels and stage at S-20F on C-103.

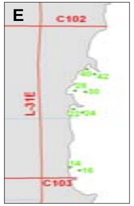
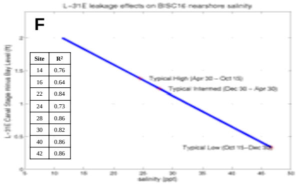


Figure E: (top) Location of salinity monitoring sites and L-31E canal used in the study.



Site	R²
14	0.76
16	0.64
22	0.84
24	0.73
28	0.86
30	0.82
40	0.86
42	0.86

Figure F: (top right) The relationship between nearshore salinity and the head difference from groundwater and bay from 2004-2006 was derived from a least-squares fit (inset) to field data (Fig E). The loss of head cuts off freshwater flows to the bay from groundwater and canals.

Can Management Practices Be Modified to Benefit Both Agriculture and the Natural System ?

In agricultural areas closer to Lake O, farmers use pumps to drain their fields into nearby canals instead of managing the entire water table to provide adequate drainage. Management includes the use of 6 stormwater treatment areas (STAs) that passively treat agricultural runoff before it is released into natural areas. Could such a scheme be an acceptable alternative to annually draining 21 billion gallons of water from 53,000 acres of the county to the benefit of less than 2,000 acres of agricultural land?

Goals of such management modifications:

- **A more natural ground water recession rate to promote a longer wet season**
- **Longer wet season conditions promote estuarine and wetland function**
- **Estuarine species can become re-established in S Biscayne Bay**

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

EXHIBIT 25

Miami-Dade Canal Agricultural Drawdown Study

February 12, 2008 Governing Board

Dewey Worth – Restoration Planning Division, Everglades Restoration

EXHIBIT 25

Agricultural Drawdown Area in Miami-Dade County

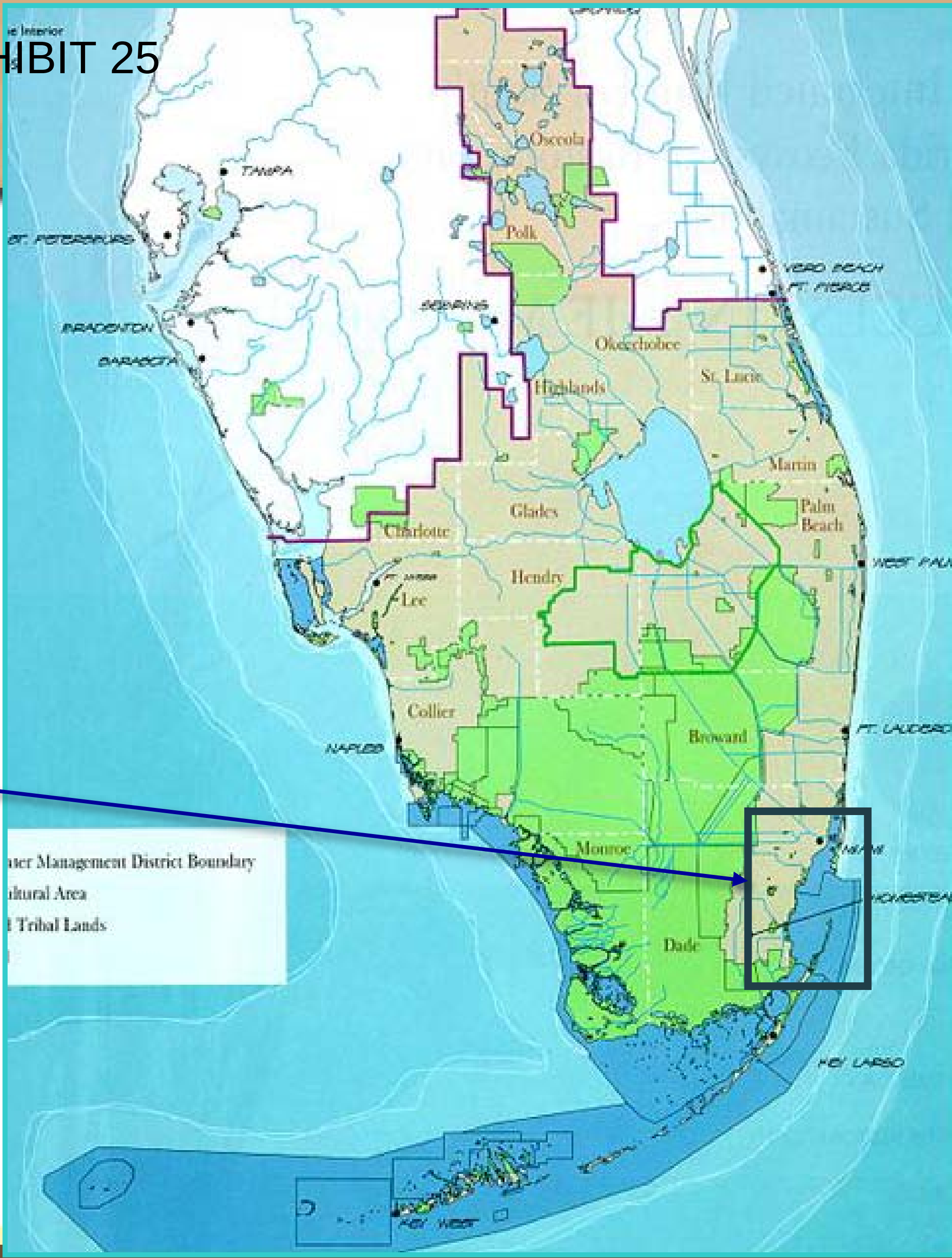


EXHIBIT 25

Farming and Water Management History

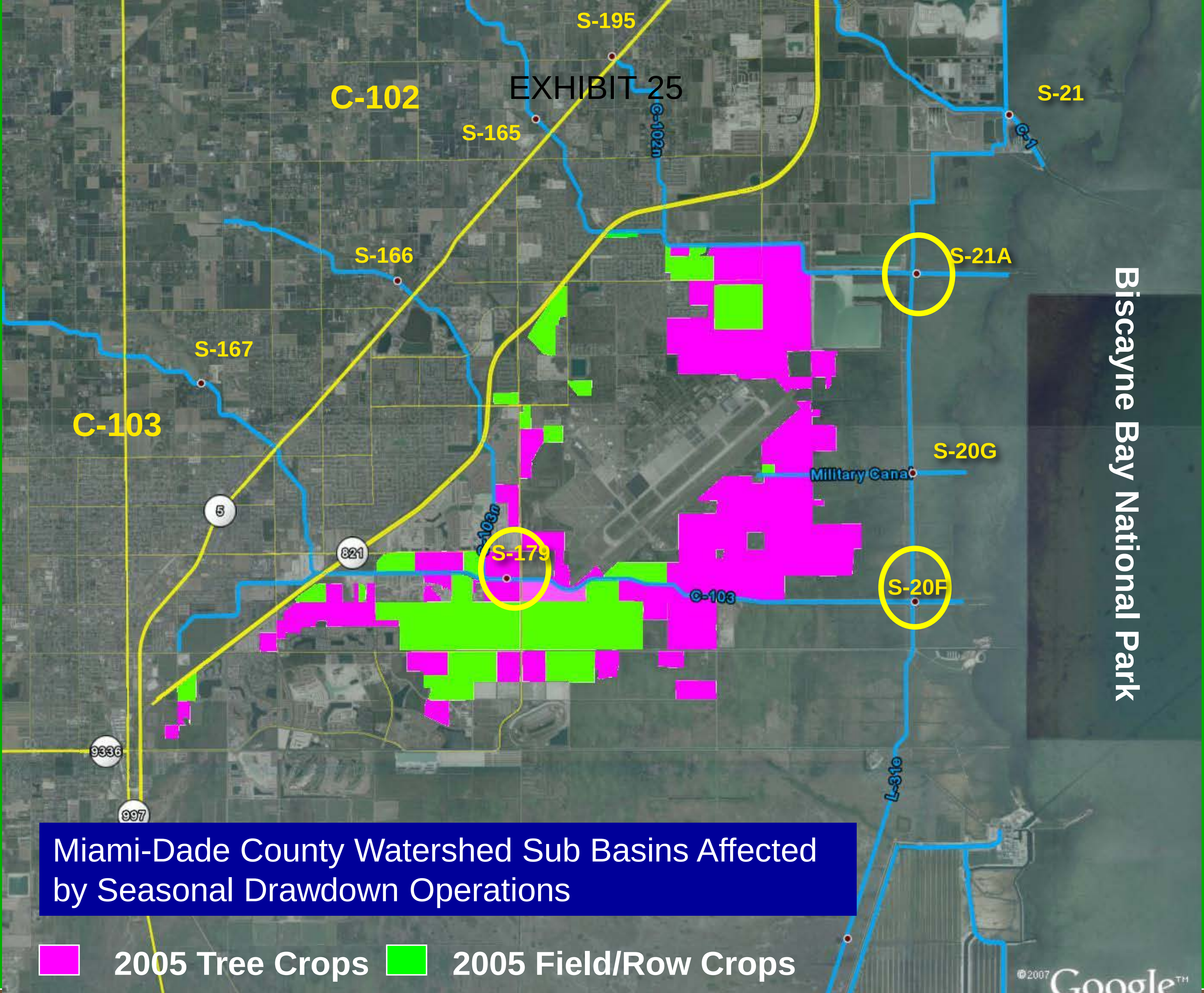
- **Extensive farming began in 1900s when local farmers dug and maintained local drainage canals**
- **Canals expanded and upgraded by C&SF project in 1960s to aid economic output of agriculture and commerce**
- **Common practice is to lower water levels at beginning of dry season**
- **This practice has been acknowledged since 1981 by SFWMD**

"Governing Board gave no guarantee for flood protection – operate system to minimize impacts"

EXHIBIT 25

Region impacted by agricultural drawdown

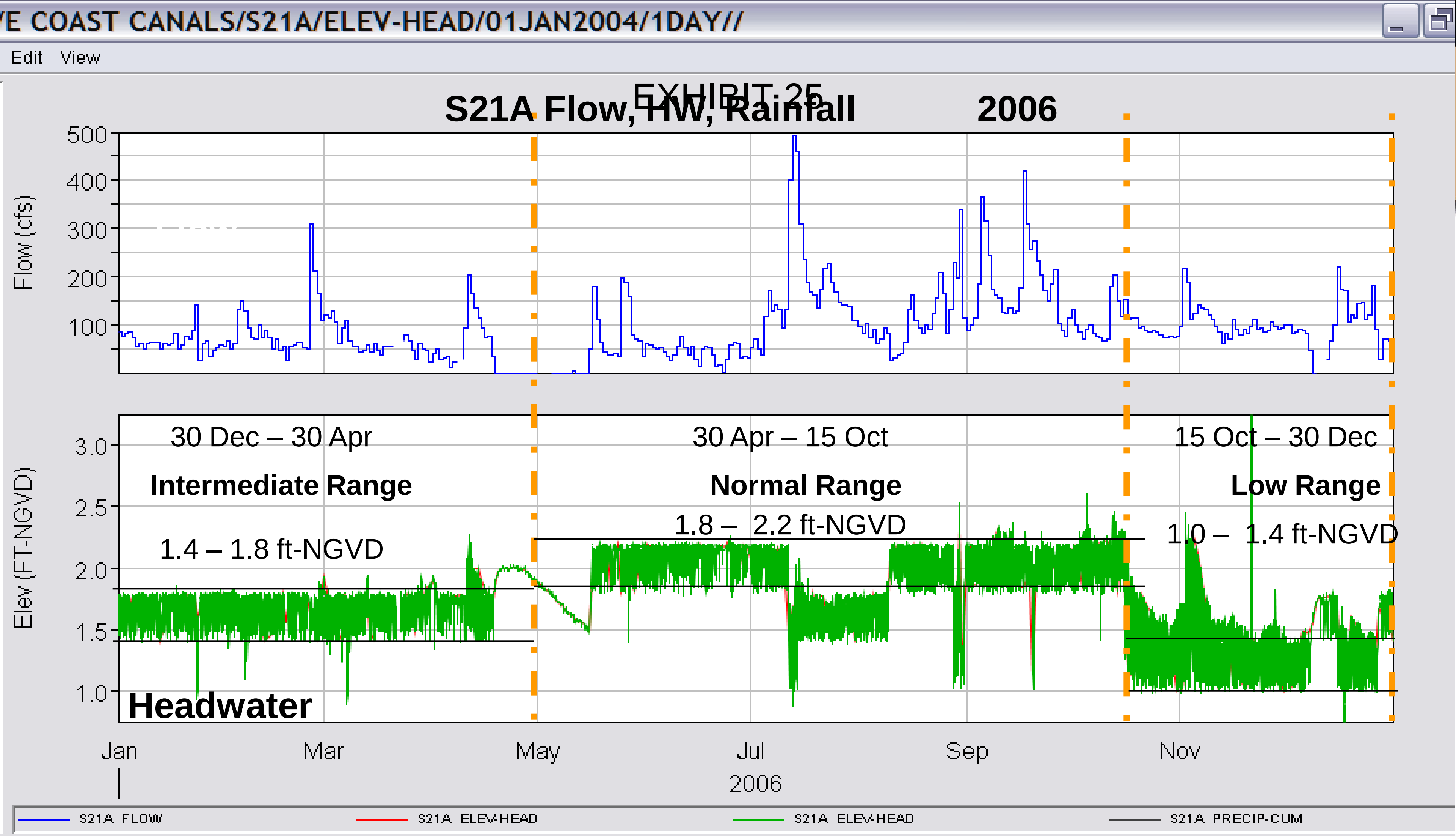
EXHIBIT 25



Miami-Dade County Watershed Sub Basins Affected by Seasonal Drawdown Operations

EXHIBIT 25

S21A Flow, HW, Rainfall 2006



30 Dec – 30 Apr

Intermediate Range

1.4 – 1.8 ft-NGVD

30 Apr – 15 Oct

Normal Range

1.8 – 2.2 ft-NGVD

15 Oct – 30 Dec

Low Range

1.0 – 1.4 ft-NGVD

Three modes of operation based on field conditions and agriculture:

- **Normal Range Operation (April 30th to October 15th)**
- **Intermediate Range Operation (December 30th to April 30th)**
- **Low Range Operation (October 15th to December 30th)**

EXHIBIT 25

Drawdown Impacts to Biscayne Bay

- Lowering canal levels at the start of the dry season releases water to Biscayne Bay at the wrong time
- Biscayne National Park estimates 63,000 acre-feet annually (average) lost that could provide dry season groundwater flow
- Biscayne Bay often experiences high salinities later in the dry season which this water could help mitigate

EXHIBIT 25

Stakeholder Issues Discussed at WRAC

- Biscayne Bay Coastal Wetlands Project recommends eliminating the drawdown practice (part of phase 2 plan) – provides significant environmental benefits
- Farming intensity has diminished and crop types have changed from historical
- Conversion of crop lands to urban development
- Farming still active part of local economy and practice still needed

EXHIBIT 25

Other Emerging Issues

- Increased evidence of regional salt water intrusion within the Biscayne Aquifer
- Increased mining activity that could accelerate mixing of surface water and salt-intruded aquifers
- Florida Power and Light expanded power facility at Turkey Point and affect on regional water resources
- Proximity of wellfields to saltwater intrusion line and future wellfield sustainability

EXHIBIT 25

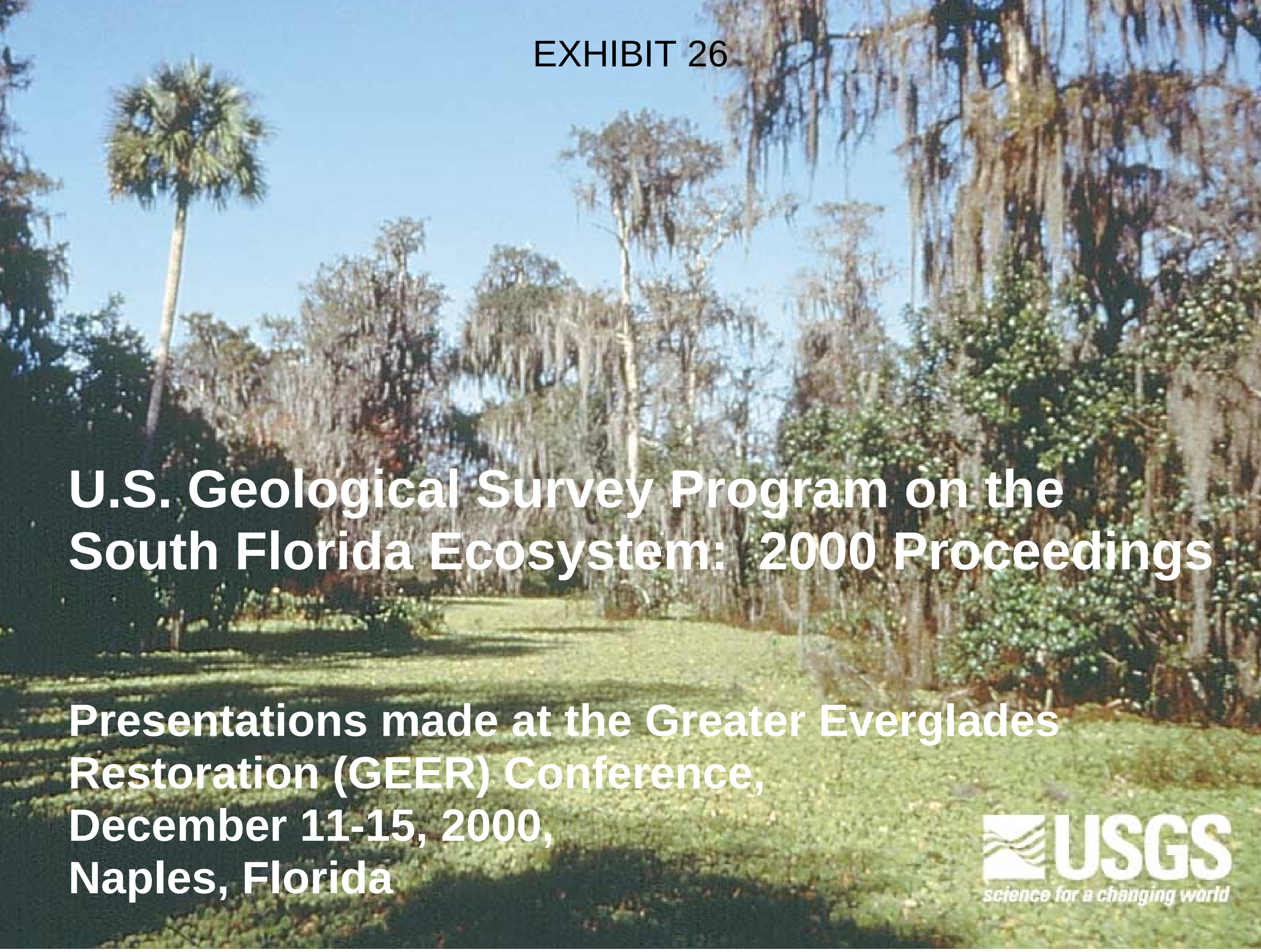
Agricultural Drawdown Study

- Fact-finding effort
- Work with local agricultural representatives to identify drawdown practices and future needs
- Identify temporary opportunities to change seasonal practice in the short term
- Identify potential operational or structural improvements to lessen water losses and address other water resource needs throughout the basin

EXHIBIT 25

Questions

EXHIBIT 26



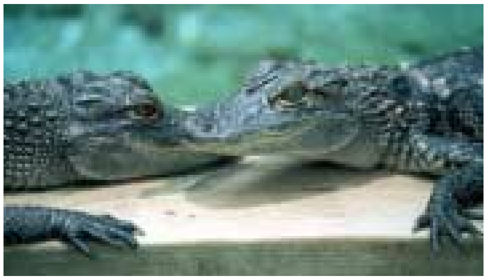
U.S. Geological Survey Program on the South Florida Ecosystem: 2000 Proceedings

Presentations made at the Greater Everglades Restoration (GEER) Conference,
December 11-15, 2000,
Naples, Florida

USGS
science for a changing world

U.S. Geological Survey

Open-File Report 00-449



Hosted by
The Science
Coordination Team

a committee of the
SOUTH FLORIDA
ECOSYSTEM RESTORATION
TASK FORCE AND
WORKING GROUP

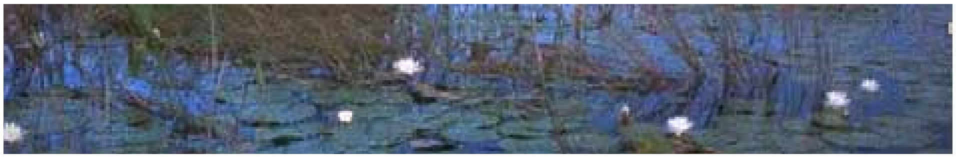


EXHIBIT 26

Photographs:

Photographs and images used in this report are from projects and studies performed by the U.S. Geological Survey, South Florida Ecosystem Program, and the Florida Caribbean Science Center.

EXHIBIT 26

U.S. Geological Survey Program on the South Florida Ecosystem: 2000 Proceedings

Presentations made at the Greater Everglades Ecosystem Restoration (GEER) Conference, December 11-15, 2000, Naples, Florida

---

Compiled by Jane R. Eggleston, Teresa L. Embry, Robert H. Mooney, Leslie Wedderburn, Carl R. Goodwin, Heather S. Henkel, Kathleen M.H. Pegram, and Tracy J. Enright

Under the direction of
Aaron L. Higer,
U.S. Geological Survey
South Florida Ecosystem Coordinator

U.S. GEOLOGICAL SURVEY
Open-File Report 00-449

Hosted by:

The Science Coordination Team

a committee of the

SOUTH FLORIDA ECOSYSTEM RESTORATION

TASK FORCE AND WORKING GROUP

Tallahassee, Florida
2001

EXHIBIT 26

U.S. DEPARTMENT OF THE INTERIOR
GALE A. NORTON, Secretary

U.S. GEOLOGICAL SURVEY
CHARLES G. GROAT, Director

This second printing of Open-File Report 00-449 contains revisions not reflected in original printing of 2000.

For additional information
write to:

District Chief
U.S. Geological Survey
Suite 3015
227 N. Bronough Street
Tallahassee, FL 32301

Copies of this report can be
purchased from:

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, CO 80225-0286
888-ASK-USGS

Additional information about water resources in Florida is available on the World Wide Web at http://sofia.usgs.gov.

EXHIBIT 26

Computer Simulation Modeling of Intermediate Trophic Levels for Across Trophic Level Systems Simulation of the Everglades/ Big Cypress Region

By Michael S. Gaines

Department of Biology, University of Miami

The project has three primary components: (1) modeling of the snail kite population in Florida; (2) modeling of wading bird populations in the Everglades; and (3) modeling of the reptile and amphibian food web in the Everglades.

Snail kite modeling: The snail kite is a raptor whose distribution in the United States is limited to the freshwater marshes of southern and central Florida, including the Everglades. The snail kite is listed as an endangered species in the United States. Although its numbers have appeared to increase in recent years, total population size is probably still below 2000. Because of its endangered status, the snail kite is among the species being given specific attention in the ongoing Everglades restoration project (Bennetts and others, 1994, Davis and Ogden 1994). It is the objective of this work to develop an individual-based, spatially-explicit model of the snail kite population that includes the response of the snail kite population, both in its spatial patterns and its survival to drought conditions. The model is being applied to both historical data on the spatial pattern of water levels throughout the snail kite's range as well as the pattern of water levels projected from models for changed water regulation conditions.

The spatial structure of the model consists of several disjunct habitat areas, which we will refer to as wetland habitat sites. Following Bennetts and Kitchens (1996), fourteen major wetlands in southern and central Florida were identified as suitable snail kite habitat: Everglades National Park, Big Cypress National Preserve, Water Conservation Areas 3A, 3B, 2A, 2B, and 1 (Loxahatchee National Wildlife Refuge Preserve), Loxahatchee Slough, Holey Land Wildlife Management Area, Lake Okeechobee, Upper Saint John's Marsh, Lake Kissimmee, Kissimmee Chain of Lakes, Lake Tohopekaliga, and East Lake Tohopekaliga. A fifteenth habitat area was added to the model, representing the scattered pieces of peripheral habitat in the agricultural areas, as a refugium for the kites during a system-wide drought.

The hydrology of individual wetland habitat sites in particular years is critically important to whether that site can be used for nesting by snail kites. Their sole food supply, apple snails, die or become unavailable when a site becomes dry. After drydown, a particular site may not be good habitat for a few years, until the apple snail population recovers. For purposes of modeling, the water levels in each wetland habitat site can be defined by a historical record estimated from a single water gauge near the core habitat of the snail kites on the wetland site, or these water levels can be produced from hydrologic models applied to forecast future water levels under different water regulation conditions. Each modeled kite goes through a fixed set of life stages. These life stages affect the probabilities with which the demographic processes of breeding, movement, and mortality occur. Each individual kite is simulated in the model on a weekly basis. Figure 1 shows sample model predictions of the relative effects of different hydrologic scenarios on the growth rates of the snail kite in a particular wetland over the 31-year period.

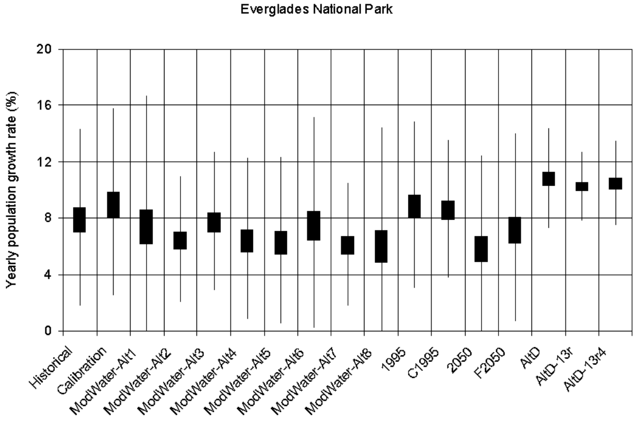


Figure 1. Output of the ATLSS snail kite model. The output compares the mean annual growth rate of the snail kite population in one particular breeding site, Everglades National Park, under a number of different water regulation scenarios.

EXHIBIT 26

Wading bird modeling: The purpose of the wading bird model is to investigate the dynamics of colonies and nesting success in relation to different hydrologic scenarios and the resulting spatial and temporal distribution of their prey. The model uses an individual-based approach and simulates the activities of potential nesting adults for a period of time immediately preceding the formation of a nesting colony and then through the entire nesting season. The model will enable wading bird ecologists to assess the effects of changes in the volume, timing, and spatial distribution of water flows on wading bird colonies sited at various locations in the Everglades.

Each individual wading bird in the model is described by a set of species-specific rules that govern their behavioral activities. A model wading bird does not operate on a fixed time scale, because its behavioral activities are of different duration. Instead, the wading bird model uses an event-driven approach, in which each bird sets its own time scales depending on its current activities. In its current version, the wading bird model operates on spatial grid of 500 m x 500 m grid cells.

Decisions made by the birds are guided by various constraints. Each bird must meet its energy demand during each day. If it can not meet this requirement, the bird is assumed to have died or left the system and is removed from the simulation. Colony formation, courtship, nesting, and egg laying are also determined by energetic constraints. The model assumes that nesting will only start if females have acquired sufficient energy reserves to produce eggs. Unless female birds can meet these demands, nesting will not start. Colony formation and nesting is therefore directly tied to the availability of prey and the ability of the birds to obtain enough food in close proximity to their potential colony site.

The model keeps track of colony sizes and the number of nesting adults as well as the number of successfully fledged nestlings after the breeding season is over. Because energetic constraints drive most of their activities, in particular the onset and timing of nesting, different environmental conditions will lead to varying reproductive behavior and recruitment of young wading birds into the population.

Reptilian and amphibian modeling: The herpetological assemblage may play a vital role in sustaining a number of trophic groups and species in the Everglades. The American alligator, an important top predator in the region and a major concern of the Everglades restoration effort, is a good example. A recent study in the central Everglades indicated that reptiles and amphibians make up to 65 percent, on average, of adult alligator diets. In addition, wading birds, raptors, arthropods, mammals, and fish also prey on members of the assemblage. Given the importance of reptiles and amphibians to the freshwater aquatic ecosystems in the Everglades, an estimate was developed of the amount of biomass the assemblage produces that could be available to higher predators, given the internal feeding dynamics between assemblage members, and energetic constraints.

Food web structures were constructed consisting of nine functional groups for each of three general habitat types based on stomach content analyses. Estimates were made of energy gains and losses (fluxes) for each functional group. The model was parameterized using estimates derived from field data and the literature. Linear Programming was used to solve for a better set of estimates of the fluxes, given conditions of mass balance and constraints set by the initially estimated values. Critical to the model were choices of: (1) the relevant natural history of the assemblage and modeling considerations; (2) the choice of three habitat types; (3) decisions for lumping species into functional groups; (4) the mathematical relationships describing energy flow; (5) the linear programming models; and (6) parameter estimation.

Crocodile modeling and empirical work: The American crocodile individual-based model has been developed within the a modeling platform developed at the Netherlands Institute of Ecology (OSIRIS) framework. The purpose of the model is to predict how the American crocodile population will respond to alterations in freshwater flow into the estuary habitat. In the working version of the model individuals grow, interact, breed and suffer mortality dependent upon a static hypothetical landscape, salinity, and interactions with other crocodiles. The most recent work has focused on creating a dynamic landscape dependent upon freshwater input. In support of this modeling effort, the American crocodile radio-tracking project seeks to test for salinity effects upon hatchlings. Based on the literature, it is expected that hatchlings would prefer freshwater and would lose weight in hypersaline habitats.

EXHIBIT 26

The population of American crocodiles is being modeled using a spatially-explicit individual-based approach from the estuary areas of south Florida. The model imports an initial estuary landscape and then runs hypothetical water delivery scenarios which can alter the dominate vegetation types and salinity levels. Figure 2 shows the body condition of a model crocodile hatchling under different salinity conditions due to differences in rainfall for different years. Other work involves model parameterization, which is currently focused on fitting growth data to available models and acquisition of hatchling movement and survivorship data via radio-tracking. During the summer of 1999 11 radio-transmitters were placed on hatchling American crocodiles at the Florida Power and Light Company's Turkey Point Power Plant. Of these, 5 individuals were successfully tracked for up to 82 days in both the hypersaline cooling canal system and in surrounding freshwater and low saline habitats.

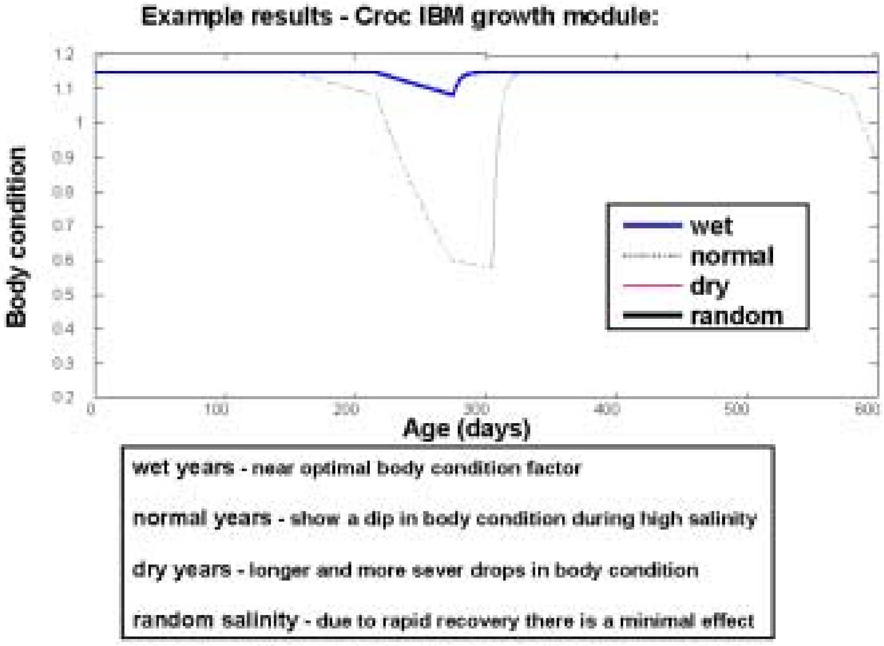


Figure 2. Output from individual-based model of American crocodile. Body condition of a particular crocodile is shown as a function of age under different environmental conditions.

EXHIBIT 27

South Florida Business Journal - July 29, 2010
/southflorida/stories/2010/07/26/daily47.html

South Florida
BUSINESS JOURNAL

Thursday, July 29, 2010

RealtyTrac: Florida a foreclosure leader

South Florida Business Journal

Florida led the way with nine of the top 20 metro foreclosure rates in the country, according to **RealtyTrac**'s June and midyear metro foreclosure reports.

More properties received a foreclosure filing in South Florida during the first half of the year than any other metro area with a population of 200,000 or more, according to RealtyTrac data.

There were 94,466 properties in the metro area that received a foreclosure filing between January and June 2010. That translated to one in every 26 homes. And while that was down 8 percent from the previous six months, it was up nearly 11 percent from the first six months of 2009.

Statewide, the Cape Coral-Fort Myers metro area saw foreclosure activity decrease nearly 22 percent from the previous six months and drop nearly 30 percent from the first half of 2009. However, it still had the nation's second-highest metro foreclosure rate with one in every 20 homes filing for foreclosure.

"While we are seeing early signs that foreclosure activity may have peaked in some of the hardest-hit markets, foreclosures continued to rise in three-quarters of the nation's metropolitan areas in the first half of the year," said James J. Saccacio, RealtyTrac's CEO. "The fragile stability achieved in many local housing markets hinges on improvements in the underlying economy, specifically job growth. If unemployment remains persistently high and foreclosure prevention efforts only delay the inevitable, then we could continue to see increased foreclosure activity and a corresponding weakness in home prices in many metro areas."

Florida's seasonally adjusted unemployment rate for **June** fell slightly, to 11.4 percent from 11.7 percent. The numbers show that there are 1.06 million jobless in the state out of a labor force of 9.24 million.

EXHIBIT 28

FPL

Ten Year Power Plant Site Plan

2009-2018

Submitted To:

Florida Public
Service Commission

Miami, Florida
April 2009

EXHIBIT 28

(This page is intentionally left blank.)

EXHIBIT 28

Table of Contents

EXHIBIT 28

EXHIBIT 28

List of Figures and Tables

EXHIBIT 28

Potential Sites

EXHIBIT 28

EXHIBIT 28

List of Schedules

EXHIBIT 28

Overview of the Document

Chapter 186, Florida Statutes, requires that each electric utility in the State of Florida with a minimum existing generating capacity of 250 megawatts (MW) must annually submit a Ten Year Power Plant Site Plan. This plan includes an estimate of the utility's electric power generating needs, a projection of how those needs will be met, and disclosure of information pertaining to the utility's preferred and potential power plant sites. This information is compiled and presented in accordance with rules 25-22.070, 25-22.071, and 25-22.072, Florida Administrative Code (F.A.C.).

This Ten Year Power Plant Site Plan (Site Plan) document is based on Florida Power & Light Company's (FPL) integrated resource planning (IRP) analyses that were carried out in 2008 and that were on-going in the first Quarter of 2009. The forecasted information presented in this plan addresses the 2009–2018 time frame.

Site Plans are long-term planning documents and should be viewed in this context. A Site Plan contains tentative information, especially for the latter years of the ten-year time horizon, and is subject to change at the discretion of the utility. Much of the data submitted is preliminary in nature and is presented in a general manner. Specific and detailed data will be submitted as part of the Florida site certification process, or through other proceedings and filings, at the appropriate time.

This document is organized in the following manner:

Chapter I – Description of Existing Resources

This chapter provides an overview of FPL's current generating facilities. Also included is information on other FPL resources including purchased power, demand side management, and FPL's transmission system.

Chapter II – Forecast of Electric Power Demand

FPL's load forecasting methodology, and its forecast of seasonal peaks and annual energy usage, is presented in Chapter II.

Chapter III – Projection of Incremental Resource Additions

This chapter discusses FPL's integrated resource planning (IRP) process and outlines FPL's projected resource additions, especially new power plants, based on FPL's IRP work in 2008 and

EXHIBIT 28

early 2009.

Chapter IV – Environmental and Land Use Information

This chapter discusses environmental information as well as Preferred and Potential site locations for additional electric generation facilities.

Chapter V – Other Planning Assumptions and Information

This chapter addresses twelve “discussion items” which pertain to additional information that is to be included in a Site Plan filing.

EXHIBIT 28

FPL
List of Abbreviations
Used in FPL Forms

Reference	***Abbreviation***	***Definition***
Unit Type	BIT	Bituminous Coal
	CC	Combined Cycle
	CT	Combustion Turbine
	GT	Gas Turbine
	IC	Internal Combustion
	NP	Nuclear Power
	PV	Photovoltaic
	ST	Steam Unit
Fuel Type	UR	Uranium
	BIT	Bituminous Coal
	FO2	#1, #2 or Kerosene Oil (Distillate)
	FO6	#4,#5,#6 Oil (Heavy)
	NG	Natural Gas
	No	None
	Pet	Petroleum Coke
Fuel Transportation	No	None
	PL	Pipeline
	RR	Railroad
	TK	Truck
	WA	Water
Unit/Site Status	OT	Other
	P	Planned Unit
	T	Regulatory approval received but not under construction
	U	Under construction, less than or equal to 50% Complete
	V	Under construction, more than 50% Complete

EXHIBIT 28

(This page is left intentionally blank.)

EXHIBIT 28

Executive Summary

Florida Power & Light Company's (FPL) 2009 Ten Year Power Plant Site Plan (Site Plan) presents FPL's current plans to augment and enhance its electric generation capability (owned or purchased) as part of its efforts to meet its projected incremental resource needs for the 2009 - 2018 time period. By design, the primary focus of this document is on supply side additions; i.e., electric generation capability. The supply side additions discussed in this document are resources projected to be needed after accounting for FPL's extensive demand side management (DSM) contributions and the significant energy efficiency contributions from the latest, enhanced federal appliance and lighting efficiency standards. The projected impacts of the federal appliance and lighting efficiency standards are included in FPL's load forecast presented in this document. The projected impacts of FPL's DSM contributions are addressed as reductions to the forecasted load.

The resource plan that is presented in FPL's 2009 Site Plan contains two key similarities to the resource plan presented in FPL's 2008 Site Plan, especially for the early years of the ten-year period. However, there are also three significant changes in the current resource plan compared to the resource plan presented in the 2008 Site Plan. These similarities to, and changes from, the 2008 Site Plan, plus the factors driving these changes are discussed below.

I. Similarities to the Resource Plan Presented in the 2008 Site Plan:

There are two key similarities in the current resource plan presented in this document compared to the resource plan presented in the 2008 Site Plan.

Similarity # 1: Three highly efficient combined cycle (CC) generating units and increases in generating capacity at FPL's existing nuclear units will be added to FPL's system in 2009 - 2012.

One similarity is the addition of new highly efficient natural gas-fired CC generating units and increased generating capacity from FPL's existing nuclear units in the 2009 through 2012 time period. FPL will be adding three 1,219 MW (Summer) CC units in western Palm Beach County during 2009 through 2011. The site for these units is named the West County Energy Center (WCEC) and these units are identified as WCEC Units 1, 2, and 3. The WCEC Unit 1 and WCEC Unit 2 were approved by the Florida Public Service Commission (FPSC) in June 2006. Site certification for these units under the Florida Electric Power Plant Siting Act was approved by the Governor and the Cabinet serving as the Siting Board in December 2006. The WCEC Unit 3 was

EXHIBIT 28

approved by the FPSC in September 2008 and FPL's site certification for this unit was approved in November 2008.

In addition, FPL will be adding approximately 400 MW of increased generating capacity at its existing nuclear power plants at its Turkey Point and St. Lucie sites. This increased capacity is scheduled to come in-service in 2011 and 2012. The need for these capacity "uprates" was approved by the FPSC in January 2008. The Final Order for the Site Certification was issued in September 2008 for the St. Lucie uprates and October 2008 for the Turkey Point uprates.

Similarity # 2: The amount of projected DSM additions remains unchanged in this Site Plan. These projections are subject to change in late 2009 based on the outcome of the 2009 DSM Goals proceeding before the FPSC.

The other key similarity to the resource plan presented in the 2008 Site Plan is the amount of additional DSM that is projected to be implemented annually over the ten-year period. There is essentially no change in the amount of projected annual DSM additions between the 2008 Site Plan and the 2009 Site Plan.

The DSM values presented in the 2009 Site Plan are based on meeting FPL's currently approved DSM Goals through 2014, plus implementing additional cost-effective DSM through 2014 that was identified by FPL after the current DSM Goals were established, and a projection of continued DSM additions in 2015 through 2017 at an annual implementation rate commensurate with that in the years leading up to 2014. Because the 2009 Site Plan addresses one more year (2018) than did the 2008 Site Plan, FPL has extended its DSM projection out one more year to 2018 using a similar annual implementation rate.

However, FPL is scheduled to present its new projections of cost-effective DSM to the FPSC in June 2009. These new projections will be used to determine FPL's new DSM Goals for the years 2010 through 2019. The analyses to develop these new projections of cost-effective DSM for the new DSM Goals are currently a work in progress at the time the 2009 Site Plan is being filed. The final order from the FPSC establishing FPL's new DSM Goals is expected in the 4th Quarter of 2009. The subsequent development and approval of FPL's DSM Plan (with which FPL will meet the new Goals) will likely be made in early 2010. Therefore, the impact of FPL's new DSM Goals and DSM Plan will be reflected next year in FPL's 2010 Site Plan.

EXHIBIT 28

II. Factors That Are Driving Changes in FPL's Resource Plan:

There are two primary "change factors" that are largely driving the changes in FPL's 2009 resource plan compared to the resource plan presented in FPL's 2008 Site Plan. These two change factors, and their impacts on the resource plan, are summarized below and are addressed in more detail in Chapters II and III of this document.

Change Factor # 1: The load forecast is significantly lower than in previous years.

The first factor that is driving changes in the current resource plan is FPL's new long-term load forecast that was prepared in January 2009. With this new forecast, FPL now projects lower growth in electrical demand over the ten-year period addressed in this document. The projection of lower load growth is primarily driven by several factors including: a forecasted lower rate of population growth, an economic downturn lasting several years, and increased energy efficiency impact from the latest enhanced federal appliance and lighting efficiency standards. The combined effect of these three drivers results in projected lower growth in electrical demand for the entire ten-year period (2009 – 2018) addressed in this document, compared to the projected load growth discussed in FPL's 2008 Site Plan.

Change Factor # 2: Highly Efficient New Generation Capacity has been approved by the FPSC and is now reflected in FPL's Resource Plan in 2010-2018.

The second change factor is the inclusion of highly efficient new generating capacity that was approved by the FPSC during 2008. This new generating capacity was shown to be cost-effective, to enhance system fuel diversity, and to reduce FPL's system emission rates. This new generating capacity consists of new generating units that are nuclear, solar, or highly efficient new natural gas-fired CC units.

These new generating unit additions include the following:

- Two new nuclear units (Turkey Point Units 6 & 7) are projected to be brought into service in 2018 and 2020, respectively. Each unit is projected to add approximately 1,100 MW of firm capacity. The FPSC approved the need for these new nuclear units in April 2008. As part of this approval, FPL will be providing an annual feasibility analysis as part of the annual nuclear cost recovery process. A multi-year licensing and permitting review process for these units is currently underway. Because this Site Plan addresses the time period through 2018, the first of these two units, Turkey Point Unit 6, is now included in the 2009 Site Plan.

EXHIBIT 28

- Two new photovoltaic (PV) solar facilities are projected to be brought into service by 2010. One of these PV facilities will be placed in DeSoto County and will be named the DeSoto Next Generation Solar Energy Center. This facility is projected to have a nameplate rating of 25 MW. The second PV facility will be placed in Brevard County and will be named the Space Coast Next Generation Solar Energy Center. This PV facility is projected to have a nameplate rating of 10 MW. The FPSC approved the eligibility of expenditures for these PV facilities to be recovered through the environmental cost recovery clause in August 2008. The DeSoto Next Generation Solar Energy Center obtained an Environmental Resource Permit and an Army Corps of Engineers permit in October 2008. The Space Coast Next Generation Solar Energy Center received the Army Corps of Engineers permit in December 2008 and the Environmental Resource Permit is expected to be received in mid-2009.
- A new solar thermal facility at FPL's existing Martin plant site is also projected to be brought into service in 2010. This solar thermal facility, named the Martin Next Generation Solar Energy Center, is projected to be able to produce up to 75 MW of steam capability, thus allowing reduced use of fossil fuels by FPL when the solar thermal facility is producing steam. The FPSC approved the eligibility of expenditures for this solar thermal facility to be recovered through the environmental cost recovery clause in August 2008. FPL also received the site certification modification approval in August 2008.
- Two existing generating plants, each consisting of two older fossil fired steam generating units, are projected to be converted into new, highly efficient CC units. The existing two-unit plant at FPL's Cape Canaveral site will be replaced by a new CC unit with a projected output of 1,219 MW (Summer) in 2013. This new unit will be called the Cape Canaveral Next Generation Clean Energy Center. The existing two-unit plant at FPL's Riviera site will also be replaced by a new CC unit with a projected output of 1,207 MW (Summer) in 2014. This new unit will be called the Riviera Beach Next Generation Clean Energy Center. These conversions were approved by the FPSC in September 2008. The site certification application for Cape Canaveral was filed in December 2008 and the site certification application for Riviera Beach was filed in February 2009. A decision is expected to be reached regarding these applications by early 2010.

These new generating units were selected and incorporated into FPL's resource plan for a variety of reasons including cost-effectiveness, significant system fuel savings, and significant system emission reductions, including greenhouse gas emission reductions. In addition, the solar projects will increase the contribution of renewable energy sources towards meeting the electricity needs of FPL's customers.

EXHIBIT 28

III. Resulting Changes in FPL’s Resource Plan Compared to the 2008 Site Plan:

The impact of the two change factors discussed above, plus other concerns discussed later in this chapter and in Chapter III, have resulted in three significant changes in FPL’s resource plan presented in this document compared to the resource plan presented in FPL’s 2008 Site Plan. These resulting changes are summarized below.

Resulting Change # 1: FPL’s resource plan now reflects greater contributions from nuclear energy and renewable energy.

The first of FPL’s two planned 1,100 MW nuclear units that is scheduled to come in-service in 2018 (the second unit is scheduled to come in-service in 2020 but is not addressed in this document due to the later in-service date), plus the addition of 35 MW of PV and 75 MW of solar thermal in 2010, are new to FPL’s resource plan this year. These new units will increase the contribution from both nuclear and renewable energy. In turn, this reduces fossil fuel use by FPL’s system from what it otherwise would have been.

This decrease in fossil fuel usage will also contribute to lowering FPL system emission rates, including greenhouse gas emission rates, thus lowering system emissions from what they would otherwise have been if these generating units were not added. In regards to carbon dioxide (CO_2), FPL already has a relatively low CO_2 emission rate (CO_2 tons per MWh generated) compared to other utilities. The planned additions of new nuclear capacity, highly efficient CC capacity including the conversions of two existing plants, and the PV and solar thermal contributions will result in a further lowering of FPL’s system CO_2 emission rate, thus working to offset the upward pressure on emissions that will be caused by continuing population and electrical load growth in FPL’s service territory.

Resulting Change # 2: Other than the new generating units that have recently been approved, FPL projects that it will add no additional new generating units to meet capacity needs through 2018.

FPL’s lower load forecast in January 2009 results in a significantly lower resource need projection for the next ten years than was the case with the 2008 Site Plan. The lower resource need can be effectively met by the new generating units that have recently been approved. As shown by the table ES.1 below, FPL projects no additional FPL generation unit additions through 2018 beyond the above-mentioned units that were approved in 2008. (However, this resource plan is subject to change for a variety of reasons including the need to address potential new laws and/or regulations related to renewable energy.)

EXHIBIT 28

Resulting Change # 3: FPL will also place on Inactive Reserve some of its existing generating units starting in 2009.

The lower resource need projection discussed above has also led FPL to reflect in its resource plan the temporary removal of a number of its existing, older, less efficient generating units from active service starting in 2009. These units will continue to be maintained and will be returned to active service as needed.

FPL's existing Cape Canaveral and Riviera plants will be placed in Inactive Reserve as early as the Summer of 2009. The Cape Canaveral plant is scheduled to be permanently removed in 2010, and the Riviera plant will be permanently removed in 2011, as part of the conversion projects. In addition, the following older, less efficient units will also be placed on Inactive Reserve status in 2009 and 2010: Cutler Units 5 & 6, Port Everglades Units 1 & 2, Sanford Unit 3, Martin Unit 2, and Manatee Unit 2[1]. FPL will continue to maintain these units and will again utilize these units (other than those at Riviera and Cape Canaveral where new units will be constructed) as resource needs dictate. For purposes of this planning document, FPL projects that these units will begin to be returned to operation starting in 2016. A further discussion of these units is presented in Chapter III.

Table ES.1 presents a current projection of the changes in the generating resources portion of FPL's resource plan based on the factors and changes discussed above. As such, this table does not directly address FPL's significant DSM contributions, but FPL's significant projected DSM contributions were fully accounted for by FPL and the FPSC in the process of approving the need for the new generating units presented in the table.

FPL's ongoing resource planning efforts will continue to be influenced by the two change factors discussed above (i.e., a new lower load forecast and the addition of highly efficient nuclear, solar, and CC generation already approved by the FPSC). In addition, other items will also influence FPL's resource planning work. Among these items are two that FPL refers to as on-going system concerns that FPL has considered in its resource planning work for a number of years. These on-going system concerns include: (1) maintaining/enhancing fuel diversity in the FPL system, and (2) maintaining a balance between load and generating capacity in Southeastern Florida.

In addition, two other relatively recent developments will also influence FPL's continuing resource planning efforts. One of these is the Executive Orders directive issued in 2007 by Governor Crist calling for reduction in greenhouse gas emissions and greater contribution from renewable

---

[1] The two 800 MW units, Martin Unit 2 and Manatee Unit 2, on this list may be replaced at some time in the future by two similar size units, Martin Unit 1 and Manatee Unit 1. If this were to occur, Martin Unit 1 and Manatee Unit 1 would be temporarily placed on Inactive Reserve status and Martin Unit 2 and Manatee Unit 2 would be returned to active service.

EXHIBIT 28

energy sources. As previously discussed, FPL’s resource planning has already taken positive steps in regard to both of these issues.

The other development is the ongoing effort to establish a Florida standard for renewable energy contributions to a utility system. A Renewable Portfolio Standard (RPS) proposal prepared by the FPSC has been sent to the Florida Legislature for consideration during the legislative session that began in March 2009. Because the eventual RPS outcome is not known at the time the 2009 Site Plan is being prepared, the resource plan presented in FPL’s 2009 Site Plan does not directly address any RPS decision. Assuming that an RPS decision is reached later in 2009, FPL will then determine what steps need to be taken to address the standard. These steps will be discussed next year in FPL’s 2010 Site Plan.

EXHIBIT 28

Table ES.1: Projected Capacity Changes and Reserve Margins for FPL

Projected Capacity Changes and Reserve Margins for FPL (1)

		Net Capacity Changes (MW)		***Reserve Margin (%)***	
Year	***Projected Capacity Changes***	***Winter (2)***	***Summer (3)***	***Winter***	***Summer***
2009	Changes to Existing Purchases (4)	---	(479)	53.1%	28.1%
	West County Unit 1 (5)	---	1,219		
	DeSoto Next Generation Solar Energy Center (PV) (6)	---	---		
	Riviera Unit 3 - offline for conversion	---	(276)		
	Riviera Unit 4 - offline for conversion	---	(286)		
	Changes to Existing Units	(78)	10		
	Inactive Reserve of Existing Units - offline (8)	---	(766)		
2010	Changes to Existing Purchases (4)	(559)	(352)	58.2%	20.7%
	West County Unit 1 (5)	1,335	---		
	West County Unit 2 (5)	1,335	1,219		
	Martin Next Generation Solar Energy Center (Solar Thermal) (7)	---	---		
	Space Coast Next Generation Solar Energy Center (PV) (6)	---	---		
	Riviera Unit 3 - offline for conversion	(277)	---		
	Riviera Unit 4 - offline for conversion	(288)	---		
	Cape Canaveral Unit 1 - offline for conversion	---	(395)		
	Cape Canaveral Unit 2 - offline for conversion	---	(388)		
	Changes to Existing Units	53	36		
	Inactive Reserve of Existing Units - offline (8)	(777)	(1,648)		
2011	Changes to Existing Purchases (4)	(46)	(45)	41.8%	25.8%
	West County Unit 3 (5)	---	1,219		
	Cape Canaveral Unit 1 - offline for conversion	(397)	---		
	Cape Canaveral Unit 2 - offline for conversion	(397)	---		
	Inactive Reserve of Existing Units - offline (8)	(1,663)	10		
	Changes to Existing Units	130	(92)		
2012	Changes to Existing Purchases (4)	---	(156)	45.7%	23.6%
	West County Unit 3 (5)	1,335	---		
	Changes to Existing Units	(11)	(11)		
	Existing Nuclear Units Capacity Uprates - St. Lucie 1	103	103		
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	---	88		
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	---	104		
2013	Changes to Existing Purchases (4)	(180)	---	44.1%	29.1%
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	88	---		
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	104	---		
	Existing Nuclear Units Capacity Uprates - Turkey Point 4	104	104		
	Cape Canaveral Next Generation Clean Energy Center (5)	---	1,219		
2014	Changes to Existing Purchases (4)	---	50	44.0%	28.0%
	Cape Canaveral Next Generation Clean Energy Center (5)	1,343	---		
	Riviera Beach Next Generation Clean Energy Center	---	1,207		
2015	Riviera Beach Next Generation Clean Energy Center	1,310	---	46.0%	25.1%
2016	Inactive Reserve of Existing Units - online (8)	---	814	42.3%	20.0%
	Changes to Existing Purchases (4)	---	(1,311)		
2017	Inactive Reserve of Existing Units - online (8)	825	822	41.5%	21.1%
2018	Turkey Point Nuclear Unit 6 (5)	---	1,100	38.2%	22.2%
	Inactive Reserve of Existing Units - online (8)	834	---		
	TOTALS =	**4,226**	**3,119**		

(1) Additional information about these resulting reserve margins and capacity changes are found on Schedules 7 & 8 respectively.

(2) Winter values are values for January of the year shown.

(3) Summer values are values for August of the year shown.

(4) These are firm capacity and energy contracts with QF, utilities, and other entities. See Table I.B.1 and Table I.B.2 for more details.

(5) All new unit additions are scheduled to be in-service in June of the year shown except for WCEC 1 and WCEC 2 that are projected to be in-service in August 2009 and December 2009, respectively. WCEC 1 is included in the Summer reserve margin calculation starting in 2009 and in the Winter reserve margin calculation starting in 2010. WCEC 2 is included in both the Summer and Winter starting in 2010. All additions assumed to start in June are included in the Summer reserve margin calculation starting in that year and in the Winter reserve margin calculation starting with the next year.

(6) Because of the intermittent nature of the photovoltaics (PV) resource, FPL is currently assigning no firm capacity benefit to these generating additions. FPL will reassess this once actual operating data from the PV facilities at these locations is available. This location-specific information is needed in order to gauge consistent output during the peak hours which are accounted for in FPL's reserve margin calculations.

(7) The Martin solar thermal facility is designed to provide steam for FPL's existing Martin Unit 8 combined cycle unit, thus reducing FPL's use of natural gas. No additional capacity (MW) will result from the operation of the solar thermal facility.

(8) A number of existing FPL power plants are being temporarily removed from service and placed on Inactive Reserve status. FPL plans to return these units to active service in the future as needed. The timing of the return of these units to full-time active status is uncertain at this time primarily due to the uncertainty regarding FPL's future load. However, for planning purposes, FPL is showing in this document that these units begin to return to active service starting in 2016.

EXHIBIT 28

CHAPTER I

Description of Existing Resources

EXHIBIT 28

(This page is left intentionally blank.)

EXHIBIT 28

I. Description of Existing Resources

FPL’s service area contains approximately 27,650 square miles and has a population of approximately 8.7 million people. FPL served an average of 4,509,729 customer accounts in thirty-five counties during 2008. These customers were served from a variety of resources including: FPL-owned fossil and nuclear generating units, non-utility owned generation, demand side management (DSM), and interchange/purchased power.

I.A. FPL-Owned Resources

The existing FPL generating resources are located at fourteen generating sites distributed geographically around its service territory and also include partial ownership of one unit located in Georgia and two units located in Jacksonville, Florida. The current generating facilities consist of four nuclear units, three coal units, twelve combined cycle (CC) units, seventeen fossil steam units, forty-eight combustion gas turbines, one simple cycle combustion turbine, and five diesel units. The location of these ninety generating units is shown on Figure I.A.1 and in Table I.A.1. The second page of Table I.A.1 provides a “break down” of the capacity provided by the combustion turbine (CT) and steam turbine (ST) components of FPL’s existing CC units.

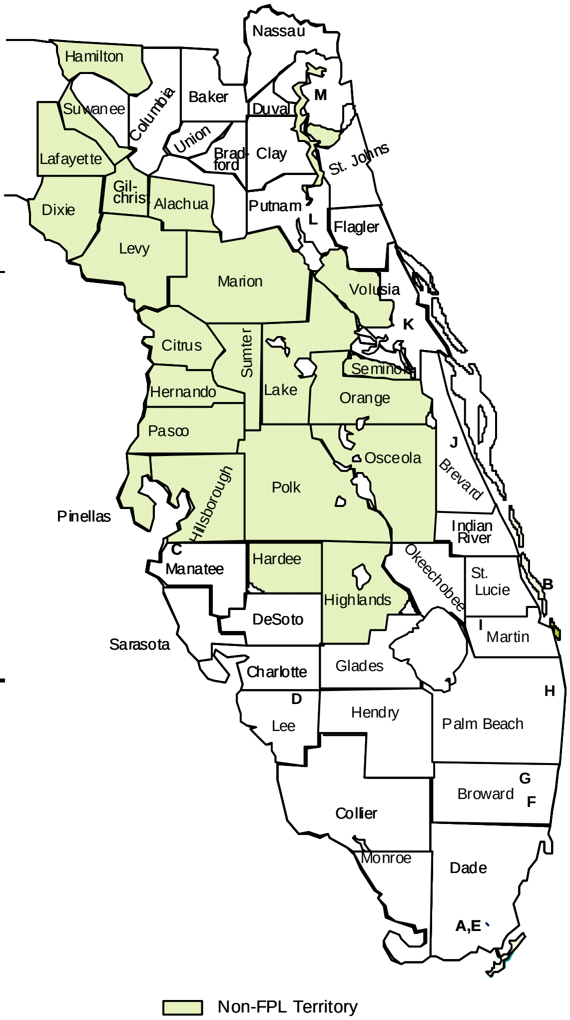
FPL’s bulk transmission system is comprised of 6,727 circuit miles of transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL’s 580 substations in Florida.

The existing FPL system, including generating plants, major transmission stations, and transmission lines, is shown on Figure I.A.2. In addition, Figure I.A.3 shows FPL’s interconnection ties with other utilities.

EXHIBIT 28

FPL Generating Resources by Location

Location/ Map Key	Plant Name	Number of Units	Summer MW
A	Turkey Point	5	3,322
B	St. Lucie *	2	1,553
C	Manatee	3	2,735
D	Fort Myers	2	1,758
E	Cutler	2	205
F	Lauderdale	2	884
G	Port Everglades	4	1,205
H	Riviera	2	565
I	Martin	5	3,701
J	Cape Canaveral	2	792
K	Sanford	3	2,050
L	Putnam	2	498
M	SJRPP **	2	254
	Scherer ***	1	646
	Gas Turbines	48	1,908
	Internal Combustion Turbines	5	12
	FPL Generation =	**90**	**22,087**



* Represents FPL's ownership share: St Lucie nuclear: 100% unit 1, 85% unit 2: St. Johns River: 20% of two units.

** SJRPP = St. John's River Power Park

*** The Scherer unit is located in Georgia and is not shown on this map.

Figure I.A.1: Capacity Resources by Location (as of December 31, 2008)

EXHIBIT 28

Table I.A.1: Capacity Resource by Unit Type (as of December 31, 2008)

Unit Type/ Plant Name	Location	Number of Units	Fuel	Summer MW
Combined-Cycle *				
Lauderdale	Dania, FL	2	Gas/Oil	884
Martin	Indiantown,FL	2	Gas	944
Martin	Indiantown,FL	1	Gas/Oil	1,105
Sanford	Lake Monroe, FL	2	Gas	1,912
Putnam	Palatka, FL	2	Gas/Oil	498
Fort Myers	Fort Myers, FL	1	Gas	1,440
Manatee	Parrish,FL	1	Gas	1,111
Turkey Point	Florida City, FL	1	Gas	1,148
Total Combined Cycle		**12**		**9,041**
Combustion Turbines *				
Fort Myers **	Fort Myers, FL	1	Gas/Oil	318
Total Combustion Turbines		**1**		**318**
Nuclear				
Turkey Point	Florida City, FL	2	Nuclear	1,386
St. Lucie ***	Hutchinson Island, FL	2	Nuclear	1,553
Total Nuclear		**4**		**2,939**
Coal Steam				
SJRPP ****	Jacksonville, FL	2	Coal	254
Scherer	Monroe County, Ga	1	Coal	646
Total Coal Steam		**3**		**900**
Oil/Gas Steam				
Cape Canaveral	Cocoa, FL	2	Oil/Gas	792
Cutler	Miami, FL	2	Gas	205
Manatee	Parrish, FL	2	Oil/Gas	1,624
Martin	Indiantown,FL	2	Oil/Gas	1,652
Port Everglades	Port Everglades, FL	4	Oil/Gas	1,205
Riviera	Riviera Beach, FL	2	Oil/Gas	565
Sanford	Lake Monroe, FL	1	Oil/Gas	138
Turkey Point	Florida City, FL	2	Oil/Gas	788
Total Oil/Gas Steam		**17**		**6,969**
Gas Turbines(GT)/Diesels(IC)				
Lauderdale (GT)	Dania, FL	24	Gas/Oil	840
Port Everglades (GT)	Port Everglades, FL	12	Gas/Oil	420
Fort Myers (GT)	Fort Myers, FL	12	Oil	648
Turkey Point (IC)	Florida City, FL	5	Oil	12
Total Gas Turbines/Diesels		**53**		**1,920**
Total Units:		**90**		
Total Net Generating Capability:				**22,087**

* The Combined Cycles and Combustion Turbines are broken down by components on Table 1.A.2.

** This unit consists of two combustion turbines.

*** Total capability of each unit is 853/839 MW. FPL's ownership share of St. Lucie 1 and 2 is 100% and 85%, respectively. Capabilities shown represent FPL's output share from each of the units (approx. 92.5% and exclude the Orlando Utilities Commission (OUC) and Florida Municipal Power Agency (FMPA) combined portion of approximately 7.44776% per unit.

**** Represents FPL's ownership share: SJRPP coal: 20% of two units

EXHIBIT 28

Table I.A.2: Combined Cycle and Combustion Turbine Components

Unit Type/ Plant Name		Summer MW *
Combined-Cycle		
Lauderdale 4 - Total		**442**
	CTA	160
	CTB	160
	Steam	122
Lauderdale 5 - Total		**442**
	CTA	160
	CTB	160
	Steam	122
Martin 3 - Total		**473**
	CTA	161
	CTB	161
	Steam	151
Martin 4 - Total		**473**
	CTA	161
	CTB	161
	Steam	151
Martin 8 - Total		**1,107**
	CTA	159
	CTB	159
	CTC	164
	CTD	164
	Steam	461
Putnam 1 - Total		**249**
	CTA	69
	CTB	69
	Steam	111
Putnam 2 - Total		**249**
	CTA	69
	CTB	69
	Steam	111
Ft Myers 2 - Total		**1,443**
	CTA	159
	CTB	159
	CTC	159
	CTD	159
	CTE	159
	CTF	159
	Steam 1	61
	Steam 2	428
Sanford 4 - Total		**956**
	CTA	158
	CTB	158
	CTC	158
	CTD	158
	Steam	324
Sanford 5 - Total		**955**
	CTA	158
	CTB	158
	CTC	158
	CTD	158
	Steam	323
Manatee 3 - Total		**1,111**
	CTA	164
	CTB	164
	CTC	164
	CTD	164
	Steam	455
Turkey Point 5 - Total		**1,147**
	CTA	171
	CTB	171
	CTC	171
	CTD	171
	Steam	463
Combustion Turbines		
Ft. Myers 3 - Total		**318**
	CTA	157
	CTB	161

* The total MW rating of the units might be slightly off from those shown in Table 1.A.1 due to rounding.

EXHIBIT 28

Table I.A.3: Purchase Power Resources by Contract (as of December 31, 2008)

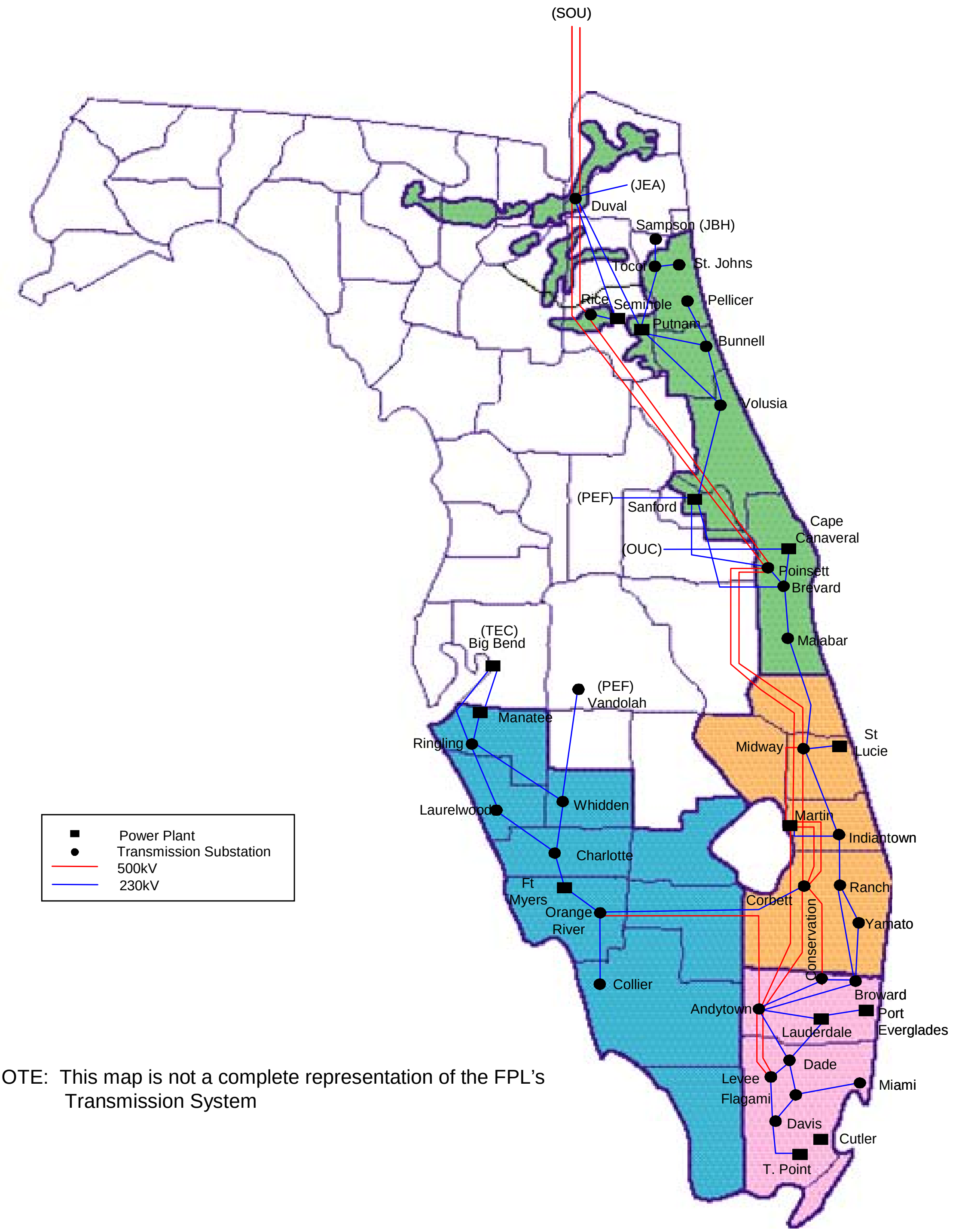
Firm Capacity and Energy Purchases (MW)

	Location (City or County)	Fuel	Summer MW
I. Purchases from QFs: Cogeneration Small Power Production Facilities			
Cedar Bay Generating Co.	Duval County	Coal (Cogen)	250
Indiantown Cogen., LP	Martin County	Coal (Cogen)	330
Broward South	Broward County	Solid Waste	54
Broward North	Broward County	Solid Waste	56
Palm Beach SWA	Palm Beach County	Solid Waste	48
		Total:	**738**
II. Purchases from Utilities:			
UPS from Southern Co.	Various	Coal	931
SJRPP	Jacksonville,FL	Coal	381
		Total:	**1,312**
III. Other Purchases:			
Reliant/Indian River	Brevard County	Oil	576
Oleander (Extension)	Brevard County	Gas	156
Williams	Outside of Florida	Gas	106
Progress Energy Ventures	Outside of Florida	Gas	105
		Total:	**943**
		Total Net Firm Generating Capability:	**2,993**

Non-Firm Energy Purchases (MWH)

Plant Name	Location (City or County)	Fuel	Energy (MWH) Delivered to FPL in 2008
Tropicana	Manatee County	Natural Gas	24,266
Elliot	Palm Beach County	Natural Gas	101
US Sugar-Bryant	Palm Beach County	Bagassee	0
Okeelanta	Palm Beach County	Bagassee/Wood	343,209
Georgia Pacific	Putnam County	Paper by-product	1,232
Tomoka Farms	Volusia County	Landfill Gas	20,140
Rothenbach Park	Sarasota County	PV	269
Customer Owned PV	Various	PV	167
		Total Non-Firm Generating MWH:	**389,384**

EXHIBIT 28



NOTE: This map is not a complete representation of the FPL's Transmission System

Figure I.A.2: FPL Substation and Transmission System Configuration

EXHIBIT 28

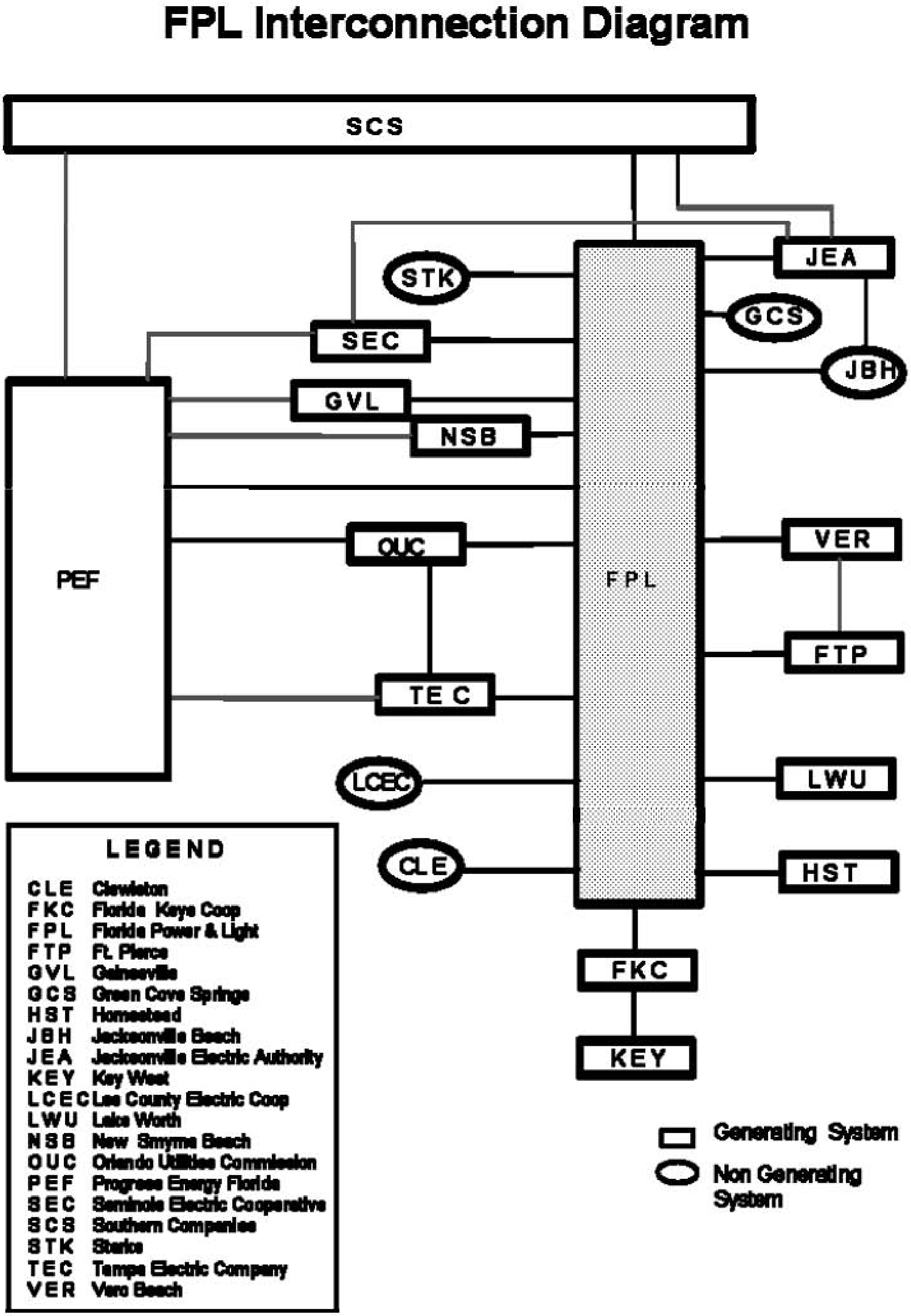


Figure I.A.3: FPL Interconnection Diagram

EXHIBIT 28

I.B Firm Capacity Power Purchases

Purchases from Qualifying Facilities (QF):

Firm capacity power purchases are an important part of FPL’s resource mix. FPL currently has contracts with five qualifying facilities; i.e., cogeneration/small power production facilities, to purchase firm capacity and energy as shown in Table I.A.2, Table I.B.1, and I.B.2.

A cogeneration facility is one which simultaneously produces electrical and thermal energy, with the thermal energy (e.g., steam) being used for industrial, commercial, or cooling and heating purposes. A small power production facility is one which does not exceed 80 MW (unless it is exempted from this size limitation by the Solar, Wind, Waste, and Geothermal Power Production Incentives Act of 1990) and uses as its primary energy source (at least 50%) solar, wind, waste, geothermal, or other renewable resources.

Purchases from Utilities:

FPL has a Unit Power Sales (UPS) contract to purchase 931 MW, with a minimum of 380 MW, of coal-fired generation from the Southern Company (Southern) through May 2010. An additional contract with Southern will result in FPL receiving 930 MW from June 2010 through the end of December 2015. This capacity will be supplied by Southern from a mix of gas-fired and coal-fired units.

In addition, FPL has contracts with the Jacksonville Electric Authority (JEA) for the purchase of 381 MW (Summer) and 390 MW (Winter) of coal-fired generation from the St. John’s River Power Park (SJRPP) Units No. 1 and No. 2. However, due to Internal Revenue Service (IRS) regulations, the total amount of energy that FPL may receive from this purchase is limited. FPL currently assumes, for planning purposes, that this limit will be reached in the first half of 2016. Once this limit is reached, FPL will be unable to receive firm capacity and energy from these purchases.

These purchases are shown in Table I.A.2, Table I.B.1, and Table I.B.2. FPL also has ownership interest in the SJRPP units. The ownership amount is reflected in FPL’s installed capacity shown on Figure I.A.1, in Table I.A.1, and on Schedule 1.

EXHIBIT 28

Other Purchases:

FPL has other firm capacity purchase contracts with a variety of Non-QF suppliers. These purchases are generally near-term in nature. Table I.B.1 and I.B.2 present the Summer and Winter MW, respectively, resulting from all firm purchased power contracts discussed above through the year 2018. For planning purposes, FPL assumes an additional 105 MW of firm capacity will be supplied from renewable energy sources. This firm capacity is expected to be provided from two sources including: 55 MW through contract extension with an existing renewable facility currently under contract with FPL but whose contract is set to expire in 2010, and 50 MW through one or more proposals received in response to a Renewable RFP, such as the RFP that FPL issued in April 2008.

EXHIBIT 28

Table I.B.1: FPL's Firm Purchased Power Summer MW

Summary of FPL's Firm Capacity Purchases: Summer MW (for August of Year Shown)

I. Purchases from QF's:

Cogeneration/Small Power Production Facilities	Contract Start Date	Contract End Date	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Broward South	04/01/91	08/01/09	0	0	0	0	0	0	0	0	0	0
Broward South	01/01/93	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward South	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward South	01/01/97	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward North	04/01/92	12/31/10	45	45	0	0	0	0	0	0	0	0
Broward North	01/01/93	12/31/26	7	7	7	7	7	7	7	7	7	7
Broward North	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward North	01/01/97	12/31/26	3	3	3	3	3	3	3	3	3	3
Cedar Bay Generating Co.	01/25/94	12/31/24	250	250	250	250	250	250	250	250	250	250
Indiantown Cogen., LP	12/22/95	12/01/25	330	330	330	330	330	330	330	330	330	330
Palm Beach SWA	04/01/92	03/31/10	50	0	0	0	0	0	0	0	0	0
Palm Beach SWA-extension	04/01/12	04/01/32	0	0	0	55	55	55	55	55	55	55
		QF Purchases Sub Total:	**690**	**640**	**595**	**650**	**650**	**650**	**650**	**650**	**650**	**650**

II. Purchases from Utilities:	Contract Start Date	Contract End Date	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UPS from Southern Co.	07/20/88	05/31/10	931	0	0	0	0	0	0	0	0	0
UPS Replacement	06/01/10	12/31/15	0	930	930	930	930	930	930	0	0	0
SJRPP	04/02/82	04/01/16	381	381	381	381	381	381	381	0	0	0
		Utility Purchases Sub Total:	**1,312**	**1,311**	**1,311**	**1,311**	**1,311**	**1,311**	**1,311**	**0**	**0**	**0**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total of QF and Utility Purchases =	**2,002**	**1,951**	**1,906**	**1,961**	**1,961**	**1,961**	**1,961**	**650**	**650**	**650**

III. Other Purchases:	Contract Start Date	Contract End Date	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Reliant/Indian River	01/01/06	12/31/09	250	0	0	0	0	0	0	0	0	0
Oleander (Extension)	06/01/07	05/31/12	156	156	156	0	0	0	0	0	0	0
Williams	03/01/06	12/31/09	106	0	0	0	0	0	0	0	0	0
Progress Energy Ventures	04/01/06	03/31/09	0	0	0	0	0	0	0	0	0	0
New Renewable Firm Capacity	Assumed	Assumed	0	0	0	0	0	50	50	50	50	50
		Other Purchases Sub Total:	**512**	**156**	**156**	**0**	**0**	**50**	**50**	**50**	**50**	**50**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total "Non-QF" Purchase Sub-Total =	**1,824**	**1,467**	**1,467**	**1,311**	**1,311**	**1,361**	**1,361**	**50**	**50**	**50**

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Summer Firm Capacity Purchases Total MW:	**2,514**	**2,107**	**2,062**	**1,961**	**1,961**	**2,011**	**2,011**	**700**	**700**	**700**

EXHIBIT 28

Table I.B.2: FPL's Firm Purchased Power Winter MW

Summary of FPL's Firm Capacity Purchases: Winter MW (for January of Year Shown)

I. Purchases from QF's:

Cogeneration/Small Power Production Facilities	Start Date	End Date	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Broward South	04/01/91	08/01/09	51	0	0	0	0	0	0	0	0	0
Broward South	01/01/93	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward South	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward South	01/01/97	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward North	04/01/92	12/31/10	45	45	0	0	0	0	0	0	0	0
Broward North	01/01/93	12/31/26	7	7	7	7	7	7	7	7	7	7
Broward North	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward North	01/01/97	12/31/26	3	3	3	3	3	3	3	3	3	3
Cedar Bay Generating Co.	01/25/94	12/31/24	250	250	250	250	250	250	250	250	250	250
Indiantown Cogen., LP	12/22/95	12/01/25	330	330	330	330	330	330	330	330	330	330
Palm Beach SWA	04/01/92	03/31/10	50	50	0	0	0	0	0	0	0	0
Palm Beach SWA-extension	04/01/12	04/01/32	0	0	0	0	55	55	55	55	55	55
		QF Purchases Sub Total:	**740**	**690**	**595**	**595**	**650**	**650**	**650**	**650**	**650**	**650**

II. Purchases from Utilities:

	Start Date	End Date	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UPS from Southern Co.	07/20/88	05/31/10	931	931	0	0	0	0	0	0	0	0
UPS Replacement	06/01/10	12/31/15	0	0	930	930	930	930	930	0	0	0
SJRPP	04/02/82	04/01/16	390	390	390	390	390	390	390	**390**	0	0
		Utility Purchases Sub Total:	**1,321**	**1,321**	**1,320**	**1,320**	**1,320**	**1,320**	**1,320**	**390**	**0**	**0**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total of QF and Utility Purchases =	**2,061**	**2,011**	**1,915**	**1,915**	**1,970**	**1,970**	**1,970**	**1,040**	**650**	**650**

III. Other Purchases:

	Contract Start Date	Contract End Date	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Reliant/Indian River	01/01/06	12/31/09	250	0	0	0	0	0	0	0	0	0
Oleander (Extension)	06/01/07	05/31/12	180	180	180	180	0	0	0	0	0	0
Williams	03/01/06	12/31/09	106	0	0	0	0	0	0	0	0	0
Progress Energy Ventures	04/01/06	03/31/09	105	0	0	0	0	0	0	0	0	0
New Renewable Firm Capacity	Assumed	Assumed	0	0	0	0	0	50	50	50	50	50
		Other Purchases Sub Total:	**641**	**180**	**180**	**180**	**0**	**50**	**50**	**50**	**50**	**50**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
"Non-QF" Purchase Sub-Total =	**1,962**	**1,501**	**1,500**	**1,500**	**1,320**	**1,370**	**1,370**	**440**	**50**	**50**

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Winter Firm Capacity Purchases Total MW:	**2,702**	**2,191**	**2,095**	**2,095**	**1,970**	**2,020**	**2,020**	**1,090**	**700**	**700**

EXHIBIT 28

I.C Non-Firm (As Available) Energy Purchases

FPL purchases non-firm (as-available) energy from several cogeneration and small power production facilities. Table I.C.1 shows the amount of energy purchased in 2008 from these facilities.

Table I.C.1: As-Available Energy Purchases From Non-Utility Generators in 2008

Project	*County*	*Fuel*	*In-Service Date*	*Energy (MWH) Delivered to FPL in 2008*
Tropicana	Manatee	Natural Gas	2/90	24,266
Elliot	Palm Beach	Natural Gas	7/05	101
US Sugar-Bryant	Palm Beach	Bagassee	2/80	0
Okeelanta	Palm Beach	Bagassee/Wood	11/95	343,209
Georgia Pacific	Putnam	Paper by-product	2/94	1,232
Tomoka Farms	Volusia	Landfill Gas	7/98	20,140
Rothenbach Park	Sarasota	PV	10/07	269
Customer Owned PV	Various	PV	Various	167

I.D. Demand Side Management (DSM)

FPL has sought out and implemented cost-effective DSM programs since 1978. These programs include a number of conservation/energy efficiency and load management initiatives. FPL's DSM efforts through 2008 have resulted in a cumulative Summer peak reduction of approximately 4,109 MW at the generator and an estimated cumulative energy saving of approximately 46,646 Gigawatt Hour (GWh) at the generator. After accounting for reserve margin requirements, FPL's DSM efforts through 2008 have eliminated the need to construct the equivalent of approximately 12 new 400 MW generating units.

For purposes of the projections presented in this document, FPL is utilizing essentially the same projection of DSM that was utilized in FPL's 2008 Site Plan. This amount of DSM is based on: FPL's current DSM Goals that were approved by the Florida Public Service Commission through 2014, additional cost-effective DSM identified by FPL after these DSM Goals were established, and a projection of continued DSM implementation for 2015 – 2018 at an implementation rate commensurate with the projected annual rate of implementation for the years immediately preceding 2014.

EXHIBIT 28

FPL will be submitting proposed new DSM Goals for 2010 – 2019 to the FPSC in a June 2009 filing and the analysis work that will lead to FPL's proposed new DSM Goals is in its early stages as this document is prepared. A final order from the FPSC regarding the proposed DSM amounts is expected in the 4th Quarter of 2009. FPL will formally incorporate the approved new DSM Goals amounts into its resource planning work at that time. The new DSM Goals amounts, the approved DSM Plan with which FPL will achieve those Goals, and the resource planning work that incorporates this DSM will be presented in FPL's 2010 Site Plan.

EXHIBIT 28

Schedule 1

Existing Generating Facilities
As of December 31, 2008

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						Fuel		Alt. Fuel	Commercial	Expected	Gen.Max.	Net Capability 1/	
	Unit		Unit	Fuel		Transport		Days	In-Service	Retirement	Nameplate	Winter	Summer
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Use	Month/Year	Month/Year	KW	MW	MW
Cape Canaveral		Brevard County											
		19/24S/36F									804,100	796	792
	1		ST	FO6	NG	WA	PL	Unknown	Apr-65	Unknown	402,050	398	396
	2		ST	FO6	NG	WA	PL	Unknown	May-69	Unknown	402,050	398	396
Cutler		Miami Dade County											
		27/55S/40E									236,500	207	205
	5		ST	NG	No	PL	No	Unknown	Nov-54	Unknown	75,000	69	68
	6		ST	NG	No	PL	No	Unknown	Jul-55	Unknown	161,500	138	137
Fort Myers		Lee County											
		35/43S/25E									2,895,890	2,709	2,406
	2		CC	NG	No	PL	No	Unknown	Jun-02	Unknown	1,775,390	1,570	1,440
	3A & B		CT	NG	FO2	PL	PL	Unknown	Jun-03	Unknown	376,380	370	318
	1-12		GT	FO2	No	PL	No	Unknown	May-74	Unknown	744,120	769	648
Lauderdale		Broward County											
		30/50S/42E									1,873,968	1,988	1,724
	4		CC	NG	FO2	PL	PL	Unknown	May-93	Unknown	526,250	485	442
	5		CC	NG	FO2	PL	PL	Unknown	Jun-93	Unknown	526,250	485	442
	1-12		GT	NG	FO2	PL	PL	Unknown	Aug-70	Unknown	410,734	509	420
	13-24		GT	NG	FO2	PL	PL	Unknown	Aug-72	Unknown	410,734	509	420
Manatee		Manatee County											
		18/33S/20E									2,951,110	2,831	2,735
	1		ST	FO6	NG	WA	PL	Unknown	Oct-76	Unknown	863,300	822	812
	2		ST	FO6	NG	WA	PL	Unknown	Dec-77	Unknown	863,300	822	812
	3		CC	NG	No	PL	No	Unknown	Jun-05	Unknown	1,224,510	1,187	1,111

1/ These ratings are peak capability.

EXHIBIT 28

Schedule 1

Existing Generating Facilities
As of December 31, 2008

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
								Alt.					
						Fuel		Fuel	Commercial	Expected	Gen.Max.	Net Capability 1/	
	Unit		Unit	Fuel		Transport		Days	In-Service	Retirement	Nameplate	Winter	Summer
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Use	Month/Year	Month/Year	KW	MW	MW
Martin		Martin County											
		29/29S/38E									4,317,510	3,827	3,701
	1		ST	FO6	NG	PL	PL	Unknown	Dec-80	Unknown	934,500	832	826
	2		ST	FO6	NG	PL	PL	Unknown	Jun-81	Unknown	934,500	832	826
	3		CC	NG	No	PL	No	Unknown	Feb-94	Unknown	612,000	498	472
	4		CC	NG	No	PL	No	Unknown	Apr-94	Unknown	612,000	498	472
	8*		CC	NG	FO2	PL	PL	Unknown	Jun-05	Unknown	1,224,510	1,167	1,105
Port Everglades		City of Hollywood											
		23/50S/42E									1,710,384	1,720	1,625
	1		ST	FO6	NG	WA	PL	Unknown	Jun-60	Unknown	247,775	214	213
	2		ST	FO6	NG	WA	PL	Unknown	Apr-61	Unknown	247,775	214	213
	3		ST	FO6	NG	WA	PL	Unknown	Jul-64	Unknown	402,050	389	387
	4		ST	FO6	NG	WA	PL	Unknown	Apr-65	Unknown	402,050	394	392
	1-12		GT	NG	FO2	PL	PL	Unknown	Aug-71	Unknown	410,734	509	420
Putnam		Putnam County											
		16/10S/27E									580,008	560	498
	1		CC	NG	FO2	PL	WA	Unknown	Apr-78	Unknown	290,004	280	249
	2		CC	NG	FO2	PL	WA	Unknown	Aug-77	Unknown	290,004	280	249
Riviera		City of Riviera Beach											
		33/42S/43E									620,840	571	565
	3		ST	FO6	NG	WA	PL	Unknown	Jun-62	Unknown	310,420	280	277
	4		ST	FO6	NG	WA	PL	Unknown	Mar-63	Unknown	310,420	291	288
Sanford		Volusia County											
		16/19S/30E									2,533,970	2,217	2,050
	3		ST	FO6	NG	WA	PL	Unknown	May-59	Unknown	156,250	140	138
	4		CC	NG	No	PL	No	Unknown	Oct-03	Unknown	1,188,860	1,040	958
	5		CC	NG	No	PL	No	Unknown	Jun-02	Unknown	1,188,860	1,037	954

1/ These ratings are peak capability.

* Martin 8 A and B combustion turbine units went into service on 6/14/2001 and the conversion to Combined Cycle went into service 6/30/2005.

EXHIBIT 28

Schedule 1

Existing Generating Facilities
As of December 31, 2008

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
								Alt.					
						Fuel		Fuel	Commercial	Expected	Gen.Max.	Net Capability 1/	
	Unit		Unit	Fuel		Transport		Days	In-Service	Retirement	Nameplate	Winter	Summer
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Use	Month/Year	Month/Year	KW	MW	MW
Scherer 2/		Monroe, GA									680,368	652	646
	4		BIT	BIT	No	RR	No	Unknown	Jul-89	Unknown	680,368	652	646
St. Johns River Power Park 3/		Duval County 12/15/28E (RPC4)									271,836	250	254
	1		BIT	BIT	Pet	RR	WA	Unknown	Mar-87	Unknown	135,918	125	127
	2		BIT	BIT	Pet	RR	WA	Unknown	May-88	Unknown	135,918	125	127
St. Lucie		St. Lucie County 16/36S/41E									1,573,775	1,579	1,553
	1		NP	UR	No	TK	No	Unknown	May-76	Unknown	850,000	853	839
	2	4/	NP	UR	No	TK	No	Unknown	Jun-83	Unknown	723,775	726	714
Turkey Point		Miami Dade County 27/57S/40E									3,560,548	3,451	3,334
	1		ST	FO6	NG	WA	PL	Unknown	Apr-67	Unknown	402,050	398	396
	2		ST	FO6	NG	WA	PL	Unknown	Apr-68	Unknown	402,050	394	392
	3		NP	UR	No	TK	No	Unknown	Nov-72	Unknown	759,900	717	693
	4		NP	UR	No	TK	No	Unknown	Jun-73	Unknown	759,900	717	693
	5		CC	NG	FO2	PL	PL	Unknown	May-07	Unknown	1,224,510	1213	1,148
	1-5		IC	FO2	No	TK	No	Unknown	Dec-67	Unknown	12,138	12	12
											Total System as of December 31, 2008 =	**23,358**	**22,087**

1/ These ratings are peak capability.

2/ These ratings represent Florida Power & Light Company's share of Scherer Unit No. 4, adjusted for transmission losses.

3/ The net capability ratings represent Florida Power & Light Company's share of St. Johns River Park Unit No. 1 and No. 2, excluding Jacksonville Electric Authority (JEA) share of 80%.

4/ Total capability of each unit is 853/839 MW. FPL's ownership share of St. Lucie 1 and 2 is 100%(853/839) and 85% (714/726) respectively as shown above. FPL's share of the deliverable capacity from each unit is approx. 92.5% and exclude the Orlando Utilities Commission (OUC) and Florida Municipal Power Agency (FMPA) combined portion of approximately 7.44776% per unit.

EXHIBIT 28

CHAPTER II

Forecast of Electric Power Demand

EXHIBIT 28

(This page is left intentionally blank.)

EXHIBIT 28

II. Forecast of Electric Power Demand

II. A. Overview of the Load Forecasting Process

Long-term (20-year) forecasts of sales, net energy for load (NEL), and peak loads are typically developed on an annual basis for resource planning work at FPL. New long-term forecasts were developed by FPL in January 2009 that replaced the previous long-term load forecasts that were used by FPL during 2008 in much of its resource planning work and which were presented in FPL's 2008 Site Plan. These new load forecasts are utilized throughout FPL's 2009 Site Plan. These forecasts are a key input to the models used to develop FPL's integrated resource plan. The following pages describe how forecasts are developed for each component of the long-term forecast: sales, NEL, and peak loads.

Consistent with past forecasts, the primary drivers to develop these forecasts include economic conditions and weather.

The projections for the national and Florida economies are obtained from the consulting firm Global Insight. Population projections are obtained from the Bureau of Economic and Business Research (BEBR) of the University of Florida. These inputs are quantified and qualified using statistical models in terms of their impact on the future demand for electricity.

Weather is always a key factor that affects FPL's energy sales and peak demand. Two sets of weather variables are developed and used in FPL's forecasting models:

1. Cooling and Heating Degree-Hours are used to forecast energy sales.
2. Temperature data is used to forecast Summer and Winter peaks.

The Cooling and Heating Degree-Hours are used to capture the changes in the electric usage of weather-sensitive appliances such as air conditioners and electric space heaters. A composite temperature hourly profile is derived using hourly temperatures across FPL's service territory. Miami, Ft. Myers, Daytona Beach, and West Palm Beach are the locations from which temperatures are obtained. In developing the composite hourly profile, these regional temperatures are weighted by regional energy sales. This composite temperature is used to derive Cooling and Heating Degree-Hours which are based on starting point temperatures of 72°F and 66°F degrees, respectively. Similarly, composite temperature and hourly profile of temperatures are used for the Summer and Winter peak models.

EXHIBIT 28

II. B. Comparison of FPL's Current and Previous Load Forecasts

FPL's current load forecast is significantly different from the load forecast presented in its 2008 Site Plan. The current load forecast projects lower load growth. There are three factors that are the primary drivers behind the lower load forecast: projected lower population growth, higher energy efficiency impacts from new enhanced federal standards for appliance and lighting efficiency, and the effects of a lingering recession.

The customer forecast is based on a review of recent population projections from the University of Florida and Global Insight, as well as an analysis of historical population trends. Population projections through 2011 are derived from the University of Florida's October 2008 population projections which are significantly lower than prior projections. According to the University of Florida, net migration has fallen to a record low as a result of the economic slowdown and is expected to remain at historically low levels until 2010. Consequently, FPL's projects that customer growth in 2009 and 2010 will be significantly below the historical average. As population growth recovers, a modest rebound in customer growth is projected in 2011. Population growth after 2011 is based on the average levels experienced historically. As a result of lower growth in the initial years of the forecast, the total number of customers in the current load forecast remains below the levels projected in FPL's 2008 Site Plan in all years.

The impact of higher energy efficiency resulting from new federal standards for appliances and lighting is based on estimates developed by ITRON, an energy industry consulting firm. ITRON developed estimates for the impact of the 2005 National Energy Policy Act, the 2007 Energy Independence and Security Act, and the naturally occurring energy reductions resulting from the adoption of compact florescent light bulbs. As a result of these appliance and lighting standards, FPL now projects that by 2018, FPL's Summer peak demand will be approximately 2,095 MW lower than it otherwise would have been. This projected impact from higher appliance and lighting standards is 839 MW more than the 1,256 MW reduction assumed in the 2008 Site Plan. In the 2008 Site Plan, only the impact of the 2005 National Energy Policy Act was considered.

Economic conditions in the state are also projected to have a significant impact on the forecast. Economic conditions in the state have deteriorated significantly since the 2008 Site Plan was published. After leading the nation in job creation, Florida is now leading the nation in job losses. Likewise, Florida now ranks second in the nation in terms of foreclosures and personal bankruptcies. The severity of current economic conditions

EXHIBIT 28

suggests that Florida will likely experience a longer recession than that projected by Global Insight. Based on the examination of past recessions and review of forecasts from a number of outside experts, FPL developed an economic outlook reflecting a lingering recession through 2010 and below average growth in 2011. A resumption of cyclical growth, as forecasted by Global Insight, is forecasted by 2012.

Although the projected load growth for FPL is below that presented in FPL's 2008 Site Plan, the total growth projected by FPL for the ten-year reporting period of this document is still substantial. The Summer peak is projected to increase to 26,143 MW by 2018, an increase of 5,066 MW over the 2008 actual summer peak. Likewise, NEL is projected to reach 132,136 GWH in 2018, an increase of 21,092 GWH from the actual 2008 value. This compares to projected increases of 6,659 MW and 41,352 GWH over the ten-year reporting period presented in FPL's 2008 Site Plan compared to the 2007 actual values.

II.C. Long-Term Sales Forecasts

Long-term forecasts of electricity sales were developed for each revenue class for the forecasting period of 2009-2027 and are adjusted to match the NEL forecast. The results of these sales forecasts for the years 2009-2018 are presented in Schedules 2.1 - 2.3 which appear at the end of this chapter. Econometric models are developed for each revenue class using the statistical software package MetrixND. The methodologies used to develop energy sales forecasts for each jurisdictional revenue class and NEL forecast are outlined below.

1. Residential Sales

Residential electric usage per customer is estimated by using an econometric model. Residential sales are a function of: Cooling Degree-Hours and Heating Degree-Hours, real price of electricity (a 12-month moving average), Florida real household disposable income, dummy variables for the month of January and the specific month of November 2005, and an intercept term. A dummy variable for the calendar month of January was included to improve the predictability of the model by accounting for the otherwise higher than predicted usage in that model. A dummy variable for November 2005 was included because an analysis of residuals identified that data point as an outlier. The price of electricity plays a role in explaining electric usage, because electricity, like all other goods and services, will be used in greater or lesser quantities depending upon its price. To capture economic conditions, the model includes Florida's real household disposable income. The degree of economic

EXHIBIT 28

prosperity can, and does, affect residential electricity sales. The impact of weather is captured by the Cooling Degree-Hours and Heating Degree-Hours. Residential energy sales are forecast by multiplying the residential use per customer forecast by the number of residential customers forecasted.

2. Commercial Sales

The commercial sales forecast is also developed using an econometric model. Commercial sales are a function of the following variables: Florida non-agricultural employment, commercial real price of electricity (a 12-month moving average), Cooling Degree-Hours, as well as an autoregressive term. The price of electricity is also included as an explanatory variable in the model because it has an impact on customer usage. Cooling Degree-Hours are used to capture weather-sensitive load in the commercial sector. The model also includes an intercept and two binary variables to account for statistical outliers in November 2005 and January 2007.

3. Industrial Sales

Industrial sales were forecasted using an econometric model. The model utilizes the following variables: Florida Housing Starts, Cooling Degree-Hours, industrial real price of electricity (a 24-month moving average), and several dummy variables for outliers. The Cooling Degree-Hour is used to capture the weather-sensitive load in the industrial class.

4. Railroad & Railways Sales and Street and Highway Sales

The forecast for street and highway sales is developed using historical usage patterns and multiplying these usage levels by the number of forecasted customers. The projections for railroad & railways sales are based on historical average use per customer because the number of customers is projected to remain the same. This class consists solely of the Miami-Dade County’s Metrorail system.

5. Other Public Authority Sales

This revenue class is a closed class with no new customers being added. This class consists of sports fields and a government account. The forecast for this class is based on historical knowledge of its usage characteristics.

6. Total Sales to Ultimate Customer

Sales forecasts by revenue class are summed to produce a total sales forecast.

EXHIBIT 28

7. Sales for Resale

Sales for resale (wholesale) customers are composed of municipalities and/or electric co-operatives. These customers differ from jurisdictional customers in that they are not the ultimate users of the electricity they buy. Instead, they resell this electricity to their own customers. Currently there are four customers in this class: the Florida Keys Electric Cooperative; City of Key West; Metro-Dade County; and Seminole Electric Cooperative. In addition, FPL will begin serving the Lee County load in 2010.

FPL provides service to the Florida Keys under a long-term partial requirements contract. The sales for Florida Keys are forecasted using a regression model.

FPL's sales to the City of Key West are expected to terminate in 2013. Forecasted sales to the City of Key West are based on assumptions regarding their contract demand and expected load factor.

Metro-Dade County sells 60 MW to Florida Progress. Line losses are billed to Metro-Dade under a wholesale contract.

Seminole Electric Cooperative has contracted for delivery of 75 MW for the period of December 2008 through December 2009. Also included in the forecast is a 200 MW sale to Seminole Electric beginning in June 2014 to December 2040.

Lee County has contracted for FPL to supply a portion of their load beginning in January 2010 and for FPL to supply their total load beginning in January 2014 through December 2033. Forecasted sales to Lee County are based on assumptions regarding their contract demand and expected load factor.

II.D. Net Energy for Load (NEL)

An econometric model is developed to produce an NEL forecast. The key inputs to the model are: the real price of electricity (a 12-month moving average), Cooling and Heating Degree-Hours, and Florida real household disposable income. In addition, the model also includes an autoregressive term as well as a dummy variable for the calendar month of February. A dummy variable for the calendar month of February was added to account for the lower than otherwise predicted usage associated with that month.

EXHIBIT 28

The forecast is further adjusted for the impacts of the 2005 National Energy Policy Act, the 2007 Energy Independence and Security Act, and compact florescent light bulbs. The forecast was also adjusted for additional load estimated from hybrid cars beginning in 2012 which resulted in an increase of approximately 244 GWH by the end of the ten-year reporting period. An adjustment was also made to the forecast to account for the increase in the number of empty homes which has resulted from the current housing slump. Because the increase in empty homes is viewed as a cyclical phenomenon, only the initial years of the forecast were impacted by this adjustment.

Once the NEL forecast is obtained using the above-mentioned model, total billed sales are computed using a historical ratio of sales to NEL. The sales by class forecasts previously discussed are then adjusted to match the NEL from the annual NEL model. The forecasted NEL values for 2009 – 2018 are presented in Schedule 3.3 that appears at the end of this chapter.

II.E. System Peak Forecasts

The rate of absolute growth in FPL system peak load has been a function of a growing customer base, varying weather conditions, projected economic growth, changing patterns of customer behavior (including an increased stock of electricity-consuming appliances), and more efficient appliances and lighting. FPL developed the peak forecast models to capture these behavioral relationships. Similar to the NEL forecast, the peak forecasts are also adjusted for the empty homes in the first three years of the forecast horizon as well as for the impacts of the 2005 National Energy Policy Act, the 2007 Energy Independence and Security Act, and the impact of compact fluorescent light bulbs. The forecast was also adjusted for additional load estimated from hybrid cars which resulted in an increase of approximately 49 MW by the end of the ten-year reporting period.

The forecasting methodology of Summer, Winter, and monthly system peaks is discussed below. The forecasted values for Summer and Winter peak loads for the years 2009–2018 are presented in Schedules 3.1 and 3.2 as well as in Schedules 7.1 and 7.2.

1. System Summer Peak

The Summer peak forecast is developed using an econometric model. The variables included in the model are the price of electricity, Florida real household disposable income, Cooling Degree-Hours in the day prior to the peak, and the average

EXHIBIT 28

temperature on the day of the peak. The model below is based on the Summer peak contribution per customer and is, therefore, multiplied by total customers to derive FPL's system Summer peak.

2. <u>System Winter Peak</u>

Like the system Summer peak model, this model is also an econometric model. The model consists of two weather-related variables: the average temperature on the peak day and Heating Degree-Hours for the prior day as well as for the morning of the Winter peak day. In addition, Florida real household disposable income is a variable used in the model. The model below is based on the Winter peak contribution per customer and is, therefore, multiplied by total customers to derive FPL's system Winter peak.

3. <u>Monthly Peak Forecasts</u>

The forecasting process for monthly peaks is basically the same as for the monthly NEL forecast and consists of the following actions:

a. Develop the historical seasonal factor for each month by using ratios of historical monthly peaks to seasonal peaks.

b. Apply the monthly ratios to their respective seasonal peak forecast to derive the peak forecast by month. This process assumes that the seasonal factors remain unchanged over the forecasting period.

II.F. The Hourly Load Forecast

Forecasted values for system hourly load for the period 2009-2027 are produced using a System Load Forecasting "shaper" program. This model uses years of historical FPL hourly system load data to develop load shapes for weekdays, weekend days, and holidays. The model allows calibration of hourly values where the peak is maintained or where both the peak and minimum load-to-peak ratio is maintained.

II.G. Uncertainty

In order to address uncertainty in the forecasts of aggregate peak demand and NEL, FPL first evaluates the assumptions underlying the forecasts. FPL takes a series of steps in evaluating the input variables, including comparing projections from different sources, identifying outliers in the series, and assessing the series' consistency with past forecasts. In addition, FPL reviews factors which may affect the input variables. This may require reviewing data from local economic development boards or from FPL's own Customer Service Business Unit. Other factors which may be considered include demographic trends and housing characteristics such as starts, size, and vintage of homes.

Uncertainty is also addressed in the modeling process. Generally, econometric models are used to forecast the aggregate peak demand and NEL. During the modeling process, the relevant statistics (goodness of fit, F-statistic, P-values, mean absolute deviation (MAD), mean absolute percentage error (MAPE), etc.) are scrutinized to ensure that the models adequately explain historical variation. Once a forecast is developed, it is compared with past forecasts. Deviations from past forecasts are examined in light of changes in input assumption to ensure that the drivers underlying the forecast are well understood. Finally, forecasts of aggregate peak demand and NEL are compared with their actual values as they become available. An ongoing process of variance analyses is performed. To the extent that the variance analysis identifies large unexplained deviations between the forecast and actual values, revisions to the econometric model may be considered.

The inherent uncertainty in load forecasting is addressed in different ways in regard to FPL's overall resource planning and operational planning work. In regard to FPL's resource planning work, FPL's utilization of a 20% reserve margin criterion (approved by the FPSC) is designed, in part, to maintain reliable electric service for FPL's customers in light of forecasting uncertainty. In regard to operational planning, a extreme weather load forecast for the projected Summer peak day is produced. The maximum average temperature on the day of the Summer peak over the last twenty years is used to produce this extreme weather forecast. Likewise, the minimum average temperature on the day of the Winter peak is used to estimate the extreme weather Winter peak forecast. The extreme weather scenarios are typically estimated for a two-to- five year period.

II.H. DSM

The effects of FPL's DSM implementation to-date are assumed to be imbedded in the actual usage data for forecasting purposes. Any change in usage pattern, be it the impact of FPL's DSM efforts, price impact, or weather impact, is reflected in the actual observed load data. Therefore, energy efficiency impacts, whether market-driven or as a

EXHIBIT 28

result of FPL’s DSM programs, are assumed to be included in the historical usage data for peaks and NEL.

The load forecasts provided in the schedules at the end of this chapter are not adjusted for incremental energy efficiency that FPL plans to implement in future years. The impacts of this incremental energy efficiency, plus the impacts of FPL’s cumulative and incremental load management programs, are accounted for as “line item reductions” to the forecasts as part of the IRP process as shown in Schedules 7.1 and 7.2. After making these adjustments to the load forecasts, the resulting “firm” load forecast is then used in FPL’s IRP work.

EXHIBIT 28

Schedule 2.1
History and Forecast of Energy Consumption And Number of Customers by Customer Class

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Rural & Residential			Commercial		
Year	Population 1/	Members per Household	GWH 2/	Average 3/ No. of Customers	Average KWH Consumption Per Customer	GWH 2/	Average 3/ No. of Customers	Average KWH Consumption Per Customer
1999	7,412,744	2.22	44,187	3,332,422	13,260	35,524	404,942	87,725
2000	7,603,964	2.23	46,320	3,414,002	13,568	37,001	415,295	89,096
2001	7,754,846	2.22	47,588	3,490,541	13,633	37,960	426,573	88,989
2002	7,898,628	2.21	50,865	3,566,167	14,263	40,029	435,313	91,955
2003	8,079,316	2.21	53,485	3,652,663	14,643	41,425	444,650	93,163
2004	8,247,442	2.20	52,502	3,744,915	14,020	42,064	458,053	91,832
2005	8,469,602	2.21	54,348	3,828,374	14,196	43,468	469,973	92,490
2006	8,620,855	2.21	54,570	3,906,201	13,970	44,487	478,930	92,889
2007	8,729,806	2.19	55,138	3,981,451	13,849	45,921	493,130	93,121
2008	8,771,694	2.20	53,229	3,992,257	13,333	45,561	500,748	90,987
2009	8,775,903	2.20	52,041	3,994,173	13,029	44,878	509,881	88,016
2010	8,812,518	2.20	51,427	4,010,837	12,822	45,417	521,804	87,039
2011	8,912,688	2.20	51,654	4,056,428	12,734	46,620	534,717	87,187
2012	9,100,508	2.20	52,438	4,141,910	12,660	48,460	548,319	88,380
2013	9,287,417	2.20	52,639	4,226,978	12,453	49,537	562,200	88,113
2014	9,472,518	2.20	52,818	4,311,223	12,251	51,273	576,590	88,924
2015	9,656,156	2.20	53,087	4,394,802	12,080	52,822	591,382	89,319
2016	9,838,819	2.20	53,614	4,477,937	11,973	54,515	606,467	89,889
2017	10,020,376	2.20	54,249	4,560,569	11,895	56,233	621,955	90,414
2018	10,200,558	2.20	55,175	4,642,575	11,885	58,198	637,980	91,222

Historical Values (1999 - 2008):

1/ Population represents only the area served by FPL.

2/ Actual energy sales include the impacts of existing conservation. These values are at the meter.

3/ Average No. of Customers is the annual average of the twelve month values.

Projected Values (2009 - 2018):

1/ Population represents only the area served by FPL.

2/ Forecasted energy sales do not include the impact of incremental conservation. These values are at the meter.

3/ Average No. of Customers is the annual average of the twelve month values.

EXHIBIT 28

Schedule 2.2
History and Forecast of Energy Consumption And Number of Customers by Customer Class

(1)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Industrial						
Year	GWH [2/]	Average [3/] No. of Customers	Average KWH Consumption Per Customer	Railroads & Railways GWH	Street & Highway Lighting GWH [2/]	Other Sales to Public Authorities GWH	Total [4/] Sales to Ultimate Consumers GWH
1999	3,948	16,040	246,135	79	473	465	84,676
2000	3,768	16,410	229,616	81	408	381	87,960
2001	4,091	15,445	264,875	86	419	67	90,212
2002	4,057	15,533	261,186	89	420	63	95,523
2003	4,004	17,029	235,128	93	425	64	99,496
2004	3,964	18,512	214,139	93	413	58	99,095
2005	3,913	20,392	191,873	95	424	49	102,296
2006	4,036	21,216	190,232	94	422	49	103,659
2007	3,774	18,732	201,499	91	437	53	105,415
2008	3,587	13,377	268,168	81	423	37	102,919
2009	3,584	12,527	286,133	91	446	37	101,078
2010	3,606	12,686	284,271	91	451	36	101,029
2011	3,656	12,980	281,675	91	457	35	102,514
2012	3,690	13,257	278,319	91	464	34	105,177
2013	3,687	13,397	275,187	91	474	33	106,461
2014	3,676	13,497	272,380	91	484	33	108,375
2015	3,662	13,575	269,744	91	494	33	110,188
2016	3,645	13,604	267,928	91	504	33	112,401
2017	3,631	13,604	266,896	91	515	33	114,752
2018	3,622	13,610	266,117	91	525	33	117,644

Historical Values (1999 - 2008):

2/ Actual energy sales include the impacts of existing conservation.

3/ Average No.of Customers is the annual average of the twelve month values.

4/ GWH Col. (16) = Col. (4) + Col. (7) + Col. (10) + Col. (13) + Col. (14) + Col. (15).

Projected Values (2009 - 2018):

2/ Forecasted energy sales do not include the impact of incremental conservation.

3/ Average No. of Customers is the annual average of the twelve month values.

4/ GWH Col. (16) = Col. (4) + Col. (7) + Col. (10) + Col. (13) + Col. (14) + Col. (15).

EXHIBIT 28

Schedule 2.3
History and Forecast of Energy Consumption And Number of Customers by Customer Class

(1) Year	(17) Sales for Resale GWH	(18) Utility Use & Losses GWH	(19) Net[5/] Energy For Load GWH[6/]	(20) Average[3/] No. of Other Customers	(21) Total Average[3/,7/] Number of Customers
1999	953	5,829	91,458	2,605	3,756,009
2000	970	7,059	95,989	2,694	3,848,401
2001	970	7,222	98,404	2,722	3,935,281
2002	1,233	7,443	104,199	2,792	4,019,805
2003	1,511	7,386	108,393	2,879	4,117,221
2004	1,531	7,464	108,091	3,029	4,224,509
2005	1,506	7,498	111,301	3,157	4,321,896
2006	1,569	7,909	113,137	3,216	4,409,563
2007	1,499	7,401	114,315	3,276	4,496,589
2008	993	7,092	111,004	3,347	4,509,729
2009	1,149	7,213	109,440	3,405	4,519,986
2010	2,137	7,042	110,207	3,435	4,548,763
2011	2,252	7,161	111,926	3,470	4,607,594
2012	2,280	7,358	114,815	3,519	4,707,005
2013	2,172	7,394	116,027	3,580	4,806,155
2014	5,122	7,631	121,128	3,649	4,904,959
2015	5,844	7,768	123,800	3,722	5,003,480
2016	5,952	7,925	126,278	3,796	5,101,804
2017	6,070	8,087	128,908	3,871	5,199,999
2018	6,202	8,289	132,136	3,946	5,298,111

Historical Values (1999 - 2008):

3/ Average No.of Customers is the annual average of the twelve month values.

5/ GWH Col. (19) = Col. (16) + Col. (17) + Col. (18). Actual NEL include the impacts of existing conservation and agrees to Col. (8) on Schedule 3.3.

6/ Actual energy sales include the impacts of existing conservation. These values are at the generator.

7/ Total Col. (21) = Col. (5) + Col. (8) + Col. (11) + Col. (20).

Projected Values (2009 - 2018):

2/ Forecasted energy sales do not include the impact of incremental conservation and agrees to Col. (2) on Schedule 3.3.

3/ Average No.of Customers is the annual average of the twelve month values.

5/ GWH Col. (19) = Col. (16) + Col. (17) + Col. (18). Matches to Col (2) on Schedule 3.3 for Forecasted \

6/ Total Col. (21) = Col. (5) + Col. (8) + Col. (11) + Col. (20).

EXHIBIT 28

Schedule 3.1
History and Forecast of Summer Peak Demand: Base Case

(1) August of Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Res. Load Management	(7) Residential Conservation	(8) C/I Load Management	(9) Small Business Load Management	(10) C/I Conservation	(11) Net Firm Demand
1999	17,615	169	17,446	0	673	592	438	15	420	16,490
2000	17,808	161	17,647	0	719	645	448	19	451	16,622
2001	18,754	169	18,585	0	737	697	449	40	481	17,529
2002	19,219	261	18,958	0	770	755	441	49	517	17,960
2003	19,668	253	19,415	0	781	799	516	61	554	18,310
2004	20,545	258	20,287	0	783	847	517	71	578	19,174
2005	22,361	264	22,097	0	790	895	516	84	611	20,971
2006	21,819	256	21,563	0	809	948	516	120	640	20,375
2007	21,962	261	21,701	0	954	982	515	200	683	20,293
2008	21,060	181	20,879	0	974	1042	538	221	705	19,327
2009	21,124	241	20,882	0	1,016	76	753	86	65	19,128
2010	21,147	381	20,765	0	1,034	122	772	93	98	19,028
2011	21,368	385	20,983	0	1,053	171	780	100	132	19,132
2012	21,933	393	21,540	0	1,073	222	788	107	167	19,576
2013	22,249	354	21,895	0	1,095	275	796	114	203	19,766
2014	23,533	1,184	22,349	0	1,120	329	804	121	240	20,919
2015	24,142	1,205	22,937	0	1,146	385	812	128	278	21,393
2016	24,772	1,229	23,543	0	1,172	440	820	136	316	21,888
2017	25,401	1,256	24,145	0	1,198	496	828	143	353	22,383
2018	26,143	1,284	24,860	0	1,207	514	831	145	366	23,080

Historical Values (1999 - 2008):

Col. (2) - Col. (4) are actual values for historical summer peaks. As such, they incorporate the effects of conservation (Col. 7 & Col. 10), and may incorporate the effects of load control if load control was operated on these peak days. Therefore, Col. (2) represents the actual Net Firm Demand.

Col. (5) - Col. (10) for 1999 through 2008 represent actual DSM capabilities starting from January 1988 and are annual (12-month) values. Note that the values for FPL's former Interruptible Rate are incorporated into Col. (8), which also includes Business On Call (BOC) and Commercial /Industrial Demand Reduction (CDR).

Col (9) represents FPL's Business On Call program.

Col. (11) represents a HYPOTHETICAL "Net Firm Demand" if the load control values had definitely been exercised on the peak. Col. (11) is derived by the formula:Col. (11) = Col.(2) - Col.(6) - Col.(8)- Col. (9).

Projected Values (2009 - 2018):

Col. (2) - Col.(4) represent FPL's forecasted peak w/o incremental conservation or cumulative load control. The effects of conservation implemented prior to 2004 are incorporated into the load forecast.

Col. (5) - Col. (10) represent all incremental conservation,current load management and incremental load management. These values are projected August values and the conservation values are based on projections with a 1/2008 starting point designed for use with the 2008 load forecast.

Col (9) represents FPL's Business On Call program.

Col. (11) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented on the peak. Col. (11) is derived by using the formula: Col. (11) = Col. (2) - Col. (5) - Col. (6) - Col. (7) - Col. (8) - Col. (9)-Col (10).

EXHIBIT 28

Schedule 3.2
History and Forecast of Winter Peak Demand:Base Case

(1) January of Year	(2) Total	(3) Firm Wholesale	(4) Retail	(5) Interruptible	(6) Res. Load Management	(7) Residential Conservation	(8) C/I Load Management	(9) Small Business Load Management	(10) C/I Conservation	(11) Net Firm Demand
2000	17,057	142	16,915	0	741	434	438	0	176	15,878
2001	18,199	150	18,049	0	791	459	448	0	183	16,960
2002	17,597	145	17,452	0	811	500	457	0	196	16,329
2003	20,190	246	19,944	0	847	546	453	0	206	18,890
2004	14,752	211	14,541	0	857	570	532	0	230	13,363
2005	18,108	225	17,883	0	862	583	542	0	233	16,704
2006	19,683	225	19,458	0	870	600	550	0	240	18,263
2007	16,815	223	16,592	0	894	620	577	0	249	15,344
2008	18,055	163	17,892	0	879	644	635	0	279	16,541
2009	20,031	216	19,815	0	922	48	729	0	31	18,380
2010	18,790	329	18,461	0	938	73	767	0	41	16,971
2011	19,120	334	18,786	0	955	105	775	0	53	17,232
2012	19,710	340	19,370	0	973	138	783	0	67	17,749
2013	20,098	346	19,752	0	992	171	791	0	81	18,063
2014	21,154	878	20,276	0	1,012	205	799	0	97	19,041
2015	21,882	1,100	20,783	0	1,036	239	807	0	113	19,687
2016	22,396	1,123	21,273	0	1,060	273	815	0	130	20,118
2017	22,912	1,148	21,764	0	1,084	307	823	0	146	20,552
2018	23,466	1,173	22,293	0	1,106	338	831	0	161	21,030

Historical Values (1999 - 2008):

Col. (2) - Col. (4) are actual values for historical winter peaks. As such, they incorporate the effects of conservation (Col. 7 & Col. 10), and may incorporate the effects of load control if load control was operated on these peak days. Therefore, Col. (2) represents the actual Net Firm Demand.

Col. (5) - Col.(10) for 2000 through 2008 represent actual DSM capabilities starting from January 1988 and are annual (12-month) values. Note that the values for FPL's former Interruptible Rate are incorporated into Col. (8), which also includes Business On Call (BOC) and Commercial/Industrial Demand Reduction (CDR).

Col (9) represents FPL's Business On Call program.

Col. (11) represents a HYPOTHETICAL "Net Firm Demand" if the load control values had definitely been exercised on the peak. Col. (11) is derived by the formula: Col. (11) = Col. (2) - Col. (6) - Col. (8).

Projected Values (2009 - 2018):

Col. (2) - Col.(4) represent FPL's forecasted peak w/o incremental conservation or cumulative load control. The effects of conservation implemented prior to 2004 are incorporated into the load forecast.

Col. (5) - Col.(10) represent all incremental conservation and cumulative load control. These values are projected January values and the conservation values are based on projections with a 1/2008 starting point designed for use with the 2008 load forecast.

Col (9) represents FPL's Business On Call program.

Col. (11) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented on the peak. Col. (11) is derived by using the formula: Col. (11) = Col. (2) - Col. (5) - Col. (6) - Col. (7) - Col. (8) - Col. (9)- Col.(10).

EXHIBIT 28

Schedule 3.3

History of Annual Net Energy for Load - GWH: Base Case

(All values are "at the generator"value except for Col (8))

(1)	(2) = (3) + (3) + (5)	(3)	(4)	(5)	(6)	(7)	(8) = (5) - (6) - (7)	(9)
Year	Total Net Energy For Load without DSM	Residential Conservation	C/I Conservation	**Actual** Net Energy For Load	Sales for Resale GWH	Utility Use & Losses	**Actual** Total Billed Retail Energy Sales (GWH)	Load Factor(%)
1999	94,365	1,542	1,365	91,458	953	5,829	84,676	59.3%
2000	99,097	1,674	1,434	95,989	970	7,059	87,960	61.4%
2001	101,739	1,789	1,545	98,404	970	7,222	90,212	59.9%
2002	107,755	1,917	1,639	104,199	1,233	7,443	95,523	61.9%
2003	112,160	2,008	1,759	108,393	1,511	7,386	99,496	62.9%
2004	112,031	2,106	1,834	108,091	1,531	7,464	99,095	59.9%
2005	115,440	2,205	1,934	111,301	1,506	7,498	102,296	56.8%
2006	117,490	2,312	2,041	113,137	1,569	7,909	103,659	59.2%
2007	118,894	2,373	2,206	114,315	1,499	7,401	105,415	59.4%
2008	115,755	2,485	2,267	111,004	993	7,092	102,919	60.0%

Historical Values (1999 - 2008):

Col. (2) represents derived "Total Net Energy For Load w/o DSM". The values are calculated using the formula: Col. (2) = Col. (3) + Col. (4) + Col. (5).

Col.(3) & Col.(4) for 1999 through 2008 are DSM values starting in January 1988 and are annual (12-month) values.Col. (3) and Col. (4) for 2008 are "estimated actuals" and are also annual (12-month) values. The values represent the total GWH reductions actually experienced each year .

Col. (5) is the actual Net Energy for Load (NEL) for years 1999 - 2008.

Col. (8) is the Total Retail Billed Sales. The values are calculated using the formula: Col. (8) = Col. (5) - Col. (6) - Col. (7).

Col. (9) is calculated using Col. (5) from this page and Col. (2), "Total", from Schedule 3.1 using the formula: Col. (9) = ((Col. (5)*1000) / ((Col.(2) * 8760)
Adjustments are made for leap years.

Forecast of Annual Net Energy for Load - GWH: Base Case

(All values are "at the generator"value except for Col (8))

(1)	(2)	(3)	(4)	(5) = (2) - (3) - (4)	(6)	(7)	(8) = (2) - (6) - (7)	(9)
Year	**Forecasted** Net Energy For Load without DSM	Residential Conservation	C/I Conservation	Net Energy For Load Adjusted for DSM	Sales for Resale GWH	Utility Use & Losses	**Forecasted** Total Billed Retail Energy Sales (GWH) without DSM	Load Factor(%)
2009	109,440	142	106	109,192	1,149	7,213	101,078	59.1%
2010	110,207	236	155	109,816	2,137	7,042	101,029	59.5%
2011	111,926	334	207	111,386	2,252	7,161	102,514	59.8%
2012	114,815	434	261	114,119	2,280	7,358	105,177	59.6%
2013	116,027	539	319	115,169	2,172	7,394	106,461	59.5%
2014	121,128	647	380	120,102	5,122	7,631	108,375	58.8%
2015	123,800	754	440	122,605	5,844	7,768	110,188	58.5%
2016	126,278	862	501	124,915	5,952	7,925	112,401	58.0%
2017	128,908	970	562	127,376	6,070	8,087	114,752	57.9%
2018	132,136	1,078	564	130,494	6,202	8,289	117,644	57.7%

Forecasted Values (2009 - 2018):

Col. (2) represents Forecasted Net Energy for Load w/o DSM values. The values are extracted from Schedule 2.3, Col. (19).

Col. (3) & Col. (4) are forecasted values of the reduction on sales from incremental conservation and are mid-year (6-month) values.
The effects of conservation implemented prior to 2009 are incorporated into the load forecast.

Col. (5) is the forecasted Net Energy for Load (NEL) with DSM for years 2008 - 2017. Col (5) = Col (2) -Col (3) - Col (4).

Col. (8) is the Retail Billed Sales. The values are calculated using the formula: Col. (8) = Col. (2) - Col. (6) - Col. (7).These values are at the meter.

Col. (9) is calculated using Col. (2) from this page and Col. (2), "Total", from Schedule 3.1. Col. (9) = ((Col. (2)*1000) / ((Col. (2) * 8760)
Adjustments are made for leap years.

EXHIBIT 28

Schedule 4
Previous Year Actual and Two-Year Forecast of Retail Peak Demand and Net Energy for Load (NEL) by Month

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2008 ACTUAL		2009* FORECAST		2010* FORECAST	
Month	Total Peak Demand MW	NEL GWH	Total Peak Demand MW	NEL GWH	Total Peak Demand MW	NEL GWH
JAN	18,055	8,230	18,697	7,970	18,790	7,981
FEB	15,735	7,843	15,443	7,225	15,533	7,265
MAR	16,226	8,258	16,260	8,039	16,265	8,094
APR	16,995	8,815	17,389	8,451	17,462	8,506
MAY	20,289	9,814	19,369	9,338	19,429	9,382
JUN	20,565	10,836	20,122	10,369	20,192	10,401
JUL	20,951	10,374	20,809	10,780	20,873	10,834
AUG	21,060	11,090	21,124	10,985	21,147	11,041
SEP	20,456	11,102	20,650	10,635	20,696	10,702
OCT	18,752	9,254	19,253	9,446	19,287	9,547
NOV	16,538	7,886	16,788	8,265	16,835	8,384
DEC	14,849	7,502	15,786	7,936	15,791	8,070
TOTALS		111,004		109,440		110,207

* Forecasted Peaks & NEL do not include the impacts of cumulative load management and incremental conservation and are consistent with values shown in Col. (19) of Schedule 2.3 and Col (2) of Schedule 3.3.

EXHIBIT 28

CHAPTER III

Projection of Incremental Resource Additions

EXHIBIT 28

(This page is left intentionally blank.)

EXHIBIT 28

III. Projection of Incremental Resource Additions

III.A FPL's Resource Planning:

FPL developed an integrated resource planning (IRP) process in the early 1990s and has since utilized the process to determine when new resources are needed, what the magnitude of the needed resources are, and what type of resources should be added. The timing and type of new power plants, the primary subjects of this document, are determined as part of the IRP process work. This section discusses how FPL applied this process in its 2008 and early 2009 resource planning work.

Four Fundamental Steps of FPL's Resource Planning:

There are 4 fundamental steps to FPL's resource planning. These steps can be described as follows:

Step 1: Determine the magnitude and timing of FPL's new resource needs;

Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of FPL's resource needs (i.e., identify competing options and resource plans);

Step 3: Evaluate the competing options and resource plans in regard to system economics and non-economic factors; and,

Step 4: Select a resource plan and commit, as needed, to near-term options.

Figure III.A.1 graphically outlines the 4 steps.

EXHIBIT 28

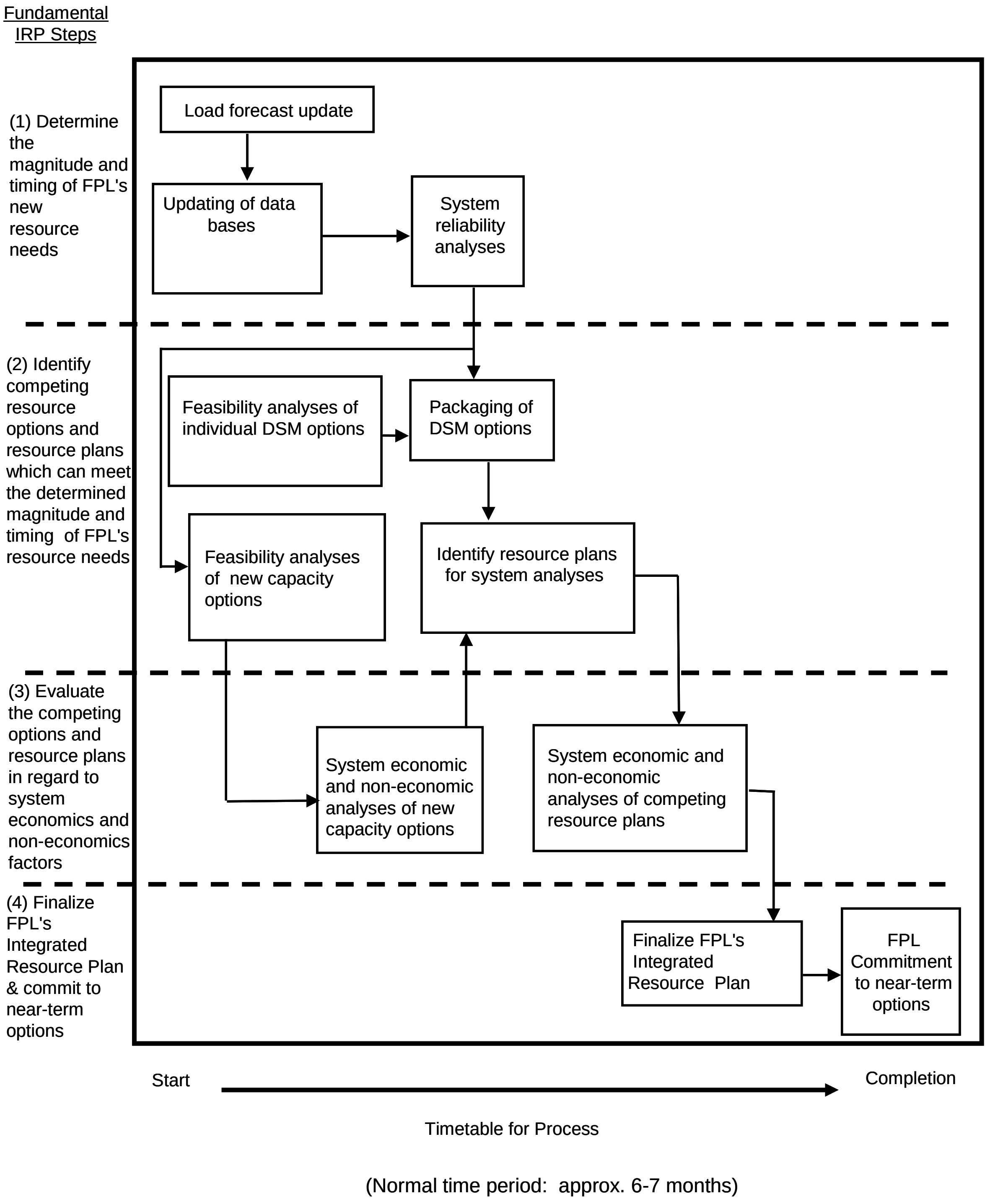


Figure III.A.1: Overview of FPL's IRP Process

EXHIBIT 28

Step 1: Determine the Magnitude and Timing of FPL's New Resource Needs:

The first of the four resource planning steps, determining the magnitude and timing of FPL's resource needs, is essentially a determination of the amount of capacity or megawatts (MW) of load reduction, new capacity additions, or a combination of both load reduction and new capacity additions that are needed to maintain system reliability. Also determined in this step is when the MW are needed to meet FPL's planning criteria. This step is often referred to as a reliability assessment, or resource adequacy, analysis for the utility system.

Step 1 typically starts with an updated load forecast. Several databases are also updated in this first fundamental step, not only with the new information regarding forecasted loads, but also with other information that is used in many of the fundamental steps in resource planning. Examples of this new information include, but not limited to: delivered fuel price projections, current financial and economic assumptions, and power plant capability and reliability assumptions. FPL also includes key assumptions regarding three specific resource areas: (1) near-term construction capacity additions, (2) firm capacity power purchases, and (3) DSM implementation.

The first of these assumptions is based on new generating capacity additions that have been approved by the Florida Public Service Commission (FPSC) through Determination of Need hearings that evaluated both the need for, and the cost-effectiveness of, each of the new capacity additions. These generating capacity additions have also either received the necessary Site Certification approvals from either the Secretary of the Florida Department of Environmental Protection (FDEP) or the Governor and Cabinet (acting as the Siting Board) or, as in the case of the new nuclear units, are in the process of receiving the necessary state and federal approvals. A number of new generating unit additions will occur in the 2009 – 2018 time frame that is addressed in this document.

These generating unit additions include:

- Three new natural gas-fired CC units at FPL's West County Energy Center (WCEC) site that are scheduled to come in-service during 2009 through 2011. These new units will each add approximately 1,219 MW (Summer) of generation capacity. FPL selected these CC units, designated as WCEC Units 1, 2, & 3, after conducting two Request for Proposals (RFP) solicitations and evaluating the options received in response to the RFPs.

EXHIBIT 28

- Two new photovoltaic (PV) solar energy facilities are projected to be brought into service by 2010. One of these PV facilities will be placed in DeSoto County and will be named the DeSoto Next Generation Solar Energy Center. This facility is projected to have a nameplate rating of 25 MW. The second PV facility will be named the Space Coast Next Generation Solar Energy Center and is projected to have a nameplate rating of 10 MW. The FPSC approved the eligibility of expenditures for these PV facilities to be recovered through the environmental cost recovery clause in August 2008. The DeSoto Next Generation Solar Energy Center obtained an Environmental Resource Permit and an Army Corps of Engineers permit in October 2008. The Space Coast Next Generation Solar Energy Center received the Army Corps of Engineers permit in December 2008 and expects to receive the Environmental Resource Permit in mid-2009.
- A new solar thermal facility at FPL's existing Martin plant site is also projected to be brought into service in 2010. This solar thermal facility, named the Martin Next Generation Solar Energy Center, is projected to be able to produce up to 75 MW of steam capability, thus allowing reduced use of fossil fuels by FPL when the solar thermal facility is producing steam. The FPSC approved the eligibility of expenditures for this solar thermal facility to be recovered through the environmental cost recovery clause in August 2008. FPL received the site certification modification approval in August 2008.
- Two existing generating plants, each consisting of two older fossil fuel-fired generating units, are projected to be converted into new, highly efficient CC units. The existing plant at FPL's Cape Canaveral site will be replaced in 2013 by a new CC unit with a projected output of 1,219 MW. This new plant will be called the Cape Canaveral Next Generation Clean Energy Center. The existing plant at FPL's Riviera site will be replaced in 2014 by a new CC unit with a projected output of 1,207 MW. This new plant will be called the Riviera Beach Next Generation Clean Energy Center. These conversions were approved by the FPSC in September 2008. The site certification application for Cape Canaveral was filed in December 2008 and the site certification application for Riviera Beach was filed in February 2009. A decision is expected to be reached regarding these applications in early 2010.
- Two new nuclear units (Turkey Point Units 6 & 7) are projected to be brought into service in 2018 and 2020, respectively. Each unit is projected to produce approximately 1,100 MW. The FPSC approved the need for these new nuclear units in April 2008. As part of this approval, FPL will be providing a annual feasibility analysis as part of the annual nuclear cost recovery process. A multi-year permitting review process for these units is currently underway. Because this Site Plan

EXHIBIT 28

addresses the time period through 2018, the first of these two units, Turkey Point Unit 6, is now included in the 2009 Site Plan.

- In addition, FPL will be adding approximately 400 MW of increased generating capacity at its existing nuclear power plants at its Turkey Point and St. Lucie sites. This increased capacity is scheduled to come in-service in 2011 and 2012. These capacity “uprates” were approved by the FPSC in January 2008. The Final Order for the Site Certification was issued in September 2008 for the St. Lucie uprates and October 2008 for the Turkey Point uprates.

These new generating units were added for a variety of reasons including cost-effectiveness, significant system fuel savings, and significant system emission reductions, including greenhouse gas emission reductions. In addition, the solar projects will increase the contribution of renewable energy sources towards meeting the electricity needs of FPL’s customers.

The second of these assumptions involves firm capacity power purchases. FPL’s current projection of firm capacity purchases is very similar to the projection shown in FPL’s 2008 Site Plan. These firm capacity purchases are from a combination of utility and independent power producers. Details, including the annual total capacity values for these purchases, are presented in Chapter I in Tables I.B.1 and I.B.2. These purchased capacity amounts were incorporated in FPL’s resource planning work.

The third of these assumptions involves a projection of the amount of additional demand side management (DSM) that is projected to be implemented annually over the ten-year period. Since 1994, FPL’s resource planning work has assumed that at least the DSM MW called for in FPL’s approved DSM Goals will be achieved as planned. This is again the case with the resource plan FPL discusses in its 2009 Site Plan.

There is essentially no change in the amount of DSM shown between the 2008 Site Plan and the 2009 Site Plan. The DSM values that are presented in this 2009 Site Plan, are based on meeting FPL’s currently approved DSM Goals through 2014, plus implementing additional cost-effective DSM through 2014 that was identified by FPL after the current DSM Goals were established, and a projection of continued DSM additions in 2015 through 2017 at an annual implementation rate commensurate with that in the years leading up to 2014. Because the 2009 Site Plan addresses one more year (2018) than did the 2008 Site Plan, FPL has extended its DSM projection out one more year to 2018 using a similar annual implementation rate.

EXHIBIT 28

However, FPL is scheduled to present its new projections of cost-effective DSM to the FPSC in June 2009. These new projections will be used to determine FPL's new DSM Goals for the years 2010 through 2019. The analyses to develop these new projections of cost-effective DSM for the new DSM Goals are currently a work in progress at the time the 2009 Site Plan is being filed. The final order from the FPSC establishing FPL's new DSM Goals is expected in the 4th Quarter of 2009. The subsequent development and approval of FPL's DSM Plan (with which FPL will meet the new Goals) will likely be made in early 2010. Therefore, the impact of FPL's new DSM Goals and DSM Plan will be reflected next year in FPL's 2010 Site Plan.

These key assumptions, plus the other updated information, are then applied in the first fundamental step: the determination of the magnitude and the timing of FPL's resource needs. This determination is accomplished by system reliability analyses which are typically based on a dual planning criteria of a minimum peak period reserve margin of 20% (FPL applies this to both Summer and Winter peaks) and a maximum loss-of-load probability (LOLP) of 0.1 day per year. Both of these criteria are commonly used throughout the utility industry.

Historically, two types of methodologies, deterministic and probabilistic, have been employed in system reliability analysis. The calculation of excess firm capacity at the annual system peaks (reserve margin) is the most common method, and this relatively simple deterministic calculation can be performed on a spreadsheet. It provides an indication of the adequacy of a generating system's capacity resources compared to its load during peak periods. However, deterministic methods do not take into account probabilistic-related elements such as the impact of individual unit failures. For example: two 50 MW units which can be counted on to run 90% of the time are more valuable in regard to utility system reliability than is one 100 MW unit which can also be counted on to run 90% of the time. Probabilistic methods also recognize the value of being part of an interconnected system with access to multiple capacity sources.

For this reason, probabilistic methodologies have been used to provide an additional perspective on the reliability of a generating system. There are a number of probabilistic methods that are being used to perform system reliability analyses. Of these, the most widely used is loss-of-load probability or LOLP. Simply stated, LOLP is an index of how well a generating system may be able to meet its demand (i.e., a measure of how often load may exceed available resources). In contrast to reserve margin, the calculation of

EXHIBIT 28

LOLP looks at the daily peak demands for each year, while taking into consideration such probabilistic events as the unavailability of individual generators due to scheduled maintenance or forced outages.

LOLP is expressed in units of the “number of times per year” that the system demand could not be served. The standard for LOLP accepted throughout the industry is a maximum of 0.1 day per year. This analysis requires a more complicated calculation methodology than does the reserve margin analysis. LOLP analyses are typically carried out using computer software models such as the Tie Line Assistance and Generation Reliability (TIGER) program used by FPL.

The result of the first fundamental step of resource planning is a projection of how many new MW of resources are needed to meet both reserve margin and LOLP criteria, and thus maintain system reliability, and of when the MW are needed. Information regarding the timing and magnitude of these resource needs is used in the second fundamental step: identifying resource options and resource plans that can meet the determined magnitude and timing of FPL’s resource needs.

Step 2: Identify Resource Options and Plans That Can Meet the Determined Magnitude and Timing of FPL’s Resource Needs:

The initial activities associated with this second fundamental step of resource planning generally proceed concurrently with the activities associated with Step 1. During Step 2, feasibility analyses of new capacity options are conducted to determine which new capacity options appear to be the most competitive on FPL’s system. These analyses also establish capacity size (MW) values, projected construction/permitting schedules, and operating parameters and costs. In similar analyses, feasibility analyses of new DSM options and/or continued growth in existing DSM options are conducted.

The individual new resource options emerging from these feasibility options are then typically “packaged” into different resource plans which are designed to meet the system reliability criteria. In other words, resource plans are created by combining individual resource options so that the timing and magnitude of FPL’s new resource needs are met. The creation of these competing resource plans is typically carried out using spreadsheet, dynamic programming, and/or linear and non-linear programming techniques.

EXHIBIT 28

At the conclusion of the second fundamental resource planning step, a number of different combinations of new resource options (i.e., resource plans) of a magnitude and timing necessary to meet FPL's resource needs are identified.

Step 3: Evaluate the Competing Options and Resource Plans in Regard to System Economics and Non-Economic Factors:

At the completion of fundamental steps 1 & 2, the most viable new resource options have been identified, and these resource options have been combined into a number of resource plans which meet the magnitude and timing of FPL's resource needs. The stage is set for evaluating these resource options and resource plans. In 2008, once the resource plans were developed, FPL utilized the P-MArea production cost model and a Fixed Cost Spreadsheet to perform the economic analyses. The P-MArea model is the model used by FPL to develop the Fuel Cost Budget and to conduct other production cost-related analyses.

FPL also utilized several other models in the economic evaluation portion of its resource planning work. For analyses of individual DSM options, FPL typically uses its DSM cost-effectiveness model which is an FPL spreadsheet model utilizing the FPSC's approved methodology for analyzing the cost-effectiveness of individual DSM measures/programs, and its non-linear programming model for analyzing the potential for lowering system peak loads through additional load management capacity.

The basic economic analyses of the competing resource plans focus on total system economics. The standard basis for comparing the economics of competing resource plans is their relative impact on FPL's electricity rate levels, with the intent of minimizing FPL's leveled system average rate (i.e., a Rate Impact Measure or RIM methodology). However, in cases in which the DSM contribution was assumed as a given and the only competing options were new generating units and/or purchase options, comparisons of competing resource plans' impacts on electricity rates and on system revenue requirements are equivalent. Consequently, the competing options and plans in such cases were evaluated on a cumulative present value revenue requirement (CPVRR) basis.

Other factors are also included in FPL's evaluation of resource options and resource plans. While these factors may have an economic component or impact, they are often discussed in quantitative, but non-economic terms, such as percentages, etc. rather than

EXHIBIT 28

in terms of dollars. These factors are often referred to by FPL as “system concerns” that include (but are not necessarily limited to) maintaining/enhancing fuel diversity in the FPL system and maintaining a regional balance between load and generating capacity, particularly in Southeastern Florida. In conducting the evaluations needed to determine which resource options and resource plans are best for FPL’s system, both the economic and non-economic evaluations are conducted with an eye to whether the system concern is positively or negatively impacted by a given resource option or resource plan.

Step 4: Finalizing FPL’s Current Resource Plan

The results of the previous three fundamental steps were used to develop the future generation plan. This plan is presented in the following section.

III.B Incremental Resource Additions/Changes

FPL’s projected incremental generation capacity additions/changes for 2009 through 2018 are depicted in Table III.B.1. These capacity additions/changes result from a variety of actions including: changes to existing units (which are frequently achieved as a result of plant component replacements during major overhauls), temporarily removing older, less efficient generating units from active service and placing them into Inactive Reserve status, changes in the amounts of purchased power being delivered under existing contracts as per the contract schedules or by entering into new purchase contracts, increases in generating capacity at FPL’s four existing nuclear units, the conversion of FPL’s existing steam generating units at its existing Cape Canaveral and Riviera sites into new, very fuel-efficient CC generating units, and by construction of approved new generating units.

As shown in Table III.B.1, the capacity additions are largely made up of construction of new CC and nuclear generating units, the conversion of existing steam units into new CC units, and capacity increases at FPL’s existing nuclear generating units. (The DSM MW that FPL is adding each year are not presented in this table but have been accounted for by FPL and the FPSC in the process of obtaining approval for these new capacity additions.)

This table also shows the addition of the previously discussed 110 MW of new solar facilities (35 MW of PV and 75 MW of solar thermal). However, as indicated in the table and its footnotes, these new solar facilities are not projected to contribute new firm capacity. There are two reasons for this. First, one of these facilities – the 75 MW solar

EXHIBIT 28

thermal facility at the Martin site – is designed not to add new capacity, but to serve as a "fuel substitute" facility. When sufficient sunlight is available, the solar thermal facility will produce steam that would otherwise have been produced by burning fossil fuels. Second, in regard to the two new PV facilities that together have a 35 MW nameplate rating, it is unclear at this time what the output of these PV facilities will consistently be during FPL's late afternoon Summer and early morning Winter peak hours. Consequently, FPL is not assigning a firm capacity value (i.e., those values reflected in Table III.B.1) to these PV facilities at this time. Once FPL has actual operating experience with these PV facilities in these specific locations, it will evaluate what an appropriate firm capacity value for each of the facilities should be. However, FPL's economic and non-economic analyses fully capture the system fuel and emission savings from these three new solar facilities.

FPL is also currently assuming, for planning purposes, that it is likely to obtain additional capacity and/or energy from Renewable RFP solicitations, other proposed purchases, or its own renewable energy development efforts. For purposes of this planning document, FPL is assuming that 50 MW of firm capacity purchases from new renewable facilities will be added to FPL's system in the ten-year reporting period. In addition, one of FPL's existing renewable purchase power contracts is set to expire in 2010. For purposes of this planning document, FPL is assuming that a new contract for 55 MW of firm capacity and energy will be entered into. This is discussed further in Section III.F.

The significantly lower new load forecast, coupled with the approved additions of highly efficient new nuclear, solar, and natural gas-fired generating capacity, allow the opportunity for FPL to temporarily remove some older, less efficient generating capacity from active service, resulting in savings in operational and maintenance costs. A number of such units will be placed on Inactive Reserve status starting in 2009. The existing units that will be placed on Inactive Reserve include: Cutler Units 5 & 6, Sanford Unit 3, Port Everglades Units 1 & 2, Martin Unit 2, and Manatee Unit 2. These units will continue to be maintained and will be returned to active service when needed. The timing of the return of these units is uncertain at this time primarily due to the uncertainty regarding FPL's future load. However, for planning purposes, FPL is showing in this document that these units begin to return to active service starting in 2016.

In addition, the existing units at the Cape Canaveral and Riviera sites that will be converted to CC generation as part of the Conversions, will first be placed on Inactive Reserve status, then will be completely removed from service in preparation for the construction of the new units at those sites.

EXHIBIT 28

In regard to FPL's projected reserve margin values, these values are higher than the values projected in the 2008 Site Plan. As a consequence, no new uncommitted generation is projected to be needed in the 2009 – 2018 time frame, subject to changes in laws and regulations regarding renewable energy.[2]

---

[2] For purposes of establishing a Standard Offer Contract, and using the same forecasts and other assumptions presented in this document, FPL projects that it's next fossil-fueled new generating unit would be a Greenfield 3x1 G CC with a 2021 in-service date. Details of that unit are not provided in this Site Plan because its projected in-service date is beyond the 2009-2018 time period addressed in this document.

EXHIBIT 28

Table III.B.1: Projected Capacity Changes for FPL

Projected Capacity Changes and Reserve Margins for FPL (1)

		Net Capacity Changes (MW)	
Year	***Projected Capacity Changes***	***Winter (2)***	***Summer (3)***
2009	Changes to Existing Purchases (4)	---	(479)
	West County Unit 1 (5)	---	1,219
	DeSoto Next Generation Solar Energy Center (PV) (6)	---	---
	Riviera Unit 3 - offline for conversion	---	(276)
	Riviera Unit 4 - offline for conversion	---	(286)
	Changes to Existing Units	(78)	10
	Inactive Reserve of Existing Units - offline (8)	---	(766)
2010	Changes to Existing Purchases (4)	(559)	(352)
	West County Unit 1 (5)	1,335	---
	West County Unit 2 (5)	1,335	1,219
	Martin Next Generation Solar Energy Center (Solar Thermal) (7)	---	---
	Space Coast Next Generation Solar Energy Center (PV) (6)	---	---
	Riviera Unit 3 - offline for conversion	(277)	---
	Riviera Unit 4 - offline for conversion	(288)	---
	Cape Canaveral Unit 1 - offline for conversion	---	(395)
	Cape Canaveral Unit 2 - offline for conversion	---	(388)
	Changes to Existing Units	53	36
	Inactive Reserve of Existing Units - offline (8)	(777)	(1,648)
2011	Changes to Existing Purchases (4)	(46)	(45)
	West County Unit 3 (5)	---	1,219
	Cape Canaveral Unit 1 - offline for conversion	(397)	---
	Cape Canaveral Unit 2 - offline for conversion	(397)	---
	Inactive Reserve of Existing Units - offline (8)	(1,663)	10
	Changes to Existing Units	130	(92)
2012	Changes to Existing Purchases (4)	---	(156)
	West County Unit 3 (5)	1,335	---
	Changes to Existing Units	(11)	(11)
	Existing Nuclear Units Capacity Uprates - St. Lucie 1	103	103
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	---	88
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	---	104
2013	Changes to Existing Purchases (4)	(180)	---
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	88	---
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	104	---
	Existing Nuclear Units Capacity Uprates - Turkey Point 4	104	104
	Cape Canaveral Next Generation Clean Energy Center (5)	---	1,219
2014	Changes to Existing Purchases (4)	---	50
	Cape Canaveral Next Generation Clean Energy Center (5)	1,343	---
	Riviera Beach Next Generation Clean Energy Center	---	1,207
2015	Riviera Beach Next Generation Clean Energy Center	1,310	---
2016	Inactive Reserve of Existing Units - online (8)	---	814
	Changes to Existing Purchases (4)	---	(1,311)
2017	Inactive Reserve of Existing Units - online (8)	825	822
2018	Turkey Point Nuclear Unit 6 (5)	---	1,100
	Inactive Reserve of Existing Units - online (8)	834	---
	TOTALS =	**4,226**	**3,119**

(1) Additional information about these resulting reserve margins and capacity changes are found on Schedules 7 & 8 respectively.

(2) Winter values are values for January of the year shown.

(3) Summer values are values for August of the year shown.

(4) These are firm capacity and energy contracts with QF, utilities, and other entities. See Table I.B.1 and Table I.B.2 for more details.

(5) All new unit additions are scheduled to be in-service in June of the year shown except for WCEC 1 and WCEC 2 that are projected to be in-service in August 2009 and December 2009, respectively. WCEC 1 is included in the Summer reserve margin calculation starting in 2009 and in the Winter reserve margin calculation starting in 2010. WCEC 2 is included in both the Summer and Winter starting in 2010. All additions assumed to start in June are included in the Summer reserve margin calculation starting in that year and in the Winter reserve margin calculation starting with the next year.

(6) Because of the intermittent nature of the photovoltaics (PV) resource, FPL is currently assigning no firm capacity benefit to these generating additions. FPL will reassess this once actual operating data from the PV facilities at these locations is available. This location-specific information is needed in order to gauge consistent output during the peak hours which are accounted for in FPL's reserve margin calculations.

(7) The Martin solar thermal facility is designed to provide steam for FPL's existing Martin Unit 8 combined cycle unit, thus reducing FPL's use of natural gas. No additional capacity (MW) will result from the operation of the solar thermal facility.

(8) A number of existing FPL power plants are being temporarily removed from service and placed on Inactive Reserve status. FPL plans to return these units to active service in the future as needed. The timing of the return of these units to full-time active status is uncertain at this time primarily due to the uncertainty regarding FPL's future load. However, for planning purposes, FPL is showing in this document that these units begin to return to active service starting in 2016.

EXHIBIT 28

III.C Issues Impacting FPL's Resource Planning Work

FPL's ongoing resource planning efforts will continue to be influenced by the two driving factors previously discussed: a new lower load forecast and the addition of a significant amount of new highly efficient nuclear, solar, and CC generating capacity that has been approved by the FPSC. In addition, there are at least four other issues that will impact FPL's resource planning work. FPL refers to two of these issues as on-going system concerns that FPL has considered in its resource planning work for a number of years. These on-going system concerns include: (1) maintaining/enhancing fuel diversity in the FPL system, and (2) maintaining a balance between load and generating capacity in Southeastern Florida.

In addition, two other relatively recent issues have emerged that will also influence FPL's resource planning efforts. These include: (3) the Executive Orders directive issued in 2007 by Governor Crist calling for reduction in greenhouse gas emissions and greater contribution from renewable energy sources, and (4) a Florida standard for renewable energy contributions to a utility system.

These four (4) issues that impact FPL's on-going resource planning work are briefly discussed below.

1. System Fuel Diversity

FPL is currently dependent upon using natural gas to generate approximately half of the electricity it delivers to its customers. Therefore, FPL is continually seeking to maintain and enhance the fuel diversity of its system.

In 2007, FPL sought approval from the FPSC to add two new advanced technology coal units to its system. These two new units would have been placed in-service in 2013 and 2014. However, due to concerns over greenhouse gas emissions, FPL was unable to obtain approval for these units. Consequently, FPL does not believe that new advanced technology coal units are viable fuel diversity enhancement options in Florida for the foreseeable future.

Therefore, FPL has turned its attention to nuclear energy, renewable energy, and more efficient ways in which to generate electricity using natural gas in order to enhance its fuel diversity. In regard to nuclear energy, FPL obtained approval to increase capacity at each of FPL's four existing nuclear units by up to 104 MW. In total, these capacity

EXHIBIT 28

“uprates” will add a total of approximately 400 MW to the FPL system in the 2011/2012 time period. In 2008, the FPSC approved the need for these uprates and the ability to recover expenditures related to these uprates. In 2008, FPL also obtained FPSC approval for the need to add two new nuclear units at FPL’s existing Turkey Point site and the ability to recover expenditures related to these new units. These two new nuclear units are projected to add approximately 2,200 MW to FPL’s system. The first of these units is projected to come in-service in 2018 and the second unit to come in-service in 2020 (i.e., outside of the ten-year reporting period of this document).

FPL also has been involved in activities to investigate adding or maintaining renewable resources as a part of its generation supply. One of these activities is a variety of discussions with existing facilities aimed at maintaining or extending current agreements that are scheduled to end during the ten-year reporting period of this document. Another activity is to attempt to solicit cost-effective new renewable projects from outside parties. With respect to the latter, FPL issued a second Request for Proposals (RFP) for new renewable energy capacity and energy in April 2008 and FPL is analyzing those responses. Also, as previously discussed, FPL sought and received approval from the FPSC to add 110 MW of new FPL-owned solar facilities, both solar thermal and PV, in 2008. These FPL facilities are all scheduled to be in-service by 2010. FPL’s efforts to utilize renewable energy are discussed further in Section III.F.

In regard to using natural gas more efficiently, FPL received approvals in 2008 from the FPSC to build a third highly efficient CC unit at its West County Energy Center site (WCEC Unit 3) and to convert the older steam generating units at its existing Cape Canaveral and Riviera plant sites to new, highly efficient CC units. These new CC units will go in service in 2011, 2013, and 2014, respectively.

In the future, FPL will continue to identify and evaluate alternatives that may maintain or enhance system fuel diversity. FPL also plans to maintain the ability to utilize fuel oil at those existing units that have that capability, although cost factors currently limit the expected use of these facilities. Furthermore, FPL has traditionally purchased the gas transportation capacity required for new natural gas generating units from an existing natural gas pipeline company. As an alternative, FPL is developing plans with the goal of filing for a Need Determination by the FPSC for construction of a new natural gas pipeline in Florida capable of serving future generation needs. Such a pipeline would benefit FPL and its customers by increasing the diversity of FPL’s fuel supply sources, the physical reliability of the pipeline delivery system, and competition among pipelines.

EXHIBIT 28

2. Southeastern Florida Imbalance

In recent years an imbalance had developed between regionally installed generation and peak load in Southeastern Florida. A significant amount of energy required in the Southeastern Florida region during peak periods was being provided through the transmission system from plants located outside the region. FPL's prior planning work concluded that either additional installed generating capacity in this region, or transmission capacity capable of delivering additional electricity from outside the region, would be required to address this imbalance.

Partly because of the lower transmission-related costs resulting from their location, four recent capacity additions: Turkey Point Unit 5, and WCEC Units 1, 2, & 3, were evaluated as the most cost-effective options to meet FPL's capacity needs in the near-term. Adding these units will significantly reduce the imbalance between generation and load in Southeastern Florida.

In addition, FPL will be adding increased capacity at FPL's existing two nuclear units at Turkey Point in 2011/2012 and will be increasing the generating capacity at its Riviera site through the conversion of the existing plants at that site in 2014. The result of these approved generating unit additions in Southeastern Florida are expected to address the imbalance for most, if not all, of the 2009-2018 reporting period addressed in this document even after accounting for temporarily placing some of the existing generating units in the region on Inactive Reserve status. However, the Southeastern Florida imbalance will remain a concern in FPL's on-going resource planning work.

3. Governor Crist's Executive Orders

The Executive Orders issued in 2007, particularly the portions of those Orders directing significant increases in renewable, non-emitting energy and decreases in greenhouse gas emissions, are being addressed by FPL in a variety of ways. With respect to renewable energy, FPL's efforts to procure capacity from renewable energy sources, and to build its own renewable energy facilities, were mentioned above in regard to fuel diversity and are also discussed in more detail in Section III.F.

These renewable energy efforts have the potential to help lower greenhouse gas emissions. In addition, significant reductions, particularly of carbon dioxide (CO_2), will be accomplished by the approved capacity uprates at FPL's existing nuclear units and the planned additions of two new nuclear units at FPL's existing Turkey Point site in 2018 and 2020. Further reductions in greenhouse gas emissions are also expected from

EXHIBIT 28

increasing the overall fuel efficiency of FPL's system through the addition of the approved new generating units WCEC Units 1, 2, & 3 and the approved conversions of FPL's existing Cape Canaveral and Riviera plants. FPL will also continue to look for cost-effective ways to further improve the efficiency of its system that will lead to even more greenhouse gas emission reductions.

FPL's system CO_2 emission rate (amount of CO_2 emitted per MWh of electricity generated) is already relatively low due in large part to the overall efficiency of FPL's system. The efforts described above have the potential not only to continue the trend of steadily lowering FPL's already low CO_2 emission rate, but also to begin to lower total system CO_2 emissions despite continued growth in population.

4. <u>Renewable Portfolio Standards</u>

The ongoing effort to establish a Florida standard for renewable energy contributions to a utility system is still underway at the time this document is being prepared. A Renewable Portfolio Standard (RPS) proposal prepared by the FPSC has been sent to the Florida Legislature for consideration during the legislative session that began in March 2009. Because the eventual RPS outcome is not known at the time the 2009 Site Plan is being prepared, the resource plan presented in FPL's 2009 Site Plan does not directly address an RPS decision. Assuming that an RPS decision is reached later in 2009, FPL will determine what steps need to be taken to address the standard. These steps will be discussed next year in FPL's 2010 Site Plan.

III.D Demand Side Management (DSM)

FPL offers a wide variety of cost-effective DSM programs to its customers. In addition, FPL is actively engaged in DSM research and development. These DSM efforts are discussed in the remainder of this section.

<u>Residential DSM Programs</u>

1. **<u>Residential Building Envelope:</u>** Offers incentives to residential customers to install energy efficient reflective roof and ceiling insulation measures.

2. **<u>Duct System Testing and Repair:</u>** Provides reduced cost duct system testing to identify leaks in air conditioning duct systems, and encourages the repair of those leaks by qualified contractors. Incentives are offered for duct system repair.

EXHIBIT 28

3. **Residential Air Conditioning:** Offers incentives to customers to purchase higher efficiency heating, ventilating, and air conditioning equipment. The program includes additional incentives for: 1) plenum repair measure; 2) air handler units with electronically commutated motors; and, 3) units properly sized using FPL approved sizing software.

4. **Residential Load Management (On Call Program):** Offers load control of major appliances/household equipment to residential customers in exchange for monthly electric bill credits. Direct load control equipment is installed on selected customer end-use equipment, allowing FPL to control these customer loads as needed. Qualifying equipment (and applicable monthly credits) includes central electric air conditioners, central electric heaters, conventional electric water heaters, and swimming pool pumps.

5. **Residential New Construction (BuildSmart):** Encourages the design and construction of energy efficient homes by offering education to contractors on energy efficiency measures, and providing construction design reviews and home inspections.

6. **Residential Low Income Weatherization*:*** Combines energy audits and incentives to encourage low income housing administrators to retrofit homes with energy efficiency measures. The housing authorities include: weatherization agency providers (WAPS), non-weatherization agency providers (non-WAPS), and other providers approved by FPL. The incentives are used by these providers to leverage their funds to increase the overall energy efficiency of the homes they are retrofitting. FPL offers incentives for HVAC maintenance, reduced air infiltration measures, and room air conditioning replacement.

7. **Residential Conservation Service:** Offers a walk-through energy audit, a computer-generated Class A audit, and a customer-assisted energy audit. For customer-assisted energy audits, a mail-in, phone, and Internet audit option may be offered. FPL does not apply demand and energy savings from this program towards its DSM Goals.

Business DSM Programs

1. **Business Heating, Ventilating, and Air Conditioning (HVAC):** Offers business customers financial incentives to upgrade to higher efficiency HVAC equipment that exceed the minimum efficiencies mandated by the Florida Energy Efficiency Code for Building Construction or ASHRAE Standard 90.1. The current FPL program includes

EXHIBIT 28

incentives for: 1) thermal storage; 2) chillers; 3) energy recovery ventilator units; 4) direct expansion (DX) units and efficient air conditioning room units; 5) demand control ventilation systems including kitchen hood control; and 6) electrically commutated motors for air conditioning systems.

2. **Business Efficient Lighting**: Offers business customers financial incentives to install high efficiency lighting measures at the time of replacement. The FPL current program offers incentives for linear fluorescent, plus other efficient, lighting technologies.

3. **Business Building Envelope:** Offers financial incentives to business customers to install high efficiency building envelope measures such as roof/ceiling insulation, reflective roof coatings, and window treatments.

4. **Business Custom Incentive**: Serves as a "catch-all" program for cost-effective business efficiency measures which are not included in other FPL programs. DSM measures must reduce or shift at least 25 kW during peak hours, have verifiable demand and energy savings, and pass FPL's cost-effectiveness testing.

5. **Business On Call:** Offers load control of central air conditioning units to both small non–demand-billed, and medium demand-billed, business customers in exchange for monthly electric bill credits.

6. **Commercial Industrial Demand Reduction (CDR):** Reduces peak demand by allowing the direct control of customer loads of 200 kW or greater. Participants contract for a firm demand level which may not be exceeded during load control periods. In return, participants receive a monthly credit. Participants must provide a 5-year termination notice to discontinue service under this rider.

7. **Business Energy Evaluation:** Offers free standard level energy evaluations on-site and on-line. More detailed evaluations are available through this audit program with costs shared between FPL and the participating customer. Participation in FPL's other business DSM programs is promoted through this program.

8. **Commercial/Industrial Load Control:** Reduces peak demand by controlling customer loads of 200 kW or greater in exchange for monthly electric bill credits. (This program was closed to new participants in 2000).

9. **Business Water Heating:** Provides financial incentives to encourage the installation of energy-efficient heat recovery units or heat pump water heaters.

EXHIBIT 28

10. **Business Refrigeration:** Provides financial incentives to encourage the installation of controls and equipment to reduce the usage of electric strip heat for defrosting purposes.

11. **Cogeneration and Small Power Production**: Facilitates FPL compliance with all regulatory requirements concerning qualifying facilities and small power producers. One role of the program is to assist customers in the evaluation of potential cogeneration projects, including self-generation. FPL does not project demand and energy savings from this program towards its DSM Goals.

Research And Development Programs

1. **Conservation Research and Development Program (CRD):** An umbrella research project under which new DSM technologies are analyzed. Several FPL DSM programs have emerged from the CRD program, including the business Building Envelope, Business On Call, and Residential New Construction programs. The program has also resulted in the addition of cost-effective measures to existing programs, such as the inclusion of Energy Recovery Ventilators in the Business HVAC Program. FPL operates the CRD program based on DSM Plan approval, or for 6 years, whichever occurs first, with a spending cap as approved in the most current DSM Plan.

2. **Residential Thermostat Load Control Pilot Project:** On June 15, 2007 FPL filed a petition with the FPSC for the Residential Thermostat Load Control Pilot Project. A typical barrier to customer acceptance of utility load control programs is reluctance to surrender control of heating and air conditioning appliances. Consequently, for an initial 24-month period, FPL proposed to evaluate whether the benefits of the existing On-Call Program can be expanded through use of a new generation of communication and control technologies that put residential customers in charge of decisions that could lower energy costs, while allowing customers to override FPL control of their heating and air conditioning appliances. The Commission approved FPL's request on August 14, 2007, and issued Consummating Order 07-0719 TRF-EG on September 28, 2007. The pilot project is underway and upon conclusion of the pilot, FPL will provide a final report on the results to the FPSC.

DSM Summary:

FPL has sought out and implemented cost-effective DSM programs since 1978. These programs include both conservation initiatives and load management. FPL's DSM efforts

EXHIBIT 28

through 2008 have resulted in a cumulative Summer peak reduction of approximately 4,109 MW at the generator and an estimated cumulative energy saving of approximately 46,646 Gigawatt Hour (GWh) at the generator. Accounting for reserve margin requirements, FPL's DSM efforts through 2008 have eliminated the need to construct more than 12 new 400 MW generating units.

FPL has consistently been among the leading utilities nationally in DSM achievement. For example, according to the U.S. Department of Energy's 2006 data (the last year for which the DOE data was available at the time this Site Plan was being developed), FPL ranked # 1 nationally in energy efficiency demand reduction and # 3 nationally in load management demand reduction.

In June 2009, FPL will be submitting its proposed DSM Goals for the 2010 – 2019 time period to the FPSC for its approval. At the time the 2009 Site Plan is being finalized, FPL's analyses to determine what its proposed DSM Goals for 2010 – 2019 are a work in progress. Consequently, FPL's 2009 Site Plan is retaining essentially the same level of projected DSM additions as was presented in its 2008 Site Plan. However, this level of projected DSM additions is likely to change due to the DSM Goals work.

Once FPL's DSM Goals are established, FPL will then send its proposed DSM Plan, with which it plans to meet these DSM Goals, to the FPSC for approval. FPL currently anticipates that both its DSM Goals and DSM Plan for the 2010 – 2019 time period will be approved by the first Quarter of 2010. Therefore, FPL expects that both its new DSM Goals and DSM Plan will be addressed in FPL's 2010 Site Plan.

EXHIBIT 28

III.E Transmission Plan

The transmission plan will allow for the reliable delivery of the required capacity and energy for FPL's retail and wholesale customers. The following table presents FPL's proposed future additions of 230 kV bulk transmission lines that must be certified under the Transmission Line Siting Act.

Table III.E.1: List of Proposed Power Lines

(1) Line Ownership	(2) Terminals (To)	(3) Terminals (From)	(4) Line Length CKT. Miles	(5) Commercial In-Service Date (Mo/Yr)	(6) Nominal Voltage (KV)	(7) Capacity (MVA)
FPL	St. Johns [1/]	Pringle	25	Jun-09	230	759
FPL	Manatee [2/]	BobWhite	30	Dec-12	230	1190

1/ Final order certifying the corridor was issued on April 21, 2006. This project will be completed in two phases. Phase I consists of 4 miles of new 230kV line (Pringle to Pellicer) and is scheduled to be completed by Dec-2009. Phase II consists of 21 miles of new 230kV line (St. Johns to Pellicer) and is scheduled to be completed by Dec-2013.

2/ Final order certifying the corridor was issued on November 6, 2008. This project consists of 30 miles of new 230kV line (Manatee to Bobwhite) and is scheduled to be completed by Dec-2012

In addition, there will be transmission facilities needed to connect several of FPL's committed capacity increases and additions to the system transmission grid. These transmission facilities for the committed capacity additions at the DeSoto solar photo-voltaic (PV) site, the West County Energy Center site Units 1, 2, and 3, the capacity increases (uprates) at the existing St. Lucie and Turkey Point nuclear sites, the Cape Canaveral and Riviera Beach conversions, and the new nuclear unit addition Turkey Point Unit 6, are described on the following pages.

Certain new generation additions will not need new transmission facilities. These generation additions include the Martin Next Generation Solar Energy Center and the Space Coast Next Generation Solar Energy Center. The Martin facility does not add any new generation capacity at the site and, therefore, no new transmission facilities are required. The Space Coast facility is an addition of 10 MW of PV generation that will be connected at distribution voltage at the Grissom substation. No new transmission facilities are needed.

EXHIBIT 28

In regard to the existing generating units that are projected to be placed on Inactive Reserve status beginning in 2009, there are no projected impacts to FPL's transmission system from these units because these units can be returned to active service with adequate notice.

EXHIBIT 28

III.E.1 Transmission Facilities for West County Energy Center (WCEC) Unit 1

The work required to connect West County Energy Center (WCEC) Unit 1 in 2009 to the FPL grid is projected to be as follows:

I. Substation:

1. Build new collector yard containing two collector busses with four breakers to connect the three combustion turbines (CT) and one steam turbine (ST).
2. Construct two string busses to connect the collector busses and main switchyard to Corbett 230 kV Substation.
3. Add four main step-up transformers (3-370 MVA, 1-580 MVA), one for each CT, and one for the ST.
4. Add a new Bay #4 with three breakers at the Corbett 230 kV main switchyard. Connect one string buss from the collector yard and relocate the Alva 230 kV terminal from Bay #3 to new Bay #4.
5. Connect second collector string buss to Bay #3.
6. Add relays and other protective equipment.
7. Breaker replacements:
   Corbett Substation – Replace eight 230 kV breakers
   Ranch Substation – Replace five 138 kV breakers
   Levee Substation – Replace one 230 kV breaker
   Dade Substation – Replace two 138 kV breakers

II. Transmission:

1. No upgrades expected to be necessary at this time.

EXHIBIT 28

III.E.2 Transmission Facilities for West County Energy Center (WCEC) Unit 2

The work required to connect West County Energy Center (WCEC) Unit 2 in 2009 to the FPL grid is projected to be as follows:

I. Substation:

1. Build new collector yard containing two collector busses with four breakers to connect the three combustion turbines (CT), and one steam turbine (ST).
2. Construct two string busses to connect the collector busses and main switchyard to Corbett 500kV Substation.
3. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
4. At Corbett Substation, install one breaker and relocate Martin #2 500 kV line from Bay 2S to Bay 2N. Install one West County 500 kv string bus into Bay 2S.
5. At Corbett Substation, install one breaker and second West County 500 kV string bus into Bay 1S.
6. Add relays and other protective equipment.
7. Breaker replacements:
   Dade Substation – Replace one 138 kV breaker
   Levee Substation – Replace two 230 kV breakers
   Ranch Substation – Replace one 230 kV breaker

II. Transmission:

1. No upgrades expected to be necessary at this time.

EXHIBIT 28

III.E.3 Transmission Facilities for DeSoto Next Generation Solar Energy Center

The work required to connect the Desoto Next Generation Solar Energy Center project in 2009 to the FPL grid is projected to be as follows:

I. Substation:

1. Build a new Sunshine 230/23 kV Substation on FPL's Keentown-Whidden 230 kV line to connect the solar PV arrays.
2. Add relays and other protective equipment.
3. Breaker replacements: None

II. Transmission:

1. Loop Keentown-Whidden 230 kV line approximately 0.5 miles to Sunshine Substation.

EXHIBIT 28

III.E.4 Transmission Facilities for West County Energy Center (WCEC) Unit 3

The work required to connect West County Energy Center (WCEC) Unit 3 in 2011 to the FPL grid is projected to be as follows:

I. Substation:

1. Build new collector yard containing two collector busses with four breakers to connect the three combustion turbines (CT), and one steam turbine (ST).
2. Build new Sugar 230 kV Substation on WCEC site.
3. Construct two string busses to connect the collector busses and main switchyard to Sugar 230kV Substation.
4. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
5. At Corbett Substation relocate Germantown 230 kV line terminal from Corbett to Sugar Sub.
6. At Corbett Substation relocate Broward/Yamato 230 kV line terminal from Corbett to Sugar Sub.
7. At Corbett Substation install new Sugar 230 kV line terminal in Bay 2W.
8. At Corbett Substation, install one 5-ohm inductor on the 230 kV side of the 500/230 kV autotransformer.
9. Add relays and other protective equipment.

II. Transmission:

1. Relocate Germantown 230 kV line from Corbett to Sugar.
2. Relocate Broward/Yamato 230 kV line from Corbett to Sugar.
3. Construct one mile 230 kV 1190 MVA line from Sugar to Corbett.

EXHIBIT 28

III.E.5 Transmission Facilities for St. Lucie Units 1 & 2 Capacity Uprates

The work required to accommodate the St. Lucie Units 1 & 2 uprates in 2011 for Unit 1 and in 2012 for Unit 2 to the FPL grid is projected to be as follows:

I. Substation:

1. At Midway Substation replace two 230 kV breaker and eleven 230 kV disconnect switches, and six wave traps. Also upgrade associated jumpers, bus work and equipment connections.
2. At St. Lucie Switchyard replace twenty-six 230 kV disconnect switches and six wave traps.
3. Uprate the Unit 1A and 1B main step-up transformers to 635 MVA.
4. Uprate the spare main step-up transformer to 635 MVA to replace Unit 2A main step-up transformer.
5. Replace the Unit 2B main step-up transformer with a new one rated at 635 MVA.

II. Transmission:

1. Upgrade the existing string busses for both units 1 & 2 between the main step-up transformers and the switchyard with spacers between the conductors.
2. Upgrade the three existing St. Lucie-Midway 230 kV lines with spacers between the conductors to achieve a normal (continuous) rating of 2790 Amperes.
3. Overhead ground wire and grounding improvements.

EXHIBIT 28

III.E.6 Transmission Facilities for Turkey Point Units 3 & 4 Capacity Uprates

The work required to accommodate the Turkey Point Units 3 & 4 uprates in 2012 for Unit 3 and in 2012 for Unit 4 to the FPL grid is projected to be as follows:

I. Substation:

1. At Turkey Point Switchyard install two 5-Ohm series phase inductors combined with external shunt capacitors on the southeast and southwest 230 kV operating busses.
2. At Turkey Point Switchyard replace twelve 230 kV disconnect switches. Also upgrade associated jumpers, bus work and equipment connections.
3. Uprate the Unit 3 and Unit 4 main step-up transformers to 970 MVA.
4. Replace spare main step-up transformer with 970-1050 MVA transformer.
5. Add relays and other protective equipment.

II. Transmission:

1. Upgrade the existing string busses for both Units 3 & 4 between the main step-up transformers and the switchyard with spacers between the conductors.

EXHIBIT 28

III.E.7 Transmission Facilities for Cape Canaveral Next Generation Clean Energy Center (Conversion)

The work required to connect the Cape Canaveral Next Generation Clean Energy Center in 2013 to the FPL grid is projected to be as follows:

I. Substation:

1. Build new collector yard containing two collector busses with four breakers to connect the three combustion turbines (CT), and one steam turbine (ST).
2. Construct two string busses to connect the collector busses to Cape Canaveral 230kV Substation.
3. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
4. At Cape Canaveral Switchyard replace eight 230 kV disconnect switches. Also upgrade associated jumpers, bus work and equipment connections.
5. Expand switchyard relay vault and add relays and other protective equipment.
6. Breaker replacements:
   Cape Canaveral Switchyard – Replace four 230 kV breakers.

II. Transmission:

1. Relocate the Cape Canaveral-Grissom 115 kV line.

EXHIBIT 28

III.E.8 Transmission Facilities for Riviera Beach Next Generation Clean Energy Center (Conversion)

The work required to connect the Riviera Beach Next Generation Clean Energy Center in 2014 to the FPL grid is projected to be as follows:

I. Substation:

1. Expand the Riviera 230 kV Switchyard five breakers to accommodate terminals for one combustion turbine (CT), and one steam turbine (ST).
2. Construct a new 138 kV Riviera Switchyard - five bays, fourteen breakers with terminals to connect two CT units and seven 138 kV lines.
3. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
4. Add relays and other protective equipment.
5. At Ranch Substation add a new 230 kV bay 5 and upgrade bay 4 to 3000 Amperes.
6. Breaker replacements:
   Ranch Substation – Replace one 230 kV breaker
   Broward Substation – Replace one 230 kV breaker

II. Transmission:

1. Break the Indiantown-Riviera 230kV and extend each of the line segments south (approx 4 miles) to connect to the Ranch 230 kV Substation forming Indiantown-Ranch and a Ranch-Riviera 230 kV circuits.
2. Remove Corbett-Ranch #2 230 kV line at Ranch and:
   a. extend to meet the Cedar-Lauderdale 230 kV line N/S corridor (approx 10 miles).
3. Break Cedar -Corbett 230 kV (near Ranch Sub in Corbett-Jog section) and:
   a. extend Cedar side to Riviera, (Approx 15 miles) creating new Cedar-Riviera 230 kV.
   b. extend Corbett side to meet the Cedar-Lauderdale 230 kV N/S corridor (approx 10 miles).
4. Break Cedar-Lauderdale 230 kV (near 230 corridor running N/S)
   a. connect Cedar side to meet 3.b. to create a Cedar to Corbett 230 kV.
   b. connect Lauderdale side to meet 2.a. to create a Corbett to Lauderdale 230 kV.
5. Upgrade the existing IBM-Yamato 138 kV line to 1200 Amperes.
6. New underground 138 kV tie line between new Riviera 138 kV Switchyard and 560 MVA, 230/138 kV autotransformer in the expanded Riviera 230 kV Substation.
7. Relocate six existing 138 kV lines from existing Ranch 138 kV Switchyard to new Riviera 138 kV Switchyard.

EXHIBIT 28

III.E.9 Transmission Facilities for Turkey Point Nuclear Unit 6

The work required to connect the Turkey Point Nuclear Unit 6 in 2018 to the FPL grid is projected to be as follows:

I. Substation:

1. Build new Clear Sky 500/230kV Switchyard with six bays on the 230 kV section for generator main step-up transformer connection, reserve auxiliary transformer connections, four 230 kV line terminals, two autotransformers and two 500 kV line terminals.
2. At Turkey Point Switchyard add a new bay to accommodate the Turkey Point-Clear Sky 230 kV line terminal.
3. At Gratigny Substation install a second 230/138 kV autotransformer with one 230 kV breaker and one 138 kV breaker.
4. At Pennsuco Substation install a fourth line terminal to accommodate the Pennsuco-Clear Sky 230 kV line by converting the ring bus to a breaker and a half scheme and adding four 230 kV breakers.
5. At Davis Substation construct two new 230kV line terminals for the Clear Sky-Davis 230 kV line and the Davis-Miami 230 kV line with a switchable inductor to be installed on the Davis-Miami 230 kV line.
6. At Levee Substation expand 500 kV section to accommodate the two Levee-Clear Sky 500 kV lines.
7. At Andytown Substation install two 5-Ohm inductors combined with external shunt capacitors on the 230kV side of the 500/230 autotransformers (one per auto).
8. At Miami Substation expand the 230kV section to a double bus configuration and add a new 230kV line terminal for Davis line and replace one autotransformer.
9. At Flagami Substation install a small inductor on one end of the Flagami-Miami 230kV #2 circuit.
10. Breaker replacements:
    Flagami Substation – Replace five 230 kV breakers and three 138 kV breakers
    Miami Substation – Replace one 230 kV breaker and four 138 kV breakers
    Davis Substation - Replace two 230 kV breakers
    Dade Substation - Replace seven 230 kV breakers
    Court Substation – Replace one 138 kV breaker.

EXHIBIT 28

II. Transmission:

1. FPL will design and construct two 500 kV transmission lines from the new Clear Sky Substation to the existing FPL Levee 500 kV Substation switchyard. The lines will be approximately 43 miles long.
2. Construct a new Clear Sky-Davis 230 kV line (approximately 19 miles) with a rating of 2990 Amperes.
3. Construct a new Clear Sky-Pennsuco 230 kV line (approximately 52 miles) with a rating of 2990 Amperes.
4. Construct a new Davis-Miami 230 kV line (approximately 18 miles) with a rating of 2297 Amperes.
5. Construct a new Clear Sky-Turkey Point 230 kV line (approximately 0.5 miles) with a rating of 2990 Amperes.

EXHIBIT 28

III.F. Renewable Resources

FPL has been the leading Florida utility in examining ways to utilize renewable energy technologies to meet its customers' current and future needs. FPL has been involved since 1976 in renewable energy research and development and in facilitating the implementation of various renewable energy technologies. For purposes of discussing FPL's renewable energy efforts in this document, those efforts will be placed into five categories.

1) <u>Early Research & Development Efforts</u>:

FPL assisted the Florida Solar Energy Center (FSEC) in the late 1970s in demonstrating the first residential solar photovoltaic (PV) system east of the Mississippi. This PV installation at FSEC's Brevard County location was in operation for over 15 years and provided valuable information about PV performance capabilities in Florida on both a daily and annual basis. FPL later installed a second PV system at the FPL Flagami substation in Miami. This 10-kilowatt (kW) system was placed into operation in 1984. (The system was removed in 1990 to make room for substation expansion after the testing of this PV installation was completed.)

For a number of years, FPL maintained a thin-film PV test facility located at the FPL Martin Plant Site. The FPL PV test facility was used to test new thin-film PV technologies and to identify design, equipment, or procedure changes necessary to accommodate direct current electricity from PV facilities into the FPL system. Although this testing has ended, the site is now the home for PV capacity which was installed as a result of FPL's recent Green Pricing effort (which is discussed below).

2) <u>Demand Side & Customer Efforts:</u>

In terms of utilizing renewable energy sources to meet its customers' needs, FPL initiated the first utility-sponsored conservation program in Florida designed to facilitate the implementation of solar technologies by its customers. FPL's Conservation Water Heating Program, first implemented in 1982, offered incentive payments to customers choosing solar water heaters. Before the program was ended (due to the fact that it was no longer cost-effective), FPL paid incentives to approximately 48,000 customers who installed solar water heaters.

In the mid-1980s, FPL introduced another renewable energy program, FPL's Passive Home Program. This program was created in order to broadly disseminate information about passive solar building design techniques which are most applicable in Florida's climate. As part of this program, three Florida architectural firms created complete construction blueprints for 6 passive homes with the assistance of the FSEC and FPL. These designs and blueprints were available to customers at a low cost. During its existence, this program was popular and received a U.S. Department of Energy award for innovation. The program was eventually phased out due to a revision of the Florida Model Energy Building Code (Code). This revision was brought about in part by FPL's Passive Home Program. The revision incorporated into the Code one of the most significant passive design techniques highlighted in the program: radiant barrier insulation.

In early 1991, FPL received approval from the FPSC to conduct a research project to evaluate the feasibility of using small PV systems to directly power residential swimming pool pumps. This research project was completed with mixed results. Some of the performance problems identified in the test were deemed to be solvable, particularly when new pools are constructed. However, the high cost of PV, the significant percentage of sites with unacceptable shading, and various customer satisfaction issues remain as significant barriers to wide acceptance and use of this particular solar application.

FPL then analyzed the feasibility of encouraging utilization of PV in another, potentially much larger way. FPL's basic approach did not require all of its customers to bear the high cost of PV, but facilitated the use of renewable energy by customers who were interested. FPL's initial effort to implement this approach allowed customers to make voluntary contributions into a separate fund that FPL used to make PV purchases in bulk quantities. PV modules were then installed and delivered PV-generated electricity directly into the FPL grid, thus displacing an equivalent amount of fossil fuel-generated electricity.

FPL's basic approach for this program, which was termed Green Pricing, was initially discussed with the FPSC in 1994. FPL's efforts to implement this approach were then formally presented to the FPSC as part of FPL's DSM Plan in 1995 and FPL received approval from the FPSC in 1997 to proceed. FPL began the effort in 1998 and received approximately $89,000 in contributions (that significantly exceeded the goal of $70,000). FPL purchased the PV modules and installed them at FPL's Martin Plant site.

EXHIBIT 28

FPL initiated two new renewable efforts in 2000. FPL's first new initiative in 2000 was FPL's Photovoltaic Research, Development, and Education Project. This demonstration project's objectives were to: increase the public awareness of roof tile PV technologies, provide data to determine the durability of this technology and its impact on FPL's electric system, collect demand and energy data to better understand the coincidence between PV roof tile system output and FPL's system peaks (as well as the total annual energy capabilities of roof tile PV systems), and assess the homeowner's financial benefits and costs of PV roof tile systems. This project was completed in 2003.

The second effort initiated in 2000 was the Green Energy Project. The objectives of this Project were to: determine customer interest in an on–going renewable energy program, determine their price responsiveness and views on the different renewable technologies, and identify potential renewable energy supply sources that would meet the forecasted customer demand for this type of product. This Project formed the basis for FPL's Green Power Pricing Research Project, and then led to FPL's Business Green Energy Research Project.

Both the Green Power Pricing Research Project and the Business Green Energy Research Project examined the feasibility of purchasing tradable renewable energy credits generated from renewable resources including solar-powered technologies, biomass energy, landfill methane, wind energy, low impact hydroelectric energy, and/or other renewable sources. Customers who participate are charged a premium for purchasing the tradable renewable energy credits associated with electric energy generated by these sources.

Development of the Green Pricing Research Project was completed and filed with the FPSC in August 2003. As part of this process, a supply contract was put into place that allowed FPL to match supply with demand for green energy. Tradable renewable energy credits were used to supply the renewable benefits required of this project. The FPSC approved the program in December 2003 and program implementation began during the first Quarter of 2004. The project was offered to customers as FPL's Sunshine Energy® program. As part of the project, FPL made a commitment that 150 kilowatts (kW) of solar capacity would be put in place for every 10,000 program participants. The Business Green Energy Research Project focused on determining the interest and needs for business customers in this area. In 2006 FPL petitioned the FPSC for approval to make the Green Pricing Research Project a

EXHIBIT 28

permanent program and expand eligibility to business customers. This approval was granted in the fourth Quarter of 2006.

As Florida entered the next phase in promotion of renewable energy, with FPL requesting approval to build three new solar energy centers in the state (which are discussed below), in 2008 the FPSC voted to end the Sunshine Energy program. At its conclusion, the Sunshine Energy Program included approximately 38,000 participants and resulted in 494 kW of PV installed, including the largest PV array in the state at that time, a 250 kW facility at Rothenbach Park in Sarasota County. Several additional solar initiatives had also been developed through the Sunshine Energy Program including support for schools. The Sunshine Energy Program support of installing PV at schools was a continuation of previous FPL renewable activities involving schools. In 2003, as part of the State of Florida's PV for Schools program, FPL worked with three schools to install 4.8 kW of PV systems.

FPL has also been investigating fuel cell technologies through monitoring of industry trends, discussions with manufacturers, and direct field trials. From 2002 through the end of 2005, FPL conducted field trials and demonstration projects of Proton Exchange Membrane (PEM) fuel cells with the objectives of serving customer end-uses while evaluating the technical performance, reliability, economics, and relative readiness of the PEM technology. The demonstration projects were conducted in partnership with customers and included 5 locations. The research projects were useful to FPL in identifying specific issues that can occur in field applications and the current commercial viability of this technology. FPL will continue to monitor the progress of these technologies and conduct additional field evaluations as significant developments in the fuel cell technologies occur.

In addition, FPL assists customers who are interested in installing PV equipment at their facilities. In support of Florida Administrative Code Rule 25-6.065, Interconnection and Net Metering of Customer-Owned Renewable Generation, FPL works with customers to interconnect these customer-owned PV systems. Through December 2008, approximately 270 customer systems (predominantly residential) have been interconnected.

3) <u>Supply Side Efforts – Power Purchases:</u>

FPL has also facilitated renewable energy projects (facilities which burn bagasse, waste wood, municipal waste, etc.). Firm capacity and energy and as-available

EXHIBIT 28

energy have been purchased by FPL from these types of facilities. (Please refer to Tables I.B.1, I.B.2, and Table I.C.1 in Chapter I).

FPL is seeking cost-effective Power Purchase Agreements (PPAs) with any and all potential renewable energy providers. FPL issued a Renewable Request for Proposals (RFP) in 2007 that solicited proposals that offered capacity and/or energy from new renewable energy facilities. None of the responsive bids in this RFP were at or below FPL's projected avoided cost. FPL issued another Renewable Energy RFP in April 2008, which resulted in six bids received by July. Analysis of the bids was delayed by the extreme volatility in the commodity fuel and capital markets in late 2008. Current analysis indicates that none of the bids may have the potential to provide firm capacity and/or energy at avoided cost prices (and the FPSC has ruled that costs above FPL's projected avoided costs cannot be recovered for purchase contracts).

With regard to certain of the existing contracts that are currently scheduled to end in the near-term, and proposals resulting from the RFP process, FPL has assumed that some of this firm capacity will be available during the ten-year reporting period of this document through extended and/or new contracts. Firm renewable energy capacity from these sources, and from the FPL development activities discussed below, are assumed for planning purposes to provide 105 MW through this reporting period. 55 MW of the 105 MW total is expected to come from an extension of an existing purchased power contract that will expire soon. The remaining 50 MW are projected, for planning purposes, to come from a new purchase power contract (but could be delivered by a new FPL renewable energy facility).

4) <u>Supply Side Efforts – FPL Facilities:</u>

FPL is in the process of developing a wind generation project on South Hutchinson Island in St. Lucie County. This project is known as the St. Lucie Wind project and it consists of up to 6 wind turbine generators capable of generating up to approximately 13.8 MW. In 2007, FPL began the St. Lucie County land use approval process, and soon after applied for the necessary federal and state permitting. However, a decision by the state and federal agencies on the St. Lucie Wind project's permitting will not be finalized until the local land use approval process is completed. The in-service date will depend on the approval and permitting process.

EXHIBIT 28

FPL is currently constructing 110 MW of solar capacity at three sites in Florida. These projects are in response to the Florida's Legislature House Bill 7135 which was signed into law by Governor Crist in June 2008. House Bill 7135 (hereafter referred to as the 2008 Energy Bill), was enacted to enable the development of clean, zero greenhouse gas emitting renewable generation in State of Florida. Specifically, the 2008 Energy Bill authorized cost recovery for the first 110 MW of eligible renewable projects that had the proper land, zoning and transmission rights in place. FPL's three solar projects discussed in this section met the specified criteria, and were granted approval for cost recovery in 2008. Each of the three solar projects is discussed below.

a. The Martin Next Generation Solar Energy Center:

This project will provide 75 MW of solar thermal capacity in an innovative way that directly displaces fossil fuel usage in an existing FPL generating unit. This project will involve the installation of solar thermal technology that will be integrated into the existing steam cycle for the Martin Unit 8 natural gas-fired CC plant. This project will be the first "hybrid" solar plant in the world, the second largest solar facility in the world, and the largest solar plant of any kind in the U.S. outside of California. Construction began in December 2008 and is expected to be completed by the end of 2010.

b. The DeSoto Next Generation Solar Energy Center:

This project will provide 25 MW of photovoltaic (PV) capacity, making it the largest PV facility in the U.S.. The facility will utilize a tracking array that is designed to follow the sun as it traverses through the sky. Construction began in November 2008 and is expected to be completed by the end of 2009 or early 2010.

c. The Space Coast Next Generation Solar Energy Center:

This project will provide 10 MW of PV capacity in an innovative public/private partnership with NASA at the Kennedy Space Center. Construction is expected to begin in 2009 and is expected to be completed in 2010.

Each of these facilities is a significant and innovative renewable generating plant in its own right. Collectively, these Next Generation Solar Energy Centers are expected to produce a total of 223,000 megawatt hours (MWh) of electricity each year, and at

EXHIBIT 28

peak production provide enough power and energy to serve the requirements of more than 15,000 homes.

For resource planning purposes, FPL projects that the energy delivered from these renewable facilities will be “as available”, non-firm energy. This is due to several factors. First, the Martin solar thermal facility is designed as a “fuel-substitute” facility, not as a facility that will result in additional capacity and energy being generated. The solar thermal facility will displace the use of fossil fuel on the FPL system when the solar thermal facility is operating. Second, in regard to the two PV facilities, the intermittent nature of the solar resource makes it difficult to accurately determine what contribution the PV facilities at these specific locations can consistently make at FPL late Summer afternoon and early Winter morning peak load hours. Once site-specific operating data has been gathered for an appropriate amount of time, FPL will then re-evaluate the actual output from each PV facility to determine what portion, if any, of its output can be projected as firm capacity at the projected peak hours in FPL’s resource planning work.

In addition to these three approved projects; FPL is currently in the process of identifying other potential solar sites in the state in the event that a future Renewable Portfolio Standard (RPS) or other enabling legislation is enacted by the Florida legislature. FPL is evaluating existing FPL generation sites along with potential greenfield sites within FPL’s service territory. Sites which are considered potential candidates will be developed so that the necessary local land use and zoning designations are consistent with the future development of solar generation. Sites that have been identified for further evaluation include the potential expansion of the DeSoto site for additional PV, and the expansion of the Manatee site for a solar thermal facility. These sites are discussed further in Chapter IV.

5) <u>Ongoing Research & Development Efforts:</u>

FPL has developed alliances with several Florida universities to promote development of emerging technologies. For example, an alliance as been established with the newly formed Center for Ocean Energy Technology at Florida Atlantic University (FAU), which will focus on the commercialization of ocean current, ocean thermal (i.e., energy conversion as well as cold water air conditioning) and hydrogen technologies. FPL has been taking the lead in assisting FAU with the discussions being held with the U.S. Department of the Interior’s Minerals

EXHIBIT 28

Management Service Department (MMS). MMS is working to establish the permitting process for ocean energy development on the outer continental shelf.

FPL has also developed an alliance with the University of Florida to support its studies of biomass renewable potential and wind studies in the state. In addition, FPL has partnered with the Florida Institute of Technology on fuel cell technology and with the Florida State Universities Center for Applied Power System in regard to grid integration of ocean energy and other renewables.

FPL is also developing a “living lab” to demonstrate FPL’s solar energy commitment to employees and visitors at its Juno Beach facility. FPL will evaluate multiple solar technologies and applications to develop a renewable business model resulting in the most cost-effective and reliable source(s) of solar energy to FPL customers.

FPL has also been in discussion with several private companies on multiple emerging technology initiatives including ocean current, ocean thermal, hydrogen, fuel cell technology, biomass, biofuels, and energy storage.

III.G FPL’s Fuel Mix and Fuel Price Forecasts

1. FPL’s Fuel Mix

Until the mid-1980s, FPL relied primarily on a combination of fuel oil, natural gas, and nuclear energy to generate electricity with significant reliance on oil–fired generation. In the early 1980s, FPL began to purchase “coal-by-wire.” In 1987, coal was first added to the fuel mix through FPL’s partial ownership and additional purchases from the St. Johns River Power Park (SJRPP). This allowed FPL to meet its customers’ energy needs with a more diversified mix of energy sources. Additional coal resources were added with the partial acquisition (76%) of Scherer Unit 4 which began serving FPL’s customers in 1991. Starting in 1997, petroleum coke was added to the fuel mix as a blend stock with coal at SJRPP.

The trend since the early 1990s has been a steady increase in the amount of natural gas that is used by FPL to provide electricity due, in part, to the introduction of highly efficient and cost-effective CC generating units and the ready availability of natural gas. This planning document reflects an evolution in that trend in recognition that, although efficient gas-fired generation continues to provide significant benefits to FPL’s customers, adding natural gas-fired additions exclusively would, in the long

EXHIBIT 28

term, create an unbalanced generation portfolio. FPL has committed to add three new gas-fired CC units at the West County Energy Center (WCEC) site in the 2009 – 2011 time frame. In addition, FPL has also committed to convert the existing steam generating units at its existing Cape Canaveral and Riviera sites into two highly efficient new CC units, one at each site. These five new CC units will provide highly efficient generation that will dramatically improve FPL's overall system generation efficiency.

In addition, FPL is increasing its utilization of nuclear energy through capacity uprates of its four existing nuclear units. These uprates will add a total of approximately 400 MW of nuclear generation capacity by 2012. FPL has also received approval from the FPSC to pursue plans to permit and build two new nuclear units at its existing Turkey Point site that, in total, will add approximately 2,200 MW of new nuclear generating capacity. The first of these two new units, Turkey Point Unit 6, is projected to go in-service in 2018 and is presented in this document. The second new nuclear unit, Turkey Point Unit 7, is projected to have a 2020 in-service date and will be presented in future FPL Site Plans.

In regard to utilizing renewable energy, FPL has committed to add 110 MW of solar generating capacity by 2010 through a 75 MW solar thermal facility at FPL's existing Martin site, a 25 MW PV facility in DeSoto County, and a 10 MW PV facility in Brevard County.

FPL's future resource planning work will continue to focus on identifying and evaluating alternatives that would maintain and/or enhance FPL's long-term fuel diversity. These fuel diverse alternatives may include: the purchase of power from renewable energy facilities, addition of FPL-owned renewable energy facilities, obtaining access to diversified sources of natural gas such as liquefied natural gas (LNG) and natural gas from the newly developed Mid-Continent unconventional reserves, preserving FPL's ability to utilize fuel oil at its existing units, and increased utilization of nuclear energy. (New advanced technology coal generating units are not currently considered as viable options in Florida in the ten-year reporting period of this document due to concerns over greenhouse gas emissions.) The evaluation of the feasibility and cost-effectiveness of these, and other possible alternatives, will be an ongoing part of future planning cycles.

EXHIBIT 28

FPL's current use of various fuels to supply energy to customers, plus a projection of this "fuel mix" through 2018 based on the resource plan presented in this document, is presented in Schedules 5, 6.1, and 6.2 later in this chapter.

2. Fossil Fuel Price Forecasts

Fossil fuel price forecasts, and the resulting projected price differentials between fuels, are major drivers used in evaluating alternatives for meeting future generating capacity needs. FPL's forecasts are generally consistent with other published contemporary forecasts.

Future oil and natural gas prices, and to a lesser extent, coal and petroleum coke prices, are inherently uncertain due to a significant number of unpredictable and uncontrollable drivers that influence the short-and long-term price of oil, natural gas, coal, and petroleum coke. These drivers include:

a. Current and projected worldwide demand for crude oil and petroleum products;

b. Current and projected worldwide refinery capacity/production;

c. Expected worldwide economic growth, in particular in China, India, and the other Pacific Rim countries;

d. Organization of Petroleum Exporting Countries (OPEC) production and the availability of spare OPEC production capacity and the assumed growth in spare OPEC production capacity;

e. Non-OPEC production and expected growth in non-OPEC production;

f. The geopolitics of the Middle East, West Africa, the Former Soviet Union, Venezuela, etc., as well as, the uncertainty and impact upon worldwide energy consumption related to U. S. and worldwide environmental legislation, politics, etc.;

g. Current and projected North American natural gas demand;

h. Current and projected U.S., Canadian, and Mexican natural gas production;

i. The worldwide supply and demand for LNG; and

j. The growth in solid fuel generation on a U. S. and worldwide basis.

EXHIBIT 28

The inherent uncertainty and unpredictability in these factors today and tomorrow clearly underscores the need to develop a set of plausible oil, natural gas, and solid fuel (coal and petroleum coke) price scenarios that will bound a reasonable set of long-term price outcomes. In this light, FPL developed and utilized Low, Medium, and High price forecasts for oil, natural gas, and solid fuel in much of its 2008 resource planning work, particularly in regard to the Determination of Need filings for WCEC Unit 3 and the conversions of FPL's existing Cape Canaveral and Riviera plants, and the nuclear cost recovery filings.

FPL's Medium price forecast methodology is consistent for oil and natural gas. For oil and natural gas commodity prices, FPL's Medium price forecast applies the following methodology:

a. For 2008 through 2010, the methodology used the November 6, 2008 forward curve for New York Harbor 1% sulfur heavy oil, U. S. Gulf Coast 1% sulfur heavy oil, ultra low sulfur diesel, and Henry Hub natural gas commodity prices;

b. For the next two years (2011 and 2012), FPL used a 50/50 blend of the November 6, 2008 forward curve and the most current projections at the time from The PIRA Energy Group;

c. For the 2013 through 2020 period, FPL used the annual projections from The PIRA Energy Group, and;

d. For the period beyond 2020, FPL used the real rate of escalation provided in the Energy Information Administration (EIA) *Annual Energy Outlook 2008* publication. FPL assumed a 2.5% annual rate of escalation to convert real prices to nominal prices prior to 2020, with no escalation from 2020 forward. In addition to the development of oil and natural gas commodity prices, nominal price forecasts also were prepared for oil and natural gas transportation costs. The addition of commodity and transportation forecasts resulted in delivered price forecasts.

FPL's Medium price forecast methodology is also consistent for coal and petroleum coke prices. Coal and petroleum coke prices were based upon the following approach:

a. The price forecasts for Central Appalachian coal (CAPP), South American coal, and petroleum coke were provided by JD Energy;

EXHIBIT 28

b. The marine transportation rates from the loading port for coal and petroleum coke to an import terminal were also provided by JD Energy;

c. The Terminal Throughput Fee was based on a range of offers from comparable facilities throughout the Southeast U.S.. The coal price forecast for FPL's existing coal plants at SJRPP and Plant Scherer assume the continuation of the existing mine-mouth and transportation contracts until expiration, along with the purchase of spot coal, to meet generation requirements.

The development of FPL's Low and High price forecasts for oil, natural gas, coal, and petroleum coke prices were based upon the historical relationship of prices compared to the average prices for the 2000 through 2007 time frame. FPL developed these forecasts to account for the uncertainty which exists within each commodity as well as across commodities. These forecasts reflect a range of reasonable forecast outcomes.

3. Nuclear Fuel Cost Forecast

This section reviews the various steps needed to fabricate nuclear fuel for delivery to the nuclear power plants, the method used to forecast the price for each step, and other comments regarding FPL's nuclear fuel cost forecast.

a) Steps Required for Nuclear Fuel to be delivered to FPL's Plants

Four separate steps are required before nuclear fuel can be used in a commercial nuclear power reactor. These steps are summarized below.

(1) Mining: Uranium is produced in many countries such as Canada, Australia, Kazakhstan, and the United States. During the first step, uranium is mined from the ground using techniques such as open pit mining, underground mining, in-situ leaching operations, or production as a by-product from other mining operations, such as gold, copper, or phosphate rocks. The product from this first step is the raw uranium delivered as an oxide, U_3O_8 (sometimes referred to as yellowcake).

(2) Conversion: During the second step, the U_3O_8 is chemically converted into UF_6 which, when heated, changes into a gaseous state. This second step further

EXHIBIT 28

removes any chemical impurities and serves as preparation for the third step, which requires uranium to be in a gaseous state.

(3) <u>Enrichment:</u> The third step is called enrichment. Natural uranium contains 0.711% of uranium at an atomic mass of 235 (U-235) and 99.289% of uranium at an atomic mass of 238 (U-238). FPL's nuclear reactors use uranium with a higher percentage of up to five percent (5%) of U-235 atoms. Because natural uranium does not contain a sufficient amount of U-235, the third step increases the percentage amount of U-235 from 0.711% to a level specified when designing the reactor core (typically in a range from approximately 3% to as high as 5%). The output of this enrichment process is enriched uranium in the form of UF6.

(4) <u>Fabrication:</u> During the last step, fuel fabrication, the enriched UF6 is changed to a UO2 powder, pressed into pellets, and fed into tubes, which are sealed and bundled together into fuel assemblies. These fuel assemblies are then delivered to the plant site for insertion in a reactor.

Like other utilities, FPL has purchased raw uranium and the other components of the nuclear fuel cycle separately from numerous suppliers from different countries.

b) Price Forecasts for Each Step

(1) <u>Mining:</u> There is a significant volatility in the current uranium market. Demand is rather stable but inventory sales are a significant source of supply to complement outputs from production facilities. To the extent that source of supply can be restricted and inventories held from the market, price will rise significantly. The following are the current major contributors to this uranium price volatility:

- Hedge funds have been purchasing a significant amount of uranium, reducing availability of uranium. However, the recent financial crisis has caused significant sales of inventories and has caused the market to drop earlier than predicted.

- The large inventory from the U.S. Department of Energy (DOE) is being withheld from the market due to political pressure from suppliers concerned about further price drop already affected by the current financial downturn.

EXHIBIT 28

- The Russians have announced that they would not supply down-blended weapons material to the U.S. government after 2013 for sale in the U.S. market.
- The U.S. Department of Commerce (DOC) has imposed restrictions on the import of nuclear fuel from France and Russia.

However, FPL expects these issues to be addressed within the next few years, returning price behavior to be more consistent with market fundamentals. 2008 saw a number of actions to resolve restrictions of imports of foreign uranium. Recent law enacted in 2008 resolved the import of Russian-enriched uranium, by allowing some imports of Russian-enriched uranium to about 20-25% of needs for currently operating units, but with no restriction on the first core for new units and no restrictions after 2020. The financial crisis has also had a major impact and eliminated speculative demands with uranium pricing returning to close to the fundamentals earlier than was expected last year. The hedge funds have significantly reduced their activities.

FPL's nuclear fuel price forecasts are the result of FPL's analysis based on inputs from various nuclear fuel market expert reports and studies.

(2) <u>Conversion:</u> FPL's price forecast considers the construction of new nuclear units. Just like for raw uranium, an increase in demand for conversion services would result from this need. Insufficient planned production is currently forecast after 2013 to meet the higher demand scenario. As with additional raw uranium production, supply will expand beyond current level once more firm commitments are made including commitments to building new nuclear units.

(3) <u>Enrichment:</u> With no new production capacity, and if the current restrictions on imports of enrichment services from Russia continue, the current tight market supply for economically produced enrichment services will continue until 2013. A high projection of new nuclear unit construction shows a shortage of low cost enrichment services starting in 2010. The current expensive diffusion plant can make up any gaps in supply of enrichment services. In addition, there are a number of new facilities coming on-line starting in 2009 through 2013, using more efficient and proven processes such as the use of centrifuges for enrichment of uranium. In addition, as with supply for the other steps of the

EXHIBIT 28

nuclear fuel cycle, expansion of future capacity is feasible within the lead time for constructing new nuclear units and any other projected increase in demand.

(4) Fabrication: Because the nuclear fuel fabrication process is highly regulated by the Nuclear Regulatory Commission (NRC), not all production facilities can qualify as suppliers to nuclear reactors in the U.S. Although world supply and demand is expected to show significant excess capacity for the foreseeable future, the gap is not as wide for U.S. supply and demand. The supply for the U.S. market is expected to be sufficient to meet U.S. demand for the foreseeable future.

c) Other Comments Regarding FPL's Nuclear Fuel Cost Forecast

The calculations for the nuclear fuel costs are performed consistent with the method currently used for FPL's Fuel Clause filings, including the assumption of a fuel lease and the assumption of refueling outages every 18 months. The costs for each step to fabricate the nuclear fuels are added and capitalized to come up with the total costs of the fresh fuel to be loaded at each refueling (capitalized acquisition costs). The capitalized acquisition cost for each group of fresh fuel assemblies are then amortized over the energy produced by each group of fuel assemblies, and carrying costs are also added on the total unrecovered costs to derive the total fuel costs to be charged to customers. FPL also adds 1 mill per kilowatt hour net to reflect payment to DOE for spent fuel disposal.

EXHIBIT 28

Schedule 5
Fuel Requirements [1/]

			Actual 2/		Forecasted									
	Fuel Requirements	**Units**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
(1)	Nuclear	Trillion BTU	240	261	262	247	253	275	304	309	299	305	309	305
(2)	Coal	1,000 TON	2,961	3,599	4,047	3,349	4,098	3,356	4,116	3,976	3,983	3,985	3,969	3,956
(3)	Residual (FO6)- Total	1,000 BBL	15,524	9,379	13,317	1,788	980	852	325	285	408	1,096	1,470	1,356
(4)	Steam	1,000 BBL	15,524	9,379	13,317	1,788	980	852	325	285	408	1,096	1,470	1,356
(5)	Distillate (FO2)- Total	1,000 BBL	114	38	12	211	149	130	2	1	18	120	80	41
(6)	Steam	1,000 BBL	0	11	0	0	0	0	0	0	0	0	0	0
(7)	CC	1,000 BBL	64	8	0	0	0	0	0	0	0	0	0	0
(8)	CT	1,000 BBL	50	20	12	211	149	130	2	1	18	120	80	41
(9)	Natural Gas -Total	1,000 MCF	447,354	449,819	375,691	470,309	494,198	504,620	481,036	507,792	524,072	580,258	598,896	585,348
(10)	Steam	1,000 MCF	66,914	143,581	17,180	18,364	19,092	18,193	7,691	6,450	8,901	22,942	28,899	26,913
(11)	CC	1,000 MCF	370,039	303,942	357,811	449,246	473,101	485,010	473,261	501,270	514,850	556,001	568,953	557,878
(12)	CT	1,000 MCF	10,401	2,296	700	2,699	2,004	1,417	84	73	322	1,316	1,044	557

1/ Reflects fuel requirements for FPL only.
2/ Source: A Schedules.

EXHIBIT 28

Schedule 6.1
Energy Sources

			Actual 1/		Forecasted									
	Energy Sources	**Units**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
(1)	Annual Energy Interchange 2/	GWH	10,688	10,141	11,109	8,462	5,962	5,867	5,648	5,462	5,976	796	0	0
(2)	Nuclear	GWH	21,899	24,024	23,510	22,116	22,730	24,705	27,276	27,751	26,790	27,355	27,751	32,816
(3)	Coal	GWH	6,856	6,423	7,381	6,205	7,462	6,138	7,378	7,142	7,160	7,161	7,131	7,108
(4)	Residual(FO6) -Total	GWH	9,651	5,702	8,844	1,208	658	573	218	191	274	735	983	906
(5)	Steam	GWH	9,651	5,702	8,844	1,208	658	573	218	191	274	735	983	906
(6)	Distillate(FO2) -Total	GWH	27	17	3	70	52	39	0	0	4	39	26	13
(7)	Steam	GWH	0	6	0	0	0	0	0	0	0	0	0	0
(8)	CC	GWH	6.7	3	0	0	0	0	0	0	0	0	0	0
(9)	CT	GWH	20	9	3	70	52	39	0	0	4	39	26	13
(10)	Natural Gas -Total	GWH	59,300	58,820	52,723	66,854	70,179	72,030	69,662	74,106	76,449	83,660	86,064	84,241
(11)	Steam	GWH	6,205	7,257	1,683	1,813	1,889	1,800	759	636	880	2,269	2,855	2,656
(12)	CC	GWH	52,717	51,368	50,990	64,860	68,156	70,140	68,898	73,465	75,548	81,311	83,142	81,549
(13)	CT	GWH	378	195	50	181	134	90	6	5	22	81	67	36
(14)	Other 3/	GWH	5,893	5,877	5,871	5,294	4,884	5,464	5,844	6,476	7,147	6,533	6,953	7,052
	Net Energy For Load 4/	GWH	114,314	111,004	109,440	110,207	111,926	114,815	116,027	121,128	123,800	126,278	128,908	132,135

1/ Source: A Schedules

2/ The projected figures are based on estimated energy purchases from SJRPP and the Southern Companies.

3/ Represents a forecast of energy expected to be purchased from Qualifying Facilities, Independent Power Producers, net of Economy and other Power Sales.

4/ Net Energy For Load values for the years 2009 - 2018 are also shown in Schedule 2.3.

EXHIBIT 28

Schedule 6.2
Energy Sources % by Fuel Type

			Actual [1/]		Forecasted									
	Energy Source	**Units**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
(1)	Annual Energy Interchange 2/	%	9.3	9.1	10.2	7.7	5.3	5.1	4.9	4.5	4.8	0.6	0.0	0.0
(2)	Nuclear	%	19.2	21.6	21.5	20.1	20.3	21.5	23.5	22.9	21.6	21.7	21.5	24.8
(3)	Coal	%	6.0	5.8	6.7	5.6	6.7	5.3	6.4	5.9	5.8	5.7	5.5	5.4
(4)	Residual (FO6) -Total	%	8.4	5.1	8.1	1.1	0.6	0.5	0.2	0.2	0.2	0.6	0.8	0.7
(5)	Steam	%	8.4	5.1	8.1	1.1	0.6	0.5	0.2	0.2	0.2	0.6	0.8	0.7
(6)	Distillate (FO2) -Total	%	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(7)	Steam	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(8)	CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(9)	CT	%	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(10)	Natural Gas -Total	%	51.9	53.0	48.2	60.7	62.7	62.7	60.0	61.2	61.8	66.3	66.8	63.8
(11)	Steam	%	5.4	6.5	1.5	1.6	1.7	1.6	0.7	0.5	0.7	1.8	2.2	2.0
(12)	CC	%	46.1	46.3	46.6	58.9	60.9	61.1	59.4	60.7	61.0	64.4	64.5	61.7
(13)	CT	%	0.3	0.2	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0
(14)	Other 3/	%	5.2	5.3	5.4	4.8	4.4	4.8	5.0	5.3	5.8	5.2	5.4	5.3
			100	100	100	100	100	100	100	100	100	100	100	100

1/ Source: A Schedules.

2/ The projected figures are based on estimated energy purchases from SJRPP and the Southern Companies.

3/ Represents a forecast of energy expected to be purchased from Qualifying Facilities, Independent Power Producers, net of Economy and other Power Sales.

EXHIBIT 28

Schedule 7.1
Forecast of Capacity, Demand, and Scheduled Maintenance At Time Of Summer Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
August of Year	Total Installed [1/] Capacity MW	Firm Capacity Import MW	Firm Capacity Export MW	Firm QF MW	Total Firm Capacity Available [2/] MW	Total Peak [3/] Demand MW	DSM [4/] MW	Firm Summer Peak Demand MW	Reserve Margin Before Maintenance [5/] MW	Reserve Margin Before Maintenance [5/] % of Peak	Scheduled Maintenance MW	Reserve Margin After Maintenance [6/] MW	Reserve Margin After Maintenance [6/] % of Peak
2009	21,985	1,824	0	690	24,499	21,124	1,997	19,126	5,372	28.1	0	5,372	28.1
2010	20,809	1,467	0	640	22,916	21,147	2,119	19,027	3,889	20.4	0	3,889	20.4
2011	21,946	1,467	0	595	24,008	21,368	2,236	19,132	4,876	25.5	0	4,876	25.5
2012	22,230	1,311	0	650	24,191	21,933	2,357	19,576	4,614	23.6	0	4,614	23.6
2013	23,553	1,311	0	650	25,514	22,249	2,483	19,766	5,748	29.1	0	5,748	29.1
2014	24,760	1,361	0	650	26,771	23,533	2,615	20,918	5,853	28.0	0	5,853	28.0
2015	24,760	1,361	0	650	26,771	24,142	2,749	21,393	5,377	25.1	0	5,377	25.1
2016	25,574	50	0	650	26,274	24,772	2,884	21,888	4,386	20.0	0	4,386	20.0
2017	26,396	50	0	650	27,096	25,401	3,019	22,383	4,713	21.1	0	4,713	21.1
2018	27,496	50	0	650	28,196	26,143	3,064	23,079	5,116	22.2	0	5,116	22.2

1/ Capacity additions and changes projected to be in-service by June 1st are generally considered to be available to meet Summer peak loads are forecasted to occur during August of the year indicated. All values are Summer net MW.

2/ Total Capacity Available = Col.(2) + Col.(3) - Col.(4) + Col.(5).

3/ These forecasted values reflect the 2009 load forecast without incremental DSM or cumulative load management.

4/ The DSM MW shown represent cumulative load management capability plus incremental conservation from 1/2008-on designed for use with the 2008 load forecast. They are not included in total additional resources but reduce the peak load upon which Reserve Margin calculations are based.

5/ Margin (%) Before Maintenance = Col.(10) / Col.(9)

6/ Margin (%) After Maintenance = Col.(13) / Col.(9)

EXHIBIT 28

Schedule 7.2
Forecast of Capacity , Demand, and Scheduled Maintenance At Time of Winter Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
January of Year	Total Installed [1/] Capability MW	Firm Capacity Import MW	Firm Capacity Export MW	Firm QF MW	Total Firm Capacity Available [2/] MW	Total Peak [3/] Demand MW	DSM [4/] MW	Firm Winter Peak Demand MW	Reserve Margin Before Maintenance [5/]		Scheduled Maintenance MW	Reserve Margin After Maintenance [6/]	
									MW	% of Peak		MW	% of Peak
2009	23,280	1,962	0	740	25,982	18,697	1,730	16,968	9,014	53.1	0	9,014	53.1
2010	24,661	1,501	0	690	26,852	18,790	1,819	16,971	9,880	58.2	0	9,880	58.2
2011	22,338	1,500	0	595	24,433	19,120	1,888	17,231	7,201	41.8	0	7,201	41.8
2012	23,765	1,500	0	595	25,860	19,710	1,960	17,749	8,110	45.7	0	8,110	45.7
2013	24,061	1,320	0	650	26,031	20,098	2,035	18,063	7,967	44.1	0	7,967	44.1
2014	25,404	1,370	0	650	27,424	21,154	2,113	19,041	8,382	44.0	0	8,382	44.0
2015	26,714	1,370	0	650	28,734	21,882	2,196	19,687	9,047	46.0	0	9,047	46.0
2016	27,539	440	0	650	28,629	22,396	2,278	20,118	8,510	42.3	0	8,510	42.3
2017	28,373	50	0	650	29,073	22,912	2,361	20,551	8,521	41.5	0	8,521	41.5
2018	28,373	50	0	650	29,073	23,466	2,436	21,030	8,043	38.2	0	8,043	38.2

1/ Capacity additions and changes projected to be in-service by January 1st are considered to be available to meet Winter peak loads which are forecast to occur during January of the "second" year indicated. All values are Winter net MW.

2/ Total Capacity Available = Col.(2) + Col.(3) - Col.(4) + Col.(5).

3/ These forecasted values reflect the 2009 load forecast without incremental DSM or cumulative load management.

4/ The DSM MW shown represent cumulative load management capability plus incremental conservation from 1/2008-on desinged for use with the 2008 load forecast. They are not included in total additional resources but reduce the peak load upon which Reserve Margin calculations are based.

5/ Margin (%) Before Maintenance = Col.(10) / Col.(9)

6/ Margin (%) After Maintenance = Col.(13) / Col.(9)

EXHIBIT 28

Schedule 8
Planned And Prospective Generating Facility Additions And Changes

(1)	(2)	(3)	(4)	(5)	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Transport						Net Capability		
Plant Name	Unit No.	Location	Unit Type	Pri.	Alt.	Pri.	Alt.	Const. Start Mo./Yr.	Comm. In-Service Mo./Yr.	Expected Retirement Mo./Yr.	Gen. Max. Nameplate KW	Winter MW	Summer MW	Status
ADDITIONS/ CHANGES														
2009														
Cape Canaveral	1	Brevard County	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	402,050	(1)	(1)	OT
Cape Canaveral	2	Brevard County	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	402,050	(8)	(8)	OT
Cutler	5	Miami Dade County	ST	NG	No	PL	No	Jan-09	May-09	Unknown	75,000	(4)	---	OT
DeSoto Next Generating Solar Energy Center (PV)		DeSoto County	PV											P
Ft. Myers	2	Lee County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	1,775,390	5	5	OT
Ft. Myers	3	Lee County	CT	NG	FO2	PL	PL	Jan-09	Jun-09	Unknown	376,380	5	8	OT
Lauderdale	4	Broward County	CC	NG	FO2	PL	PL	Jan-09	Jun-09	Unknown	526,250	4	2	OT
Lauderdale	5	Broward County	CC	NG	FO2	PL	PL	Jan-09	Jun-09	Unknown	526,250	1	(1)	OT
Manatee	1	Manatee County	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	863,300	(3)	(1)	OT
Manatee	2	Manatee County	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	863,300	12	10	OT
Manatee	3	Manatee County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	1,224,510	(55)	9	OT
Martin	1	Martin County	ST	FO6	NG	PL	PL	Jan-09	Jun-09	Unknown	934,500	7	---	OT
Martin	2	Martin County	ST	FO6	NG	PL	PL	Jan-09	Jun-09	Unknown	934,500	7	---	OT
Martin	3	Martin County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	612,000	(17)	(30)	OT
Martin	4	Martin County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	612,000	(3)	(5)	OT
Martin	8	Martin County	CC	NG	FO2	PL	PL	Jan-09	Jun-09	Unknown	1,224,510	13	8	OT
Port Everglades	3	City of Hollywood	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	402,050	6	6	OT
Port Everglades	4	City of Hollywood	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	402,050	5	5	OT
Putnam	1	Putnam County	CC	NG	FO2	PL	WA	Jan-09	Jun-09	Unknown	290,004	5	---	OT
Putnam	2	Putnam County	CC	NG	FO2	PL	WA	Jan-09	Jun-09	Unknown	290,004	6	1	OT
Riviera	3	City of Riviera Beach	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	310,420	(3)	(276)	OT
Riviera	4	City of Riviera Beach	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	310,420	(3)	(286)	OT
Sanford	3	Volusia County	ST	FO6	NG	WA	PL	Jan-09	5/1/2009	---	156,250	1	---	OT
Sanford	4	Volusia County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	1,188,860	12	9	OT
Sanford	5	Volusia County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	1,188,860	11	9	OT
Scherer	4	Monroe, GA	BIT	BIT	No	RR	No	Jan-09	Jun-09	Unknown	680,368	(10)	(15)	OT
SJRPP	2	Duval County	BIT	BIT	Pet	RR	WA	Jan-09	Jun-09	Unknown	135,918	2	(3)	OT
SJRPP	1	Duval County	BIT	BIT	Pet	RR	WA	Jan-09	Jun-09	Unknown	135,918	2	(3)	OT
Space Coast Next Generating Solar Energy Center (PV)	1	Brevard County	PV											P
Turkey Point	2	Miami Dade County	ST	FO6	NG	WA	PL	Jan-09	Jun-09	Unknown	402,050	(4)	(4)	OT
Turkey Point	5	Miami Dade County	CC	NG	No	PL	No	Jan-09	Jun-09	Unknown	1,224,510	(71)	11	OT
West County Combined Cycle	1	Palm Beach County	CC	NG	FO2	PL	PL	Jan-07	Aug-09	Unknown	Unknown	---	1,219	V
								2009 Changes/Additions w/o Inactive Reserve Total:				**(78)**	**670**	
Cutler	5	Miami Dade County	ST	NG	No	PL	No	---	---	---	75,000	**---**	(64)	OT
Cutler	6	Miami Dade County	ST	NG	No	PL	No	---	---	---	161,500	**---**	(137)	OT
Sanford	3	Volusia County	ST	FO6	NG	WA	PL	---	---	---	156,250	**---**	(139)	OT
Port Everglades	1	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	247,775	**---**	(213)	OT
Port Everglades	2	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	247,775	**---**	(213)	OT
								2009 Changes/Additions with Inactive Reserve Total:				**(78)**	**(96)**	

Note 1: The Winter Total MW value consists of all generation additions and changes achieved by January. The Summer Total MW value consists of all generation additions and changes achieved by June. All MW additions/changes occuring later in the year will be picked up for reporting/planning purposes in the following year.

Note 2: Changes shown may include different ratings than shown in Schedule 1 due solely to ambient temperature consistent with those in FPL 's peak load forecast to maintain consistency in reserve margin calculations.

Note 3: The Photovoltaic MWs are not included in the total at this time because these facilities are assumed to provide non-firm energy only.

EXHIBIT 28

Schedule 8
Planned And Prospective Generating Facility Additions And Changes

	(2)	(3)	(4)	(5)	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Transport		Const.	Comm.	Expected	Gen. Max.	Net Capability		
Plant Name	Unit No.	Location	Unit Type	Pri.	Alt.	Pri.	Alt.	Start Mo./Yr.	In-Service Mo./Yr.	Retirement Mo./Yr.	Nameplate KW	Winter MW	Summer MW	Status
ADDITIONS/ CHANGES														
2010														
Cape Canaveral	1	Brevard County	ST	FO6	NG	WA	PL		May-10	Unknown	402,050	---	(395)	
Cape Canaveral	2	Brevard County	ST	FO6	NG	WA	PL		May-10	Unknown	402,050	---	(388)	
DeSoto Next Generating Solar Energy Center (PV)	1	DeSoto County	PV											P
Lauderdale	4	Broward County	CC	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	526,250	1	1	OT
Manatee	1	Manatee County	ST	FO6	NG	WA	PL	Jan-10	Jun-10	Unknown	863,300	15	11	OT
Martin	3	Martin County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	612,000	14	13	OT
Riviera	3	City of Riviera Beach	ST	FO6	NG	WA	PL	Jan-10	Jun-09	Unknown	310,420	(277)	---	OT
Riviera	4	City of Riviera Beach	ST	FO6	NG	WA	PL	Jan-10	Jun-09	Unknown	310,420	(288)	---	OT
Sanford	4	Volusia County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	1,188,860	5	5	OT
Scherer	4	Monroe, GA	BIT	BIT	No	RR	No	Jan-10	Jun-10	Unknown	680,368	4	4	OT
SJRPP	2	Duval County	BIT	BIT	Pet	RR	WA	Jan-10	Jun-10	Unknown	135,918	(2)	(2)	OT
Space Coast Next Generating Solar Energy Center (PV)	1	Brevard County	PV											P
Turkey Point	2	Miami Dade County	ST	FO6	NG	WA	PL	Jan-10	Jun-10	Unknown	402,050	4	4	OT
West County Combined Cycle	1	Palm Beach County	CC	NG	FO2	PL	PL	Jan-07	Aug-09	Unknown	Unknown	1,335	---	V
West County Combined Cycle	2	Palm Beach County	CC	NG	FO2	PL	PL	Jan-08	Dec-09	Unknown	Unknown	1,335	1,219	V
											2010 Changes/Additions w/o Inactive Reserve Total:	**2,146**	**472**	
Martin	2	Martin County	ST	FO6	NG	PL	PL	---	---	---	934,500	---	(826)	OT
Manatee	2	Manatee County	ST	FO6	NG	WA	PL	---	---	---	863,300	---	(822)	OT
Cutler	5	Miami Dade County	ST	NG	No	PL	No	---	---	---	75,000	(69)	---	OT
Cutler	6	Miami Dade County	ST	NG	No	PL	No	---	---	---	161,500	(139)	---	OT
Sanford	3	Volusia County	ST	FO6	NG	WA	PL	---	---	---	156,250	(141)	---	OT
Port Everglades	1	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	247,775	(214)	---	OT
Port Everglades	2	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	247,775	(214)	---	OT
											2010 Changes/Additions with Inactive Reserve Total:	**1,369**	**(1,176)**	
2011														
Cape Canaveral	1	Brevard County	ST	FO6	NG	WA	PL	Jan-11	Jun-11	Unknown	402,050	(397)	---	OT
Cape Canaveral	2	Brevard County	ST	FO6	NG	WA	PL	Jan-11	Jun-11	Unknown	402,050	(397)	---	OT
Fort Myers	2	Lee County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	1,775,390	(22)	(22)	OT
Fort Myers	3	Lee County	CT	NG	FO2	PL	PL	Jan-11	Jun-11	Unknown	376,380	(3)	(2)	OT
Lauderdale	4	Broward County	CC	NG	FO2	PL	PL	Jan-11	Jun-11	Unknown	526,250	(5)	(9)	OT
Lauderdale	5	Broward County	CC	NG	FO2	PL	PL	Jan-11	Jun-11	Unknown	526,250	(1)	(5)	OT
Manatee	1	Manatee County	ST	FO6	NG	WA	PL	Jan-11	Jun-11	Unknown	863,300	(9)	(8)	OT
Manatee	2	Manatee County	ST	FO6	NG	WA	PL	Jan-11	Jun-11	Unknown	863,300	(9)	(8)	OT
Manatee	3	Manatee County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	1,224,510	65	(16)	OT
Martin	1	Martin County	ST	FO6	NG	PL	PL	Jan-11	Jun-11	Unknown	934,500	(5)	(4)	OT
Martin	2	Martin County	ST	FO6	NG	PL	PL	Jan-11	Jun-11	Unknown	934,500	(5)	(4)	OT
Martin	3	Martin County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	612,000	8	23	OT
Martin	4	Martin County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	612,000	8	11	OT
Martin	5	Martin County	CC	NG	FO2	PL	PL	Jan-11	Jun-11	Unknown	1,224,510	(10)	(9)	OT
Port Everglades	3	City of Hollywood	ST	FO6	NG	WA	PL	Jan-11	Jun-11	Unknown	402,050	(6)	(6)	OT
Port Everglades	4	City of Hollywood	ST	FO6	NG	WA	PL	Jan-11	Jun-11	Unknown	402,050	(5)	(5)	OT
Putnam	1	Putnam County	CC	NG	FO2	PL	WA	Jan-11	Jun-11	Unknown	290,004	12	---	OT
Putnam	2	Putnam County	CC	NG	FO2	PL	WA	Jan-11	Jun-11	Unknown	290,004	11	(1)	OT
Sanford	4	Volusia County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	1,188,860	14	(10)	OT
Sanford	5	Volusia County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	1,188,860	19	(5)	OT
SJRPP	1	Duval County	BIT	BIT	Pet	RR	WA	Jan-11	Jun-11	Unknown	135,918	(2)	(2)	OT
Turkey Point	5	Miami Dade County	CC	NG	No	PL	No	Jan-11	Jun-11	Unknown	1,224,510	71	(11)	OT
West County Combined Cycle	3	Palm Beach County	CC	NG	FO2	PL	PL	Jan-09	Jun-11	Unknown	Unknown	---	1219	T
											2011 Changes/Additions w/o Inactive Reserve Total:	**(668)**	**1,125**	
Martin	2	Martin County	ST	FO6	NG	PL	PL	---	---	---	934,500	(834)	---	OT
Manatee	2	Manatee County	ST	FO6	NG	WA	PL	---	---	---	863,300	(825)	---	OT
											2011 Changes/Additions with Inactive Reserve Total:	**(2,327)**	**1,125**	

Note 1: The Winter Total MW value consists of all generation additions and changes achieved by January. The Summer Total MW value consists of all generation additions and changes achieved by June. All MW additions/changes occuring later in the year will be picked up for reporting/planning purposes in the following year.

Note 2: Changes shown may include different ratings than shown in Schedule 1 due solely to ambient temperature consistent with those in FPL 's peak load forecast to maintain consistency in reserve margin calculations.

Note 3: The Photovoltaic MWs are not included in the total at this time because these facilities are assumed to provide non-firm energy only.

EXHIBIT 28

Schedule 8
Planned And Prospective Generating Facility Additions And Changes

	(2)	(3)	(4)	(5)	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Plant Name	Unit No.	Location	Unit Type	Fuel Pri.	Fuel Alt.	Fuel Transport Pri.	Fuel Transport Alt.	Const. Start Mo./Yr.	Comm. In-Service Mo./Yr.	Expected Retirement Mo./Yr.	Gen. Max. Nameplate KW	Net Capability Winter MW	Net Capability Summer MW	Status
ADDITIONS/ CHANGES														
2012														
Scherer	4	Monroe, GA	BIT	BIT	No	RR	No	Jan-12	Jun-12	Unknown	680,368	(11)	(11)	OT
St. Lucie Uprates	1	St. Lucie County	NP	UR	No	TK	No	See Note 3	Dec-11	Unknown	850,000	103	103	T
St. Lucie Uprates	2	St. Lucie County	NP	UR	No	TK	No	See Note 3	Jun-12	Unknown	723,775	---	88	T
Turkey Point Uprates	3	Miami Dade County	NP	UR	No	TK	No	See Note 3	May-12	Unknown	759,900	---	104	T
West County Combined Cycle	3	Palm Beach County	CC	NG	FO2	PL	PL	Jan-09	Jun-11	Unknown	Unknown	1,335	---	T
											2012 Changes/Additions w/o Inactive Reserve Total:	**1,427**	**284**	
												---	**---**	
											2012 Changes/Additions with Inactive Reserve Total:	**1,427**	**284**	
2013														
Cape Canaveral Next Generation Clean Energy Center	1	Brevard County	CC	NG	FO2	PL	PL	Jun-11	Jun-13	Unknown	Unknown	---	1,219	T
St. Lucie Uprates	2	St. Lucie County	NP	UR	No	TK	No	See Note 3	Jun-12	Unknown	723,775	88	---	T
Turkey Point Uprates	3	Miami Dade County	NP	UR	No	TK	No	See Note 3	May-12	Unknown	759,900	104	---	T
Turkey Point Uprates	4	Miami Dade County	NP	UR	No	TK	No	See Note 3	Dec-12	Unknown	759,900	104	104	T
											2013 Changes/Additions w/o Inactive Reserve Total:	**296**	**1,323**	
												---	**---**	
											2013 Changes/Additions with Inactive Reserve Total:	**296**	**1,323**	
2014														
Cape Canaveral Next Generation Clean Energy Center	1	Brevard County	CC	NG	FO2	PL	PL	Jun-11	Jun-13	Unknown	Unknown	1,343	---	T
Riviera Beach Next Generation Clean Energy Center	1	City of Riviera Beach	CC	NG	FO2	PL	PL	Jun-12	Jun-14	Unknown	Unknown	---	1,207	T
											2014 Changes/Additions w/o Inactive Reserve Total:	**1,343**	**1,207**	
												---	**---**	
											2014 Changes/Additions with Inactive Reserve Total:	**1,343**	**1,207**	
2015														
Riviera Beach Next Generation Clean Energy Center	1	City of Riviera Beach	CC	NG	FO2	PL	PL	Jun-12	Jun-14	Unknown	Unknown	1,310	---	T
											2015 Changes/Additions w/o Inactive Reserve Total:	**1,310**	**0**	
												---	**---**	
											2015 Changes/Additions with Inactive Reserve Total:	**1,310**	**0**	
2016														
												---	---	
											2016 Changes/Additions w/o Inactive Reserve Total:	**---**	---	
Manatee	2	Manatee County	ST	FO6	NG	WA	PL		Jun-16	Unknown	863,300	---	814	OT
											2016 Changes/Additions with Inactive Reserve Total:	**0**	**814**	
2017														
												---	---	
											2017 Changes/Additions w/o Inactive Reserve Total:	**---**	---	
Manatee	2	Manatee County	ST	FO6	NG	WA	PL		Jun-16	Unknown	863,300	825		OT
Martin	2	Martin County	ST	FO6	NG	PL	PL		Jun-17	Unknown	934,500	**---**	822	OT
											2017 Changes/Additions w/o Inactive Reserve Total:	**825**	**822**	
2018														
Turkey Point Nuclear Unit	6	Miami Dade County	NP	UR	No	TK	No	Jan-11	Jun-18	Unknown	Unknown	---	1,100	T
											2018 Changes/Additions w/o Inactive Reserve Total:	**0**	**1,100**	
Martin	2	Martin County	ST	FO6	NG	PL	PL			Jun-17	934,500	834	**---**	OT
											2018 Changes/Additions with Inactive Reserve Total:	**834**	**1,100**	

Note 1: The Winter Total MW value consists of all generation additions and changes achieved by January. The Summer Total MW value consists of all generation additions and changes achieved by June. All MW additions/changes occuring later in the year will be picked up for reporting/planning purposes in the following year.

Note 2: Changes shown may include different ratings than shown in Schedule 1 due solely to ambient temperature consistent with those in FPL 's peak load forecast to maintain consistency in reserve margin calculations.

Note 3: The nuclear uprates will be performed during the scheduled refueling outages for each unit.

Note 4: Certain existing FPL units that have been placed on temporarily on Inactive Reserve status are assumed, for planning purposes in this document, to being returning to active reserve starting in 2016.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1)	**Plant Name and Unit Number:**	West County Energy Center Combined Cycle Unit 1	
(2)	**Capacity**		
	a. Summer	1,219	MW
	b. Winter	1,335	MW
(3)	**Technology Type:**	Combined Cycle	
(4)	**Anticipated Construction Timing**		
	a. Field construction start-date:	2007	
	b. Commercial In-service date:	2009	
(5)	**Fuel**		
	a. Primary Fuel		Natural Gas
	b. Alternate Fuel		Distillate
(6)	**Air Pollution and Control Strategy:**		Natural Gas, Dry Low No_x Combustors, SCR 0.0015% S. Distillate, & Water Injection on Distillate
(7)	**Cooling Method:**		Cooling Tower
(8)	**Total Site Area:**	220	Acres
(9)	**Construction Status:**	V	(Under construction, more than 50% complete)
(10)	**Certification Status:**	V	(Under construction, more than 50% complete)
(11)	**Status with Federal Agencies:**	V	(Under construction, more than 50% complete)
(12)	**Projected Unit Performance Data:**		
	Planned Outage Factor (POF):	2.1%	
	Forced Outage Factor (FOF):	1.1%	
	Equivalent Availability Factor (EAF):	96.8%	(Base & Duct Firing Operation)
	Resulting Capacity Factor (%):	Approx. 90%	(First Full Year Base Operation)
	Average Net Operating Heat Rate (ANOHR): Base Operation 75F,100%	6,582	Btu/kWh (Base Operation)
(13)	**Projected Unit Financial Data *,****		
	Book Life (Years):	25	years
	Total Installed Cost (2009 $/kW):	565	
	Direct Construction Cost ($/kW):		
	AFUDC Amount ($/kW):	55	
	Escalation ($/kW):		
	Fixed O&M ($/kW -Yr.): (2009 $kW-Yr)	11.65	
	Variable O&M ($/MWH): (2009 $/MWH)	0.138	
	K Factor:	1.5834	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement, but not firm gas transportation costs.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** West County Energy Center Combined Cycle Unit 2

(2) **Capacity**
a. Summer 1,219 MW
b. Winter 1,335 MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2008
b. Commercial In-service date: 2009

(5) **Fuel**
a. Primary Fuel Natural Gas
b. Alternate Fuel Distillate

(6) **Air Pollution and Control Strategy:** Natural Gas, Dry Low No$_x$ Combustors, SCR
0.0015% S. Distillate, & Water Injection on Distillate

(7) **Cooling Method:** Cooling Tower

(8) **Total Site Area:** 220 Acres

(9) **Construction Status:** V (Under construction, more than 50% complete)

(10) **Certification Status:** V (Under construction, more than 50% complete)

(11) **Status with Federal Agencies:** V (Under construction, more than 50% complete)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	2.1%	
Forced Outage Factor (FOF):	1.1%	
Equivalent Availability Factor (EAF):	96.8%	(Base & Duct Firing Operation)
Resulting Capacity Factor (%):	Approx. 88%	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR):	6,582	Btu/kWh (Base Operation)
Base Operation 75F,100%		

(13) **Projected Unit Financial Data **,*****

Book Life (Years):	25	years
Total Installed Cost (2010 $/kW):	519	
Direct Construction Cost ($/kW):		
AFUDC Amount ($/kW):	57	
Escalation ($/kW):		
Fixed O&M ($/kW -Yr.): (2010 $kW-Yr)	10.11	
Variable O&M ($/MWH): (2010 $/MWH)	0.138	
K Factor:	1.5873	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement, but not firm gas transportation costs.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** DeSoto Next Generation Solar Energy Center

(2) **Capacity**

a. Summer	25	MW
b. Winter	25	MW

(3) **Technology Type:** Photovoltaic

(4) **Anticipated Construction Timing**

a. Field construction start-date:	2009
b. Commercial In-service date:	2010

(5) **Fuel**

a. Primary Fuel	Solar
b. Alternate Fuel	N/A

(6) **Air Pollution and Control Strategy:** N/A

(7) **Cooling Method:** N/A

(8) **Total Site Area:** 180 Acres

(9) **Construction Status:** U (Under construction, less than 50% complete)

(10) **Certification Status:** Pemitted (Individual Permits)

(11) **Status with Federal Agencies:** Permitted

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	N/A	
Forced Outage Factor (FOF):	N/A	
Equivalent Availability Factor (EAF):	0.98	
Resulting Capacity Factor (%):	Approx. 25% (First Full Year of Operation)	
Average Net Operating Heat Rate (ANOHR): Base Operation 75F,100%	N/A	Btu/kWh

(13) **Projected Unit Financial Data *,****

Book Life (Years):	25	years
Total Installed Cost (2010 $/kW):	6,937	
Direct Construction Cost ($/kW):	-	
CWIP Amount ($/kW):	369	
Escalation ($/kW):	-	
Fixed O&M ($/kW -Yr.): (2010 $kW-Yr)	54	
Variable O&M ($/MWH): (2010 $/MWH)	0	
K Factor:	1.15	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes transmission interconnection.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Space Coast Next Generation Energy Center

(2) **Capacity**
a. Summer 10 MW
b. Winter 10 MW

(3) **Technology Type:** Photovoltaic

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2009
b. Commercial In-service date: 2010

(5) **Fuel**
a. Primary Fuel Solar
b. Alternate Fuel N/A

(6) **Air Pollution and Control Strategy:** N/A

(7) **Cooling Method:** N/A

(8) **Total Site Area:** 60 Acres

(9) **Construction Status:** P (Planned)

(10) **Certification Status:** P (Planned- Individual Permits)

(11) **Status with Federal Agencies:** Permitted

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	N/A	
Forced Outage Factor (FOF):	N/A	
Equivalent Availability Factor (EAF):	0.98	
Resulting Capacity Factor (%):	Approx. 21.3%	(First Full Year of Operation)
Average Net Operating Heat Rate (ANOHR):	N/A	Btu/kWh
Base Operation 75F,100%		

(13) **Projected Unit Financial Data *,****

Book Life (Years):	25	years
Total Installed Cost (2010 $/kW):	7,890	
Direct Construction Cost ($/kW):	-	
CWIP Amount ($/kW):	427.7	
Escalation ($/kW):	-	
Fixed O&M ($/kW -Yr.): (2010 $kW-Yr)	54	
Variable O&M ($/MWH): (2010 $/MWH)	0	
K Factor:	1.2100	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes transmission interconnection.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** West County Energy Center Combined Cycle Unit 3

(2) **Capacity**

a. Summer	1,219	MW
b. Winter	1,335	MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**

a. Field construction start-date: 2009
b. Commercial In-service date: 2011

(5) **Fuel**

a. Primary Fuel: Natural Gas
b. Alternate Fuel: Distillate

(6) **Air Pollution and Control Strategy:** Natural Gas, Dry Low No$_x$ Combustors, SCR
0.0015% S. Distillate, & Water Injection on Distillate

(7) **Cooling Method:** Cooling Tower

(8) **Total Site Area:** 220 Acres

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	2.1%	
Forced Outage Factor (FOF):	1.1%	
Equivalent Availability Factor (EAF):	96.8%	(Base & Duct Firing Operation)
Resulting Capacity Factor (%):	Approx. 93%	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR):	6,582	Btu/kWh (Base Operation)
Base Operation 75F,100%		

(13) **Projected Unit Financial Data **,*****

Book Life (Years):	25	years
Total Installed Cost (2011 $/kW):	709	
Direct Construction Cost ($/kW):		
AFUDC Amount ($/kW):	71	
Escalation ($/kW):		
Fixed O&M ($/kW -Yr.): (2011 $kW-Yr)	11.63	
Variable O&M ($/MWH): (2011 $/MWH)	0.480	
K Factor:	1.4697	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement, but not firm gas transportation costs.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** St. Lucie 1 Nuclear Uprate

(2) **Capacity**

a. Summer	103	MW (Incremental)
b. Winter	103	MW (Incremental)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**

a. Field construction start-date:	During scheduled refueling outage
b. Commercial In-service date:	2011

(5) **Fuel**

a. Primary Fuel	Uranium
b. Alternate Fuel	---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9)	**Construction Status:**	T	(Regulatory approval received, but not under construction)
(10)	**Certification Status:**	T	(Regulatory approval received, but not under construction)
(11)	**Status with Federal Agencies:**	T	(Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	No change from existing unit
Forced Outage Factor (FOF):	No change from existing unit
Equivalent Availability Factor (EAF):	No change from existing unit
Resulting Capacity Factor (%):	No change from existing unit
Average Net Operating Heat Rate (ANOHR):	No change from existing unit
Base Operation 75F,100%	No change from existing unit

(13) **Projected Unit Financial Data ***

Book Life (Years):	25	years (Matches the current operating license period.)
Total Installed Cost ($/kW): **	3,054	(See Note (1) for explanation.)
Direct Construction Cost:	3,054	(See Note (1) for explanation.)
AFUDC Amount ($/kW):		(See Note (2) for explanation.)
Escalation ($/kW):		(See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.):	There is no additional O&M impact from this project.	
Variable O&M ($/MWH):	There is no additional O&M impact from this project.	
K Factor:		(See Note (2) for explanation.)

NOTE:

(1) This value does not include a plant-specific portion of the early recovery of approx. $353 million of capital carrying costs in total associated with the uprates at the four existing nuclear units, nor a plant-specific portion of a projected $45 million in total for transmission costs associated with the uprates at the four existing nuclear units.

(2) Not applicable due to early recovery of capital carrying costs.

(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.

** $/incremental kW

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Turkey Point 3 Nuclear Uprate

(2) **Capacity**
a. Summer 104 MW (Incremental)
b. Winter 104 MW (Incremental)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**
a. Field construction start-date: During scheduled refueling outage
b. Commercial In-service date: 2012

(5) **Fuel**
a. Primary Fuel Uranium
b. Alternate Fuel ---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**
Planned Outage Factor (POF): No change from existing unit
Forced Outage Factor (FOF): No change from existing unit
Equivalent Availability Factor (EAF): No change from existing unit
Resulting Capacity Factor (%): No change from existing unit
Average Net Operating Heat Rate (ANOHR): No change from existing unit
Base Operation 75F,100% No change from existing unit

(13) **Projected Unit Financial Data ***

Book Life (Years):	20	years (Matches the current operating license period.)
Total Installed Cost ($/kW): **	3,580	(See Note (1) for explanation.)
Direct Construction Cost ($/kW):	3,580	(See Note (1) for explanation.)
AFUDC Amount ($/kW):		(See Note (2) for explanation.)
Escalation ($/kW):		(See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.):	There is no additional O&M impact from this project.	
Variable O&M ($/MWH):	There is no additional O&M impact from this project.	
K Factor:		(See Note (2) for explanation.)

NOTE:
(1) This value does not include a plant-specific portion of the early recovery of approx. $353 million of capital carrying costs in total associated with the uprates at the four existing nuclear units, nor a plant-specific portion of a projected $45 million in total for transmission costs associated with the uprates at the four existing nuclear units.
(2) Not applicable due to early recovery of capital carrying costs.
(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.
** $/incremental kW

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** St. Lucie 2 Nuclear Uprate

(2) **Capacity**
a. Summer 103 MW (Total Incremental), 88 MW (incremental FPL's ownership share)
b. Winter 104 MW (Total Incremental), 88 MW (incremental FPL's ownership share)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**
a. Field construction start-date: During scheduled refueling outage
b. Commercial In-service date: 2012

(5) **Fuel**
a. Primary Fuel Uranium
b. Alternate Fuel ---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**
Planned Outage Factor (POF): No change from existing unit
Forced Outage Factor (FOF): No change from existing unit
Equivalent Availability Factor (EAF): No change from existing unit
Resulting Capacity Factor (%): No change from existing unit
Average Net Operating Heat Rate (ANOHR): No change from existing unit
Base Operation 75F,100% No change from existing unit

(13) **Projected Unit Financial Data *,****

Book Life (Years):	31	years (Matches the current operating license period.)
Total Installed Cost ($/kW): **	3,271	(See Note (1) for explanation.)
Direct Construction Cost ($/kW):	3,271	(See Note (1) for explanation.)
AFUDC Amount ($/kW):		(See Note (2) for explanation.)
Escalation ($/kW):		(See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.):	There is no additional O&M impact from this project.	
Variable O&M ($/MWH):	There is no additional O&M impact from this project.	
K Factor:		(See Note (2) for explanation.)

NOTE:
(1) This value does not include a plant-specific portion of the early recovery of approx. $353 million of capital carrying costs in total associated with the uprates at the four existing nuclear units, nor a plant-specific portion of a projected $45 million in total for transmission costs associated with the uprates at the four existing nuclear units.
(2) Not applicable due to early recovery of capital carrying costs.
(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.
** $/incremental kW

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Turkey Point 4 Nuclear Uprate

(2) **Capacity**

a. Summer	104	MW (Incremental)
b. Winter	104	MW (Incremental)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**

a. Field construction start-date:	During scheduled refueling outage
b. Commercial In-service date:	2012

(5) **Fuel**

a. Primary Fuel	Uranium
b. Alternate Fuel	---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	No change from existing unit
Forced Outage Factor (FOF):	No change from existing unit
Equivalent Availability Factor (EAF):	No change from existing unit
Resulting Capacity Factor (%):	No change from existing unit
Average Net Operating Heat Rate (ANOHR):	No change from existing unit
Base Operation 75F,100%	No change from existing unit

(13) **Projected Unit Financial Data *,****

Book Life (Years):	22	years (Matches the current operating license period.)
Total Installed Cost ($/kW): **	3,630	(See Note (1) for explanation.)
Direct Construction Cost ($/kW):	3,630	(See Note (1) for explanation.)
AFUDC Amount ($/kW):		(See Note (2) for explanation.)
Escalation ($/kW):		(See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.):	There is no additional O&M impact from this project.	
Variable O&M ($/MWH):	There is no additional O&M impact from this project.	
K Factor:		(See Note (2) for explanation.)

NOTE:

(1) This value does not include a plant-specific portion of the early recovery of approx. $353 million of capital carrying costs in total associated with the uprates at the four existing nuclear units, nor a plant-specific portion of a projected $45 million in total for transmission costs associated with the uprates at the four existing nuclear units.

(2) Not applicable due to early recovery of capital carrying costs.

(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.

** $/incremental kW

EXHIBIT 28

Schedule 9

Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Cape Canaveral Next Generation Clean Energy Center

(2) **Capacity**
a. Summer 1,219 MW
b. Winter 1,343 MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2011
b. Commercial In-service date: 2013

(5) **Fuel**
a. Primary Fuel Natural Gas
b. Alternate Fuel Ultra-low sulfur distillate

(6) **Air Pollution and Control Strategy:** Dry Low No_x Burners, SCR, Natural Gas, 0.0015% S. Distillate and Water Injection on Distillate

(7) **Cooling Method:** Once-through cooling water

(8) **Total Site Area:** 43 Acres

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	2.1%	
Forced Outage Factor (FOF):	1.1%	
Equivalent Availability Factor (EAF):	96.8%	
Resulting Capacity Factor (%):	Approx.90 %	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR):	6,580	Btu/kWh
Base Operation 75F,100%		

(13) **Projected Unit Financial Data *,****

Book Life (Years):	25	years
Total Installed Cost (2013 $/kW):	915	
Direct Construction Cost ($/kW):		
AFUDC Amount ($/kW):	98	
Escalation ($/kW):		
Fixed O&M ($/kW -Yr.): (2013 $kW-Yr)	14.81	
Variable O&M ($/MWH): (2013 $/MWH)	0.15	
K Factor:	1.494	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Riviera Beach Next Generation Clean Energy Center

(2) **Capacity**

a. Summer	1,207	MW
b. Winter	1,310	MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**

a. Field construction start-date:	2012
b. Commercial In-service date:	2014

(5) **Fuel**

a. Primary Fuel	Natural Gas
b. Alternate Fuel	Ultra-low sulfur distillate

(6) **Air Pollution and Control Strategy:** Dry Low No_x Burners, SCR, Natural Gas, 0.0015% S. Distillate and Water Injection on Distillate

(7) **Cooling Method:** Once-through cooling water

(8)	**Total Site Area:**	33	Acres
(9)	**Construction Status:**	T	(Regulatory approval received, but not under construction)
(10)	**Certification Status:**	T	(Regulatory approval received, but not under construction)
(11)	**Status with Federal Agencies:**	T	(Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	2.1%	
Forced Outage Factor (FOF):	1.1%	
Equivalent Availability Factor (EAF):	96.8%	
Resulting Capacity Factor (%):	Approx. 90%	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR):	6,576	Btu/kWh
Base Operation 75F,100%		

(13) **Projected Unit Financial Data *,****

Book Life (Years):		25	years
Total Installed Cost (2014 $/kW):		1,057	
Direct Construction Cost ($/kW):			
AFUDC Amount ($/kW):		122	
Escalation ($/kW):			
Fixed O&M ($/kW -Yr.):	(2014 $kW-Yr)	15.32	
Variable O&M ($/MWH):	(2014 $/MWH)	0.12	
K Factor:		1.494	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 28

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Turkey Point Unit 6 Nuclear Unit

(2) **Capacity**
a. Summer 1,100 MW
b. Winter 1,100 MW

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2011
b. Commercial In-service date: 2018

(5) **Fuel**
a. Primary Fuel uranium dioxide
b. Alternate Fuel NA

(6) **Air Pollution and Control Strategy:** NA

(7) **Cooling Method:** Mechanical Draft Cooling Towers

(8) **Total Site Area:** 211 Acres

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	TBD	
Forced Outage Factor (FOF):	TBD	
Equivalent Availability Factor (EAF):	TBD	
Resulting Capacity Factor (%):	Approx. 90%	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR):	TBD	Btu/kWh
Base Operation 75F,100%		

(13) **Projected Unit Financial Data *,****

Book Life (Years):	TBD	years
Total Installed Cost ($/kW):	TBD	
Direct Construction Cost ($/kW):	TBD	
AFUDC Amount ($/kW):	TBD	
Escalation ($/kW):	TBD	
Fixed O&M ($/kW -Yr.): ($kW-Yr)	TBD	
Variable O&M ($/MWH): ($/MWH)	TBD	
K Factor:		

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

West County Energy Center Unit 1

The new West County Energy Center Unit 1 does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

West County Energy Center Unit 2

The new West County Energy Center Unit 2 does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Desoto Next Generation Solar Energy Center (PV)

The new Desoto Next Generation Solar Energy Center (PV) does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Space Center Next Generation Solar Energy Center (PV)

The new Space Center Next Generation Solar Energy Center (PV) does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

West County Energy Center Unit 3

(1)	Point of Origin and Termination:	New Sugar Substation – Corbett Substation
(2)	Number of Lines:	1
(3)	Right-of-way	FPL Owned
(4)	Line Length:	1 mile
(5)	Voltage:	230 kV
(6)	Anticipated Construction Timing:	Start date: May 2009 End date: November 2010
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$11,300,000
(8)	Substations:	New Sugar Substation and Corbett Substation
(9)	Participation with Other Utilities:	None

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

St. Lucie 1 Nuclear Uprate

The St. Lucie 1 Nuclear Uprate does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point 3 Nuclear Uprate

The Turkey Point 3 Nuclear Uprate does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

St. Lucie 2 Nuclear Uprate

The St. Lucie 2 Nuclear Uprate does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point 4 Nuclear Uprate

The Turkey Point 4 Nuclear Uprate does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Cape Canaveral Next Generation Clean Energy Center (Conversion)

The Cape Canaveral Next Generation Clean Energy Center, that is the result of the conversion of the exiting Cape Canaveral power plant site, does not require any “new” transmission lines.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Riviera Beach Next Generation Clean Energy Center (Conversion)

The Riviera Beach Energy Center Conversion, that is the result of the conversion of the existing Riviera Beach power plant site, does not require any “new” transmission lines. Several lines will be extended and reconfigured to accommodate the increased capacity.

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point Unit 6

(1)	Point of Origin and Termination:	New Clear Sky Substation – Levee Substation
(2)	Number of Lines:	2
(3)	Right-of-way	FPL Owned
(4)	Line Length:	43 miles
(5)	Voltage:	500 kV
(6)	Anticipated Construction Timing:	Start date: TBD End date: TBD
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$ TBD
(8)	Substations:	New Clear Sky Substation and Levee Substation
(9)	Participation with Other Utilities:	None

(1)	Point of Origin and Termination:	New Clear Sky Substation – Pennsuco Substation
(2)	Number of Lines:	1
(3)	Right-of-way	FPL Owned
(4)	Line Length:	52 miles
(5)	Voltage:	230 kV
(6)	Anticipated Construction Timing:	Start date: TBD End date: TBD
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$ TBD
(8)	Substations:	New Clear Sky Substation and Pennsuco Substation
(9)	Participation with Other Utilities:	None

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point Unit 6

(1)	Point of Origin and Termination:	New Clear Sky Substation – Davis Substation
(2)	Number of Lines:	1
(3)	Right-of-way	FPL Owned
(4)	Line Length:	19 miles
(5)	Voltage:	230 kV
(6)	Anticipated Construction Timing:	Start date: TBD End date: TBD
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$ TBD
(8)	Substations:	New Clear Sky Substation and Davis Substation
(9)	Participation with Other Utilities:	None

(1)	Point of Origin and Termination:	Davis Substation – Miami Substation
(2)	Number of Lines:	1
(3)	Right-of-way	FPL Owned
(4)	Line Length:	18 miles
(5)	Voltage:	230 kV
(6)	Anticipated Construction Timing:	Start date: TBD End date: TBD
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$ TBD
(8)	Substations:	Davis Substation and Miami Substation
(9)	Participation with Other Utilities:	None

EXHIBIT 28

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point Unit 6

(1)	Point of Origin and Termination:	New Clear Sky Substation – Turkey Point Substation
(2)	Number of Lines:	1
(3)	Right-of-way	FPL Owned
(4)	Line Length:	0.5 miles
(5)	Voltage:	230 kV
(6)	Anticipated Construction Timing:	Start date: TBD End date: TBD
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$ TBD
(8)	Substations:	New Clear Sky Substation and Turkey Point Substation
(9)	Participation with Other Utilities:	None

EXHIBIT 28

Existing FIRM and NON-FIRM Capacity and Energy by Primary Fuel Type
Actuals for the Year 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Net (MW) Capability				NEL	Fuel Mix
	Generation by Primary Fuel	**Summer (MW)**	**Summer (%)**	**Winter (MW)**	**Winter (%)**	**GWH**	**%**
(1)	Coal	900	3.6%	902	3.4%	6,423	5.8%
(2)	Nuclear	2,939	11.7%	3,013	11.4%	24,024	21.6%
(3)	Residual	6,764	27.0%	6,818	25.8%	5,702	5.1%
(4)	Distillate	660	2.6%	781	3.0%	17	0.0%
(5)	Natural Gas	10,824	43.2%	11,844	44.9%	58,820	53.0%
(6)	***FPL Existing Units Total (1):***	***22,087***	***88.1%***	***23,358***	***88.5%***	***94,986***	***85.6%***
(7)	Renewables (Purchases)- Firm	157.6	0.6%	157.6	0.6%	1,262	1.1%
(8)	Renewables (Purchases)- Non-Firm	Not Applicable		Not Applicable		365	0.3%
(9)	***Renewable Total:***	***157.6***	***0.6%***	***157.6***	***0.6%***	***1,627***	***1.47%***
(10)	***Purchases Other:***	***2,834.0***	**11.3%**	***2,868.0***	**10.9%**	***14,391***	**13.0%**
(11)	***Total (2):***	***25,078.6***	***100.0%***	***26,383.6***	***100.0%***	***111,004***	***100.0%***

Note:
(1) FPL Existing Units Total of 22,087 MW matches Total System found on Schedule 1.
(2) Net Energy for Load GWH of 111,004 GWH matches Schedule 6.1

EXHIBIT 28

Schedule 11.2

Existing NON-FIRM Self-Service Renewable Generation Facilities
Actuals for the Year 2008

(1) Type of Facility	(2) Installed Capacity (MW)	(3) Projected Annual Output (MWH)	(4) Annual Energy Purchased from FPL (MWH)	(5) Annual Energy Sold to FPL (MWH)	(6) = (3+4)-(5) Projected Annual Energy Used by Customer (MWH)
Customer-Owned PV (less than or equal to 10 kw AC)	0.839	900	33,220	153	33,967
Customer-Owned PV greater than 10 kw and less than or equal to 100 kw AC	0.233	192	558	15	735
Total:	**1.072**	**1,092**	**33,777**	**167**	**34,702**

Notes:

(1) There were approximately 262 customer-owned operating PV facilities interconnected with FPL during 2008.
(2) The Installed Capacity value is the sum of the nameplate ratings (AC kw) for all of the customer-owned PV facilities.
(3) The Projected Annual Output value is based on NREL's PV Watts program and the Installed Capacity value in column (2), adjusted for the date when each facility was installed and assuming each facility operated as planned.
(4) The Annual Energy Purchased from FPL is an actual value from FPL's metered data for 2008.
(5) The Annual Energy Sold to FPL is an actual value from FPL's metered data for 2008.
(6) The Projected Annual Energy Used by Customers is a projected value that is the difference between the (Projected Annual output + Annual Output value in column (2) and the actual Annual Energy Sold to FPL in column (4).

EXHIBIT 28

(This page is intentionally left blank)

EXHIBIT 28

CHAPTER IV

Environmental and Land Use Information

EXHIBIT 28

(This page is left intentionally blank.)

EXHIBIT 28

IV. Environmental and Land Use Information

IV.A Protection of the Environment

FPL operates in a sensitive, temperate/sub-tropical environment containing a number of distinct ecosystems with many endangered or threatened plant and animal species. FPL competes for air, land, and water resources that are necessary to meet the demand for generation, transmission, and distribution of electricity. At the same time, residents and tourists want unspoiled natural amenities, and the general public has an expectation that large corporations such as FPL will conduct their business in an environmentally responsible manner.

FPL has been recognized for many years as one of the leaders among electric utilities for its commitment to the environment. FPL's environmental leadership has been heralded by many outside organizations as demonstrated by a few recent examples. For the second time (2007 and 2008), FPL Group is ranked first among electric and gas utilities in FORTUNE ® magazine's, "America's Most Admired Companies" edition. FPL scored number one in each of the eight attributes considered: innovation, people management, use of corporate assets, social responsibility, quality of management, financial soundness, long-term investments, and quality of products and services.

In May 2007, FPL Group was included on the KLD Global Climate 100SM Index for the third time since the Global Climate 100 was launched in 2005. The Global Climate 100 is designed to promote investment in public companies whose activities demonstrate the greatest potential for reducing the social and economic consequences of climate change. The Global Climate 100 Index includes a mix of 100 global companies that demonstrate leadership in providing near term solutions to climate change through renewable energy, alternative fuels, clean technology, and efficiency.

In January 2007, FPL Group was named one of the Global 100 Most Sustainable Corporations in the World by Corporate Knights, Inc., a Canadian media company. Some 1,800 companies from a wide range of sectors were evaluated regarding effective management of environmental, social, and governance risks and opportunities. FPL Group was one of the only two United States utility companies to make the list of 100.

FPL Group is one of America's cleanest energy providers and the emissions rates of FPL's power plants are among the lowest in the electric industry. FPL's environmental

EXHIBIT 28

achievements were reflected by its No. 1 environmental ranking, for five consecutive years, in the Innovest Strategic Value Advisor's report that compares the environmental performance of 26 United States electric utilities. Innovest is an internationally recognized independent investment research firm specializing in environmental finance and investment opportunities.

In June 2007, FPL's Green (Vehicle) Fleet Program was named the winner of the 2007 Council for Sustainable Florida Large Business Best Practice Award for FPL's commitment to reducing fuel consumption in utilities' vehicle fleets. FPL received the award from the Council for Sustainable Florida, which honors businesses, organizations, and individuals whose work demonstrates that a healthy environment and healthy economy are mutually supportive. Since 1990, the Council has been committed to promoting and recognizing best sustainability practices in Florida.

For the third time, FPL Group was one of only four corporations in the North America Electric Power sector named in the "Climate Leadership Index," an honor roll of global corporations addressing the challenges of climate change.

In 2006, FPL and the Palm Beach County-based Arthur R. Marshall Foundation joined as "partners for the environment." FPL's support included a $25,000 donation to the non-profit organization for educational and restoration programs, including the planting of native Florida wetland trees. In 2007, FPL volunteers returned to help take care of the growing saplings.

FPL has also been the recipient of earlier environmental awards and recognition. In 2001, FPL was awarded Edison Electric Institute's National Land Management Award for its stewardship of 25,000 acres surrounding its Turkey Point Plant. In 2001, FPL was awarded the 2001 Waste Reduction and Pollution Prevention Award from the Solid Waste Association of North America. FPL received the 2001 Program Champion Award from the Environmental Protection Agency's Wastewise Program. The Florida Department of Environmental Protection named FPL a "Partner for Ecosystem Protection" in 2001 for its emission-reducing "repowering" projects at its Fort Myers and Sanford Plants. FPL won the Council for Sustainable Florida's award in 2002 for its sea turtle conservation and education programs at its St. Lucie Plant. Finally, FPL has been recognized by numerous federal and state agencies for its innovative endangered species protection programs which include such species as manatees, crocodiles, and sea turtles.

EXHIBIT 28

As mentioned above, FPL Group has taken a leadership role to address climate change and the call for action for a national climate change policy. The decision to step into the forefront of this issue goes hand-in-hand with FPL Group's longtime commitment to managing operations with sensitivity to the environment.

FPL is taking action now in Florida to address climate change with a number of actions. According to the U.S. Department of Energy (DOE) data, FPL is one of the nation's leaders among electric utilities for its energy efficiency/conservation and load management achievement. FPL's nationally recognized leadership in the implementation of demand side management (DSM) within its system has avoided the need to build the equivalent of more than 12 medium-sized power plants as discussed in Chapters I and III of this document. Also discussed in Chapter III are FPL's plans for adding a significant amount of renewable energy resources. FPL is the nation's leader in power plant "repowerings" and "conversions," significantly increasing the efficiency of a number of its existing power plants while reducing FPL system emissions. Currently, two of FPL's older power plants are slated for conversion to state-of-the-art CC natural gas plants. In addition, FPL's future generation plans include nuclear uprates and two new nuclear units that are projected to significantly reduce air emissions in Florida.

IV.B FPL's Environmental Statement

To reaffirm its commitment to conduct business in an environmentally responsible manner, FPL developed an Environmental Commitment in 1992 to clearly define its position. This statement reflects how FPL incorporates environmental values into all aspects of its activities and serves as a framework for new environmental initiatives throughout the company. FPL's Environmental Statement is:

> It is the Company's intent to continue to conduct its business in an environmentally responsible manner. Accordingly, Florida Power & Light Company will:
>
> - Comply with the spirit and intent, as well as the letter of, environmental laws, regulations, and standards.
> - Incorporate environmental protection and stewardship as an integral part of the design, construction, operation, and maintenance of our facilities.
> - Encourage the wise use of energy to minimize the impact on the environment.
> - Communicate effectively on environmental issues.

EXHIBIT 28

- Conduct periodic self-evaluations, report performance, and take appropriate actions.

IV.C Environmental Management

In order to implement the Environmental Statement, FPL established an environmental management system to direct and control the fulfillment of the organization's environmental responsibilities. A key component of the system is an Environmental Assurance Program that is discussed below. Other components include: executive management support and commitment, a dedicated environmental corporate governance program, written environmental policies and procedures, delineation of organizational responsibilities and individual accountabilities, allocation of appropriate resources for environmental compliance management (which includes reporting and corrective action when non-compliance occurs), environmental incident and/or emergency response, environmental risk assessment/management, environmental regulatory development and tracking, and environmental management information systems.

IV.D Environmental Assurance Program

FPL's Environmental Assurance Program consists of activities which are designed to evaluate environmental performance, verify compliance with corporate policy as well as with legal and regulatory requirements, and communicate results to corporate management. The principal mechanism for pursuing environmental assurance is the environmental audit. An environmental audit may be defined as a management tool comprising a systematic, documented, periodic, and objective evaluation of the performance of the organization and of the specific management systems and equipment designed to protect the environment. The environmental audit's primary objectives are to facilitate management control of environmental practices and assess compliance with existing environmental regulatory requirements and FPL policies.

IV.E Environmental Communication and Facilitation

FPL is involved in many efforts to enhance environmental protection through the facilitation of environmental awareness and in public education. Some of FPL's 2008 environmental outreach activities are noted in Table IV.E.1.

EXHIBIT 28

Table IV.E.1: 2008 FPL Environmental Outreach Activities

Activity	**# of Participants**
Visitors to FPL's Energy Encounter at St. Lucie	20,000
Visitors to Manatee Park	150,000
Number of visits to FPL's Environmental Website	358,000
Number of pieces of Environmental literature distributed	>80,000

IV.F Preferred and Potential Sites

Based upon its projection of future resource needs, FPL has identified eight Preferred Sites and four Potential Sites for future generation additions. Preferred Sites are those locations where FPL has conducted significant reviews and has either taken action, or is planning to take action, to site new generation capacity. Potential Sites are those sites that have attributes that support the siting of generation and are under consideration as a location for future generation. Some of these sites are currently in use as existing generation sites and some are not. The identification of a Potential Site does not indicate that FPL has made a definitive decision to pursue generation (or generation expansion in the case of an existing generation site) at that location, nor does this designation indicate that the size or technology of a generator has been determined. The Preferred Sites and Potential Sites are discussed in separate sections below.

As has been described in previous FPL Site Plans, FPL also considers a number of other sites as possible sites for future generation additions. These include the remainder of FPL's existing generation sites and other Greenfield sites.

IV.F.1 Preferred Sites

FPL identifies eight Preferred Sites in this Site Plan: the West County Energy Center (WCEC) adjacent to the existing Corbett FPL substation, the existing St. Lucie plant site, the existing Turkey Point plant site, the existing Cape Canaveral plant site, the existing Riviera plant site, and three locations for new solar power generation: DeSoto County, Brevard County, and the existing Martin plant site.

The West County Energy Center site is the location for three CC capacity additions FPL will make in 2009 through 2011. The St. Lucie site is the location for nuclear capacity uprates that FPL will make in 2011 and 2012. The St. Lucie site is also the location for a proposed wind generation addition. The Turkey Point site is the location for nuclear capacity uprates that FPL will make in 2011 and 2012 and is the site for two new nuclear units, Turkey Point Units 6 & 7, that are projected to be added in 2018 and 2020, respectively. The existing Cape Canaveral and Riviera plant sites are being proposed for conversion of the two existing steam generating units at each site into one state-of-the-art CC unit at each site in 2013 and 2014, respectively. The three solar projects (DeSoto County, Brevard County, and Martin County) are being proposed for operation in 2009, 2010, and 2010, respectively.

The eight Preferred Sites are discussed below.

Preferred Site # 1: West County Energy Center , Palm Beach County

FPL has identified the property adjacent to the existing Corbett Substation property in unincorporated western Palm Beach County as a Preferred Site for the addition of new generating capacity. The site was selected for the addition of three new CC natural gas power plants with ultra-low sulfur light fuel oil (distillate) as a backup fuel. WCEC Units 1 & 2 have been approved by both the FPSC and the Governor and Cabinet acting as the Siting Board. WCEC Unit 3 has been approved by both the FPSC and the Secretary of the FDEP in lieu of the Governor and Cabinet. The units are scheduled to come in-service in 2009 through 2011, respectively. All three CC units will be identical in regard to technology and capacity.

The existing site is accessible to both natural gas and electrical transmission through existing structures or through additional lateral connections. The facility will use natural gas as the primary fuel and state-of-the-art combustion controls.

a. U.S. Geological Survey (USGS) Map

A USGS map of the West County Energy Center (WCEC) plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the WCEC generating facilities at the site is found at the end of this chapter.

EXHIBIT 28

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The site was inactive until February 2007 when construction of WCEC Units 1 & 2 was initiated. The site was previously dedicated to industrial (mining) and agricultural use. The site had been excavated, back-filled, and totally re-graded to an elevation of approximately 10 feet above the surrounding land surface. Prior to initiation of power plant construction, no structures were present on the site and vegetation was virtually non-existent. Structures are now being built on the site for work associated with WCEC Units 1 & 2. Construction of WCEC Unit 3 is scheduled to begin in 2009.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The plant site had been significantly altered by the construction and operation of a limestone mine where vegetation had been cleared and removed. The surrounding land use is predominantly sugar cane, agriculture, and limestone mining. FPL’s existing Corbett substation is located north of the site. The Arthur R. Marshall Loxahatchee National Wildlife Refuge is located to the south of the site.

2. Listed Species

Construction and operation of new units at the site is not expected to affect any rare, endangered, or threatened species. Wildlife utilization of the property is minimal as a result of the prior mining activities. Common wading birds can be observed on areas adjacent to, and occasionally within, the property. The property is adjacent to areas that have been identified as potential habitat for wood stork.

3. Natural Resources of Regional Significance Status

The construction and operation of a gas-fired CC generating facility at this location is not expected to have any adverse impacts on parks, recreation areas, or environmentally sensitive lands including the Arthur R. Marshall Loxahatchee National Wildlife Refuge. Construction will not result in any onsite wetland impacts under federal, state, or local agency permitting criteria.

EXHIBIT 28

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design of each of the three units is comprised of the following: new 1,219 MW (Summer capacity) unit with each unit consisting of three new combustion turbines (CT) and three new heat recovery steam generators (HRSG) and a new steam turbine. Natural gas delivered via pipeline is the primary fuel type for this facility with ultra-low sulfur light fuel oil (distillate) serving as a backup fuel.

g. Local Government Future Land Use Designations

Local government future land use designation for the project site is “Rural Residential” according to the Palm Beach County Future Land Use Map. Designations for the area under the Palm Beach County Unified Land Development Code classified the project site and surrounding area as Special Agricultural District. The site has been granted conditional use for electrical power facilities under a General Industrial zoning district.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site due to consideration of various factors including system load and economics. Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues.

i. Water Resources

In regard to WCEC Units 1 & 2, water from the Floridan Aquifer and surface water from the L10/L12 canal (when available) will be used for cooling, service, and process water. Potable water will be purchased from the Palm Beach County water municipality.

In regard to WCEC Unit 3, the primary water source for the project will be reclaimed (reuse) water that will come from Palm Beach County Water Utilities Department. FPL will obtain the necessary approvals to also supply WCEC Units 1 & 2 using reclaimed water once WCEC Unit 3 is operational. Reclaimed water will be used for cooling, service, and process water. Backup water sources include utilizing the Floridan Aquifer allocation permitted for WCEC Units 1 & 2, potable water from Palm Beach County, and the L10/L12 canal when made available by the South Florida

Water Management District (SFWMD). Potable water will be purchased from the Palm Beach County water municipality.

j. Geological Features of Site and Adjacent Areas

The site is underlain by approximately 13,000 feet of sedimentary rock strata. The basement complex in this area consists of Paleozoic igneous and metamorphic rocks about which little is known due to their great depth.

Overlying the basement complex to the ground surface are sedimentary rocks and deposits that are primarily marine in origin. Below a depth of about 400 feet these rocks are predominantly limestone and dolomite. Above 400 feet the deposits are largely composed of sand, silt, clay, and phosphate grains. The deepest formation in Palm Beach County on which significant published data are available is the Eocene Age Avon Park. Limited information is available from wells penetrating the underlying Oldsmar formation. The published information on the sediments comprising the formations below the Avon Park Limestone is based on projections from deep wells in Okeechobee, St. Lucie, and Palm Beach counties.

Testing during construction of Exploratory Well 2 (EW-2) demonstrated the presence of a highly permeable zone (Boulder Zone) below a depth of 2,790 feet below pad level (bpl) overlain by a thick confining interval from approximately 2,000 to 2,790 feet bpl. The base of the Underground Source of Drinking Water (USDW) was identified between the depths of 1,932 and 1,959 feet bpl through interpretation of packer tests, water quality data, and geophysical logs. Injection testing has confirmed that the hydrogeology of the EW-2 site is favorable for disposal of fluids via a deep injection well system.

k. Projected Water Quantities for Various Uses

The estimated quantity of water required for industrial processing for all 3 units is approximately 675 gallons per minute (gpm) for uses such as process water and service water. Approximately 22.5 million gallons per day (mgd) of cooling water for the three generating units would be cycled through the cooling towers. Water quantities needed for other uses such as potable water are estimated to be approximately 35,000 gallons per day (gpd) for the entire WCEC site.

EXHIBIT 28

l. Water Supply Sources by Type

WCEC Units 1 & 2 will use available surface or ground water as the source of cooling water for the cooling towers. The cooling towers will also act as a heat sink for the facility auxiliary cooling system. Such needs for cooling and process water will comply with the existing SFWMD regulations for consumptive water use.

WCEC Unit 3 will use reclaimed water as the primary source of cooling water for the cooling tower. The cooling tower will also act as a heat sink for the facility auxiliary cooling system. Such needs for cooling and process water will comply with the existing SFWMD regulations for consumptive water use. In addition, reclaimed water used at WCEC must meet all relevant requirements of Chapter 62-610, F.A.C., Part III, for use in cooling towers.

It is anticipated that once WCEC Unit 3 is operational, reclaimed water will also become the primary cooling water source for WCEC Units 1 & 2.

m. Water Conservation Strategies Under Consideration

The use of reclaimed water is a water conservation strategy because it is a beneficial use of wastewater. Impacts on the surficial aquifer would be minimized and used only for potable water, if necessary. Water from the Floridan Aquifer or the L10/L12 canal will be used for cooling purposes as a backup water source and cooling towers will be utilized. In addition, captured stormwater may be reused in the cooling tower whenever feasible. Stormwater captured in the stormwater ponds will also recharge the surficial aquifer.

n. Water Discharges and Pollution Control

Heat will be dissipated in the cooling towers. Blowdown water from the cooling towers, along with other wastestreams, will be injected into the boulder zone of the Floridan Aquifer. Non-point source discharges are not an issue since there will be none at this facility. Storm water runoff will be collected and used to recharge the surficial aquifer via a storm water management system. Design elements will be included to capture suspended sediments. In addition, captured stormwater may be reused in the cooling towers, whenever feasible. The facility will employ a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

EXHIBIT 28

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The site is serviced by a new natural gas transmission pipeline that is capable of providing a sufficient quantity of gas to the entire site. Ultra-low sulfur light fuel oil (distillate) would be received by truck and stored in above-ground storage tanks to serve as backup fuel for the WCEC generating units.

p. Air Emissions and Control Systems

The use of natural gas and ultra-low sulfur light fuel oil (distillate) and combustion controls will minimize air emissions from these units and ensure compliance with applicable emission limiting standards. Using these fuels minimizes emissions of sulfur dioxide (SO_2), particulate matter, and other fuel-bound contaminants. Combustion controls similarly minimize the formation of nitrogen oxides (NO_x) and the combustor design will limit the formation of carbon monoxide and volatile organic compounds. When firing natural gas, NO_x emissions will be controlled using dry-low NO_x combustion technology and selective catalytic reduction (SCR). Water injection and SCR will be used to reduce NO_x emissions during operations when using ultra-low sulfur light fuel oil (distillate) as backup fuel. These design alternatives constitute the Best Available Control Technology for air emissions, and minimize such emissions while balancing economic, environmental, and energy impacts. Taken together, the design of the WCEC generating units will incorporate features that will make them among the most efficient and cleanest power plants in the State of Florida.

q. Noise Emissions and Control Systems

Noise expected to be caused by construction at the site is expected to be below current noise levels for the residents nearest the site. Noise from the operation of the new units will be within allowable levels.

r. Status of Applications

In regard to WCEC Units 1 & 2, a Site Certification Application (SCA) for the construction and operation of the West County Energy Center project under the Florida Electrical Power Plant Siting Act was filed in April 2005 and received Site Certification by the Governor and Cabinet, acting as the Siting Board, in December 2006. The Florida Department of Environmental Protection (FDEP) issued an Underground Injection Control (UIC) Exploratory Well permit in January 2006 and another Exploratory Well Permit in December 2006. FDEP issued the Final UIC permit in May 2008. FDEP issued a Prevention of Significant Deterioration (PSD) air permit in January 2007. After acquiring these permits and authorizations, FPL initiated construction in February 2007 and anticipates an in-service date for WCEC Unit 1 of mid-2009 and Unit 2 by end of 2009.

In regard to WCEC Unit 3, an SCA was filed in December 2007 and received Site Certification by the Secretary of the FDEP, in lieu of the Governor and Cabinet, in November 2008. A Prevention of Significant Deterioration (PSD) air permit was filed in December 2007. The permit was issued by FDEP in July 2008. FPL proposes to initiate construction in 2009 and anticipates an in-service date of mid-2011. WCEC Unit 3 will utilize the UIC system permitted for the entire site.

Preferred Site # 2: St. Lucie Plant, St. Lucie County

FPL's St. Lucie Plant is located in St. Lucie County on Hutchinson Island on an FPL-owned 1,130-acre site. The plant site is bordered by the Atlantic Ocean to the east and the Indian River Lagoon to the west. Located on the site are two nuclear-powered generating units, St. Lucie Units 1 & 2, which have been in operation since 1976 and 1983, respectively. The St. Lucie site has been selected as a Preferred Site for the addition of two types of new generating capacity.

The first type of generating capacity addition is an increase in the capacity of the two existing nuclear generating units that is used to serve FPL's customers of approximately 103 MW for St. Lucie Unit 1 and 88 MW for St. Lucie Unit 2. This difference is due to FPL's 100% ownership share of St. Lucie 1 and its 85% ownership share of St. Lucie Unit 2. This work will involve changes to several existing main components within the existing facilities to increase their capability to produce steam for the generation of electricity. No new facilities are required as part of this capacity "uprate." This capacity uprate, along with a similar capacity uprate of FPL's existing Turkey Point nuclear units, was approved by the FPSC in January 2008. The capacity uprates at St. Lucie for the two nuclear units sited there are projected to be in-service in late 2011 and 2012.

The second type of generating capacity addition is the proposed installation of FPL wind generation turbines at the plant site. In 2007, FPL began the St. Lucie County land use approval process, and soon after applied for the necessary federal and state permitting. However, a decision by the state and federal agencies on the St. Lucie Wind project's permitting won't be finalized until the local land use approval process is completed. The in-service date will depend on the approval and permitting process. Six wind turbines are being proposed that, in total, would have a maximum output of approximately 13.8 MW.

a. U.S. Geological Survey (USGS) Map

A USGS map of the FPL St. Lucie Nuclear site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the proposed generating facilities at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

St. Lucie Units 1 & 2 are pressurized water reactors, each having two steam generators. The prominent structures, enclosed facilities, and equipment associated with St. Lucie Units 1 & 2 include the containment building, the turbine generator building, the auxiliary building, and the fuel handling building.

Prominent features beyond the power block area include the intake and discharge canals, switchyard, spent-fuel storage facilities, technical and administrative support facilities, and public education facilities (the Energy Encounter and the College of Turtle Knowledge). Significant features surrounding the St. Lucie Units 1 & 2 are predominately undeveloped land and water bodies including; Big Mud Creek, the Atlantic Ocean, Herman’s Bay, and Indian River Lagoon.

In regard to the nuclear capacity uprates, the only changes will be modifications to the existing power generation facilities within the power block area, modifications to the switchyard facilities, and modifications to the transmission lines from St. Lucie to Midway substation. None of the other existing facilities at the plant will change as a result of the uprates. No changes to the nuclear power generation facilities are projected as a result of the proposed wind turbine additions.

EXHIBIT 28

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

FPL's St. Lucie Plant is located in St. Lucie County on Hutchinson Island on an FPL-owned 1,130-acre site. The St. Lucie Plant includes the reactor buildings, turbine buildings, access/security building, auxiliary building, maintenance facilities, and miscellaneous warehouses and other buildings associated with the operation of Units 1 & 2. The site includes adjacent undeveloped mangrove areas. As a result of the approved capacity uprates, the site characteristics will not change.

The proposed wind turbines are also located on the FPL-owned site. Impacts to the site characteristics are projected to be minimal from the proposed wind turbines.

2. Listed Species

Some listed species known to occur in the area of the plant location are atlantic sturgeon, smalltooth sawfish, loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas)*, leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbriccata*), gopher tortoise (*Gopherus polyphemus*), kemp's ridley sea turtle (*Lepidochelys kempi*)**,** wood stork (*Mycteria americana*), black skimmer (*Rynchops niger*), and least tern (*Sterna antillarum*).

In regard to the nuclear capacity uprates, neither the development work, nor the continued operation of the two nuclear units after the uprate work has been completed, are expected to adversely affect any rare, endangered, or threatened species. No changes in wildlife populations at the adjacent undeveloped areas are anticipated, including listed species. Noise and lighting impacts will not change and it is expected that wildlife will continue to use the undeveloped areas within the St. Lucie Plant boundary.

In regard to the wind turbines, some changes to the adjacent undeveloped areas are anticipated. Noise and lighting impacts will not change and the wind turbines are not anticipated to deter the continued use by wildlife of the undeveloped areas within the St. Lucie Plant boundary or any adjacent areas.

EXHIBIT 28

3. Natural Resources of Regional Significance Status

Significant features surrounding the St. Lucie Units 1 & 2 are predominately undeveloped land and water bodies including; Big Mud Creek, the Atlantic Ocean, Herman's Bay, and Indian River Lagoon.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The source of cooling water for the St. Lucie Plant is the Atlantic Ocean. It is a once-through system. The effects of the discharge of cooling water via these discharge structures were evaluated and mixing zones were established to allow compliance with thermal water quality standards as a part of the Plant's NPDES (Permit No. FL0002208). These mixing zones include the volume of water beyond the discharge structures, at the edge of which the water temperature is no greater than 17°F above the ambient temperature of the intake water.

In regard to the nuclear capacity uprates, the once-through system will continue to be used for the nuclear units. In regard to the wind turbines, no water will be required.

g. Local Government Future Land Use Designations

St. Lucie Units 1 & 2 are located in unincorporated St. Lucie County, Florida. The County has adopted a comprehensive plan, which is updated on a periodic basis. The County Comprehensive Plan incorporates a map that depicts the future land use categories of all property falling within the unincorporated portions of the County. The St. Lucie Plant has a Future Land Use category of Transportation/Utilities (T/U) according to the St. Lucie County Future Land Use Map. The T/U category is described in the St. Lucie County Comprehensive Plan Future Land Use Element Future Land Use.

In regard to the wind turbines, FPL has submitted an application to St. Lucie County to rezone the land that would serve as the footprint of the turbines to the T/U category.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the nuclear capacity uprates because it is an existing nuclear plant site and, therefore, offers the opportunity for

EXHIBIT 28

increased nuclear capacity. The site has been selected as a Preferred Site for the wind turbines because of the available wind resource at that location.

i. Water Resources

The source of cooling water for the St. Lucie Plant is the Atlantic Ocean. The once-through system flow will not change as a result of the nuclear uprates. No water will be required to operate the wind turbines. Due to the existing nature of the St. Lucie Plant, surrounding surface waters will not be adversely affected by either of the generation capacity additions. Stormwater will be handled by the existing facilities and no new areas will be impacted. Wetlands, groundwater, and nearby surface waters will not be impacted.

j. Geological Features of Site and Adjacent Areas

Beneath the land surface, there is a peat layer 4 to 6 feet thick. Below this layer is the Anastasia Formation, a sedimentary rock formation composed of clay lenses, sandy limestone, and silty fine to medium sand with fragmented shells. This highly permeable stratum extends 35 to 90 feet below mean sea level (msl). Underlying this stratum there is a semi-permeable zone, The Hawthorn Formation, consisting of slightly clayey and very fine silt which extends 600 feet below msl.

The original surficial deposits at the St. Lucie Plant were excavated to a depth of 60 feet and backfilled with Category I or II fill. The fill is underlain by the Anastasia formation, a sequence of partially cemented sand and sandy limestone, which extend to an average depth of about 145 feet. The Anastasia is underlain to an depth of about 600 to 700 feet by the partially cemented and indurated sands, clays, and sandy limestones of The Hawthorn Formation. Underlying these surface strata are about 13,000 feet of Jurassic through Tertiary Formations, primarily carbonate rocks. These formations have a relatively gentle slope to the southeast.

k. Projected Water Quantities for Various Uses

In regard to the nuclear capacity uprates, no change is expected in the quantity or characteristics of industrial wastewaters generated by the facility. Therefore, no change in that compliance achievement status is expected. The capacity uprates will not cause any changes in hydrologic or water quality conditions due to diversion, interception, or additions to surface water flow. The St. Lucie Plant does not directly withdraw groundwater under its current operations and it will not withdraw groundwater after the capacity uprates work is completed. The use of water supplied

EXHIBIT 28

by the City of Fort Pierce, which does withdraw groundwater, will remain unchanged and there will be no changes to the groundwater discharges. There will be no quality, quantity, or hydrological changes, either by withdrawal or discharge to a drinking water source. Therefore, there will be no impacts on drinking water.

The wind turbines will not require water for operations and will not cause any changes in the hydrologic or water quality conditions due to diversion, interception, or additions to surface water flow.

l. Water Supply Sources by Type

The source of cooling water for the St. Lucie Plant is the Atlantic Ocean. General plant service water, fire protection water, process water, and potable water are obtained from City of Fort Pierce. Process water uses include demineralizer regeneration, steam cycle makeup, and general service water use for washdowns.

The existing St. Lucie Plant water use is projected to be unchanged as a result of the nuclear capacity uprates. The wind turbines will not require water for operations.

m. Water Conservation Strategies Under Consideration

The existing water resources will not change as a result of the nuclear capacity uprates. The wind turbines will not require water for operations.

n. Water Discharges and Pollution Control

St. Lucie Units 1 & 2 use once-through cooling water from the Atlantic Ocean to remove heat from the main (turbine) condensers via the Circulating Water System (CWS), and to remove heat from other auxiliary equipment via the Auxiliary Equipment Cooling Water System (AECWS). The great majority of this cooling water is used for the CWS.

Under emergency conditions, water can be withdrawn from Big Mud Creek via the Emergency Intake Canal through two 54-inch pipe assemblies in the barrier wall that separates the Creek from the Canal. FPL does not use this intake during normal operations, but does test this system quarterly.

The facility employs a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to control the inadvertent release of pollutants.

EXHIBIT 28

The wind turbines will not require water for operations. Consequently, there will be no water discharge as a result of these turbines.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

St. Lucie Units 1 & 2 are licensed for uranium-dioxide fuel that is slightly enriched uranium-235. The uranium-dioxide fuel is in the form of pellets contained in Zircaloy tubes with welded end plugs to confine radionuclides. The tubes are fabricated into assemblies designed for loading into the reactor core. Each reactor core includes 217 fuel assemblies.

FPL currently replaces approximately one-third of the fuel assemblies in each reactor at intervals of approximately 18 months. FPL operates the reactors such that the average fuel usage by the reactors is approximately 47,000 megawatt-days per metric ton uranium. In regard to the nuclear capacity uprates, more nuclear fuel will be used due to the increased capacity of each generating unit. No changes in the fuel-handling facilities are required. The addition of the wind turbines will have no fuel-related impact; i.e., no impacts from fuel delivery, storage, waste, or pollution control. Used fuel assemblies are stored in the onsite Nuclear Regulatory Commission (NRC)-approved spent fuel storage facilities. Following completion of the uprates, approximately 11 percent more nuclear fuel will be used to increase the capacity of each unit. No changes in the fuel-handling facilities are required.

Diesel fuel is used in a number of emergency generators that include four main plant generators, two building generators, and various general purpose diesel engines. The main plant emergency generators will not be changed as a result of either of the two types of generation capacity additions. These emergency generators are for standby use only and are tested to assure reliability and for maintenance. Diesel fuel is delivered to the St. Lucie Plant by truck as needed, and stored in tanks with secondary containment.

p. Air Emissions and Control Systems

The St. Lucie Plant is classified as a minor source of air pollution, since FDEP has issued a Federally Enforceable State Operating Permit (FESOP) to keep emissions less than 100 tons per year for any air pollutant regulated under the Clean Air Act.

The applicable units at the St. Lucie Plant in regard to air emissions consist of eight large main plant diesel engines, two smaller diesel engines, and various general-

EXHIBIT 28

purpose diesel engines. The air emissions from these engines are limited by the use of 0.05-percent sulfur diesel fuel and good combustion practices. Best Available Control Technology (BACT) is not applicable to these existing emission units.

Nitrogen oxide (NO_x) emissions from the operation of the diesel engines comprise the limiting pollutant for these diesel units at the St Lucie Plant. The FDEP FESOP limits NO_x emissions to 99.4 tons, which includes fuel use limits on the large main plant emergency diesel engines of 97,000 gallons in any 12-month consecutive period and the smaller building and general purpose diesel engines of 190,000 gallons in any 12-month consecutive period. Also, the Plant may choose to combine the diesel units’ fuel-tracking, which then limits the NO_x totals for a 12-month consecutive period to a maximum of 80 tons. There will be no change in the operation or emissions of the diesel engines resulting from either the nuclear capacity uprates or the wind turbines.

In addition, neither of these types of generation capacity additions will result in an increase of carbon dioxide (CO_2) or other greenhouse gas emissions. In fact, both of these increases in generation capacity are projected to result in decreased FPL system-wide emissions of $CO_{2.}$

q. Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by construction activities at the site was conducted in regard to both types of generation capacity additions. Predicted noise levels are not expected to result in adverse noise impacts in the vicinity of the site during construction or operation of either generating capacity additions.

r. Status of Applications

In regard to the nuclear capacity uprates, a Site Certification Application (SCA) under the Florida Electrical Power Plant Siting Act was filed in December 2007 and a final order issued in September 2008. The FPSC voted to approve the need for the St. Lucie (and Turkey Point) nuclear capacity uprates and the final order approving the need for these capacity additions was issued in January 2008. In regard to the wind turbines, a Site Certification Application is not required. Individual permit applications were submitted for an Environmental Resource Permit (ERP) and the Army Corps of Engineers Permits in May 2008 and the Coastal Construction Control Line in July 2008. In September of 2007, FPL submitted an application to St. Lucie County for a

EXHIBIT 28

Conditional Use, Rezoning, and Height Amendment. The local approvals process is ongoing.

Preferred Site # 3a: Turkey Point Plant, Miami-Dade County – Nuclear Capacity Uprates

The Turkey Point Plant site is located on the west side of Biscayne Bay, 25 miles south of Miami. The site is directly on the shoreline of Biscayne Bay and is geographically located approximately 9 miles east of Florida City on Palm Drive. Public access to the plant site is limited due to the nuclear units located there. The land surrounding the site is owned by FPL and acts as a buffer zone. The site is comprised of two nuclear units (Units 3 & 4), two natural gas/oil conventional boiler units (Units 1 & 2), one CC natural gas unit (Unit 5), 9 small diesel generators, the cooling canals, an FPL-maintained natural wildlife area, and wetlands that have been set aside as the Everglades Mitigation Bank (EMB).

Turkey Point Units 3 & 4 have been in operation since 1972 and 1973, respectively. The Turkey Point site has been selected as a Preferred Site for the increase in the capacity of its two existing nuclear generating units by approximately 103 MW each. This work will involve changes to several existing main components within the existing facilities to increase their capability to produce steam for the generation of electricity. No new or expanded facilities are required as part of this capacity "uprate." This capacity uprate, along with a similar capacity uprate of FPL's existing St. Lucie nuclear units, was approved by the FPSC in January 2008. The capacity uprates at Turkey Point are projected to be in-service in 2012.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Turkey Point plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the Turkey Point Units 3 and 4 generating facility at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

EXHIBIT 28

d. Existing Land Uses of Site and Adjacent Areas

The five existing power generation units and support facilities occupy approximately 150 acres of the 11,000-acre Turkey Point Plant. Support facilities include service buildings, an administration building, fuel oil tanks, water treatment facilities, circulating water intake and outfall structures, wastewater treatment basins, and a system substation. The cooling canal system occupies approximately 5,900 acres. The two 400-megawatt (MW) (nominal) fossil fuel-fired steam electric generation units at the Turkey Point Plant have been in service since 1967 (Unit 1) and 1968 (Unit 2). These units currently burn residual fuel oil and/or natural gas with a maximum equivalent sulfur content of 1 percent. The two 700-MW (nominal) nuclear units have been in service since 1972 (Unit 3) and 1973 (Unit 4). Turkey Point Units 3 and 4 are pressurized water reactor (PWR) units. Turkey Point Unit 5 is a nominal 1,150-MW CC unit that began operation in 2007. Significant features in the vicinity of the site include Biscayne National Park, the Miami-Dade County Homestead Bayfront Park, and the Everglades National Park.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The prominent structures and enclosed facilities and equipment associated with Units 3 & 4 include: the containment building, which contains the nuclear steam supply system, including the reactor, steam generators, reactor coolant pumps, and related equipment; the turbine generator building, where the turbine generator and associated main condensers are located; the auxiliary building, which contains waste management facilities, engineered safety components, and other facilities; and the fuel handling building, where the spent fuel storage pool and storage facilities for new fuel are located. Prominent features beyond the power block area include the intake system, cooling canal system, switchyard, spent fuel storage facilities, and technical and administrative support facilities.

2. Listed Species

The construction during the uprating of the units, and operation of the units after the capacity uprating is completed, are not expected to adversely affect any rare, endangered, or threatened species. Listed species known to occur at the site and in the nearby Biscayne National Park that could potentially utilize the site include the peregrine falcon *(Falco peregrinus)*, wood stork *(Mycteria americana)*, American crocodile *(Crocodylus acutus)*, mangrove rivulus *(Rivulus marmoratus)*,

EXHIBIT 28

roseate spoonbill (*Ajaja ajaja)*, limpkin *(Aramus guarauna),* little blue heron *(Egretta caerulea),* snowy egret *(Egretta thula),* American oystercatcher *(Haematopus palliates),* least tern *(Sterna antillarum)*, the white ibis *(Eudocimus albus)*, and bald eagle *(Haliaeetus leucocephalus)*. No bald eagle nests are known to exist in the vicinity of the site. The federally listed, threatened American Crocodile thrives at the Turkey Point site, primarily in and around the southern end of the cooling canals which lie south of the project area. The entire site is considered crocodile habitat due to the mobility of the species and use of the site for foraging, traversing, and basking. FPL manages a program for the conservation and enhancement of the American crocodile and is attributed with survival improvement and the downlisting of the American Crocodile from endangered to threatened.

3. Natural Resources of Regional Significance Status

Significant features in the vicinity on the site include Biscayne National Park, the Miami-Dade County Homestead Bayfront Park, and the Everglades National Park. The portion of Biscayne Bay adjacent to the site is included within the Biscayne National Park. Biscayne National Park contains 180,000 acres, approximately 95% of which is open water interspersed with more than 40 keys. The Biscayne National Park headquarters is located approximately 2 miles north of the Turkey Point plant and is adjacent to the Miami-Dade County Homestead Bayfront Park which contains a marina and day-use recreational facilities.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

Turkey Point Units 3 & 4 uses cooling water from a closed-cycle cooling canal system to remove heat from the main (turbine) condensers, and to remove heat from other auxiliary equipment. The existing cooling canals will accommodate the increase in heat load that is associated with the increased capacity from the uprates. The maximum predicted increase in water temperature entering the cooling canal system from the units resulting from the uprates is predicted to be about 2.5°F, from 106.1°F to 108.6°F. The associated maximum increase in water temperature returning to the units is about 0.9°F, from 91.9°F to 92.8°F.

EXHIBIT 28

g. Local Government future Land Use Designations

Local government future land use plan designates most of the site as IU-3 “Industrial, Unlimited Manufacturing District.” There are also areas designated GU – “Interim District.” Designations for the surrounding area are primarily GU – “Interim District.”

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the nuclear capacity uprates because it is an existing nuclear plant site and, therefore, offers the opportunity for increased nuclear capacity.

i. Water Resources

Unique to Turkey Point plant site is the self-contained cooling canal system that supplies water to condense steam used by the plant's turbine generators. The canal system consists of 36 interconnected canals. The cooling canals occupy an area approximately 2 miles wide by 5 miles long (5,900 acres), approximately four feet deep. The system performs the same function as a giant radiator. The water is circulated through the canals in a two-day journey, ending at the plant's intake pumps.

j. Geological Features of Site and Adjacent Areas

The Turkey Point Plant lies upon the Floridian Plateau, a partly-submerged peninsula of the continental shelf. The peninsula is underlain by approximately 4,000 to 15,000 feet of sedimentary rocks consisting of limestone and associated formations that range in age from Paleozoic to Recent. Little is known about the basement complex of Paleozoic igneous and metamorphic rocks due to their great depth.

Generally in Miami-Dade County, the surficial aquifer (Biscayne Aquifer) consists of a wedge-shaped system of porous clastic and carbonate sedimentary materials, primarily limestone and sand deposits of the Miocene to late Quaternary age. The Biscayne Aquifer is thickest along the eastern coast and varies in thickness from 80 to 200 feet thick. The surficial aquifer is typically composed of Pamlico Sand, Miami Limestone (Oolite), the Fort Thompson and Anastasia Formations (lateral equivalents), Caloosahatchee Marl, and the Tamiami formation. The lower confining layers below the surficial aquifer range in thickness from 350 to 600 feet and are composed of the Hawthorn Group. Beneath the Hawthorn Group, the Floridan Aquifer System ranges from 2,800 to 3,400 feet thick and consists of Suwannee Limestone, Avon Park Limestone, and the Oldsmar Formations.

EXHIBIT 28

k. Projected Water Quantities for Various Uses

The addition of nuclear generating capacity as a result of the uprates will not cause any changes in the quantity or characteristics of industrial wastewaters generated by the facility; therefore, no change in that compliance achievement status is expected. The uprates will not cause any changes in hydrologic or water quality conditions due to diversion, interception, or additions to surface water flow. The Turkey Point Plant does not directly withdraw groundwater under its current operations and it will not do so after the capacity uprates. Locally, groundwater is present beneath the Site in the surficial or Biscayne Aquifer and in deeper aquifer zones that are part of the Floridan Aquifer System. There will be no effects on those deeper aquifer zones from the capacity uprates.

l. Water Supply Sources and Type

The source of cooling water for Turkey Point Units 3 & 4 is the cooling canal system. There will be no increase in the amount of water withdrawn as a result of the capacity uprates. General plant service water, fire protection water, process water, and potable water are obtained from Miami-Dade County. Process water uses include demineralizer regeneration, steam cycle makeup, and general service water use for washdowns. The water use for the facility will not change as a result of the capacity uprates.

m. Water Conservation Strategies

The existing water resources will not change as a result of the uprates.

n. Water Discharges and Pollution Control

Heated water discharges are dissipated using the existing closed cooling water system and the cooling canal system.

The facility employs a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

Turkey Point Units 3 & 4 utilize uranium-dioxide fuel that is slightly enriched uranium-235. The uranium-dioxide fuel is in the form of pellets contained in Zircaloy tubes with welded end plugs to confine radionuclides. The tubes are fabricated into assemblies

EXHIBIT 28

designed for loading into the reactor core. Used fuel assemblies are stored in the onsite NRC-approved spent fuel storage facilities.

FPL currently replaces approximately one-third of the fuel assemblies in each reactor at intervals of approximately 18 months. FPL operates the reactors such that the average fuel usage by the reactors is approximately 45,000 megawatt-days per metric ton of uranium. Following completion of the uprates, more nuclear fuel will be used to increase the capacity of each unit. No changes in the fuel handling facilities are required. Following completion of the uprates, approximately 11 percent more nuclear fuel will be used to increase the capacity of each unit. No changes in the fuel-handling facilities are required.

Diesel fuel is used in a number of emergency generators that include four main emergency generators, five smaller emergency generators and various general purpose diesel engines. The emergency generators will not be changed as a result of the capacity uprates. These emergency generators are for stand-by use only and only operated for testing purposes to assure reliability and for maintenance. Diesel fuel for the emergency generators is delivered to the Turkey Point Plant by truck as needed, and stored in tanks with secondary containment.

p. Air Emissions and Control Systems

The normal operation of Turkey Point Units 3 & 4 does not create fossil fuel-related air emissions. However, there are 9 emergency generators associated with Units 3 & 4. Four of these 9 emergency generators are main plant emergency generators which are rated at 2.5 MW each. The remaining 5 are smaller emergency generators which are associated with the security system. In addition, various general purpose diesels are used as needed for Units 3 & 4.

Turkey Point Plant Units 3 & 4’s associated emergency generators and diesel engines, together with Units 1, 2, and 5, are classified as a major source of air pollution. FDEP has issued a separate Title V Air Operating Permit for the Turkey Point Nuclear Plant (Permit Number 0250003-004-AV). There are no operating limits for the emergency generators or diesel engines. Emergency diesel generators are limited to ultra-low sulfur distillate (0.0015% sulfur). NOx emissions are regulated under Reasonably Available Control Technology (RACT) requirements in Rule 62-296.570(4)(b)7 F.A.C., which limit NO_x emissions to 4.75 lb/MMBtu. The use of 0.05

EXHIBIT 28

percent sulfur diesel fuel and good combustion practices serve to keep NO_x emissions under this limit.

q. Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by activities associated with the uprates was conducted. Predicted noise levels are not expected to result in adverse noise impacts in the vicinity of the site.

r. Status of Applications

A Site Certification Application (SCA) under the Florida Electrical Power Plant Siting Act was filed in January 2008 and a final order was issued in October 2008. The FPSC voted to approve the need for the Turkey Point (and St. Lucie) uprates and the final order approving the need for this additional nuclear capacity was issued in January 2008.

Preferred Site # 3b: Turkey Point Plant, Miami-Dade County – Unit 6 (& 7)

The Turkey Point Plant property has been selected for two new nuclear generating units (Units 6 & 7) scheduled to come into service in 2018 and 2020, respectively. (Although the projected in-service year of Unit 7, 2020, is outside of the ten-year reporting period addressed in the 2009 Site Plan, FPL has included information regarding this unit.) The Turkey Point Plant property is located on the west side of Biscayne Bay, 25 miles south of Miami. The site is directly on the shoreline of Biscayne Bay and is geographically located approximately 8 miles east of Florida City on Palm Drive. Public access to the plant site is limited due to the operating nuclear units located there. The land surrounding the site is owned by FPL providing a buffer zone. The site is comprised of two existing nuclear units (Units 3 and 4), two natural gas/oil conventional boiler units (Units 1 & 2), one CC natural gas unit (Unit 5), 9 small diesel generators, the cooling canals, an FPL-maintained natural wildlife area, and wetlands that have been set aside as the FPL Everglades Mitigation Bank (EMB).

a. U.S. Geological Survey (USGS) Map

A map of the Turkey Point Units 6 & 7 site is found at the end of this chapter.

b. Proposed Facilities Layout

The Turkey Point Units 6 & 7 site layout is still under development. Information regarding the layout will be presented in future FPL Site Plans as this information becomes available.

c. Map of Site and Adjacent Areas

An overview map of the Turkey Point Units 6 & 7 site and adjacent areas is found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

Approximately 150 acres of the 11,000 acre Turkey Point Plant Property are used for the existing generation and support facilities and a closed cooling pond. The cooling canal system occupies approximately 5,900 acres. The remaining acreage primarily consists of forested uplands, disturbed uplands, and wetland habitat. Approximately 300 acres within the cooling canal system will be used for Turkey Point Units 6 & 7 site. Significant features in the vicinity include Biscayne National Park, the Miami-Dade County Homestead Bayfront Park, and the Everglades National Park.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The location for Turkey Point Units 6 & 7 operating facility is entirely within the cooling canal system that supports the operating plants. This is a previously impacted environment. Some of the associated facilities (e.g. roads, pipelines, etc.) will extend outside of the cooling canal system. These associated facilities are still under development and the potential natural environment in those areas are still under review.

2. Listed Species

Listed species known to occur at the site and in the nearby Biscayne National Park include the peregrine falcon *(Falco peregrinus)*, wood stork *(Mycteria americana)*, American crocodile *(Crocodylus acutus)*, mangrove rivulus *(Rivulus marmoratus)*, roseate spoonbill (*Ajaja ajaja)*, limpkin *(Aramus guarauna),* little blue heron *(Egretta caerulea),* snowy egret *(Egretta thula),* American oystercatcher *(Haematopus palliates),* least tern *(Sterna antillarum)*, the white ibis *(Eudocimus albus)*, and bald eagle *(Haliaeetus leucocephalus)*. No bald eagle nests are known to exist in the vicinity of the site. The federally listed,

EXHIBIT 28

threatened American Crocodile thrives at the Turkey Point site, primarily in and around the southern end of the cooling canals that lie south of the project area. The entire site is considered crocodile habitat due to the mobility of the species and use of the site for foraging, traversing, and basking. FPL manages a program for the conservation and enhancement of the American Crocodile and is attributed with survival improvement and the downlisting of the American Crocodile from endangered to threatened.

3. Natural Resources of Regional Significance Status

Significant features in the vicinity of the Turkey Point plant property include Biscayne National Park, the Miami-Dade County Homestead Bayfront Park, and the Everglades National Park. The portion of Biscayne Bay adjacent to the site is included within the Biscayne National Park. Biscayne National Park contains 180,000 acres, approximately 95% of which is open water interspersed with over 40 keys. The Biscayne National Park headquarters is located approximately 2 miles north of the Turkey Point plant and is adjacent to the Miami-Dade County Homestead Bayfront Park that contains a marina and day use recreational facilities.

4. Other Significant Features

FPL is not aware of any other significant features of the Turkey Point Units 6 & 7 sites.

f. Design Features and Mitigation Options

Design features and mitigation options for Turkey Point Units 6 & 7 are still under development. Information regarding these design features and mitigation options will be presented in future FPL Site Plans as this information becomes available.

g. Local Government future Land Use Designations

FPL received zoning approval for Turkey Point Units 6 & 7 from Miami-Dade County in December 2007. FPL continues to work with Miami-Dade County on land use designations as project features develop.

h. Site Selection Criteria Process

FPL conducted an extensive site selection analysis leading to the selection of the Turkey Point site as the site that, on balance, provided the most favorable location for developing new nuclear generation to serve FPL’s customers. The Site Selection

EXHIBIT 28

Study employed the principles of the Electric Power Research Institute (EPRI) siting guidelines and is modeled upon applicable NRC site suitability and National Environmental Policy Act (NEPA) criteria regarding the consideration of alternative sites. The study convened a group of industry and FPL subject matter experts to develop and assign weighting factors to a broad range of site selection criteria. Twenty-three candidate sites were then ranked using the siting criteria. This review allowed the list of candidates to be reduced until the best site emerged. Key factors contributing to the selection of Turkey Point include the existing transmission and transportation infrastructure to support new generation, the large size and seclusion of the site while being relatively close to the load center, and the long-standing record of safe and secure operation of nuclear generation at the site since the early 1970s.

i. Water Resources

Unique to the Turkey Point plant property is the self-contained cooling canal system that provides closed cooling to Turkey Point Units 1-4. The canal system consists of 36 interconnected canals. The cooling canals occupy an area approximately 2 miles wide by 5 miles long (5,900 acres), approximately four feet deep. The system performs the same function as a giant radiator. The water is circulated through the canals in a two-day journey, ending at the plant's intake pumps. These water resources will not be used by Turkey Point Units 6 & 7. The two new nuclear units currently propose to use reclaimed municipal wastewater as a primary cooling water source.

j. Geological Features of Site and Adjacent Areas

The Turkey Point Plant property lies upon the Floridian Plateau, a partly-submerged peninsula of the continental shelf. The peninsula is underlain by approximately 4,000 to 15,000 feet of sedimentary rocks consisting of limestone and associated formations that range in age from Paleozoic to Recent. Little is known about the basement complex of Paleozoic igneous and metamorphic rocks due to their great depth.

Generally in Miami-Dade County, the surficial aquifer (Biscayne Aquifer) consists of a wedge-shaped system of porous clastic and carbonate sedimentary materials, primarily limestone and sand deposits of the Miocene to late Quaternary age. The Biscayne Aquifer is thickest along the eastern coast and varies in thickness from 80 to 200 feet thick. The surficial aquifer is typically composed of Pamlico Sand, Miami Limestone (Oolite), the Fort Thompson and Anastasia Formations (lateral

EXHIBIT 28

equivalents), Caloosahatchee Marl, and the Tamiami formation. The lower confining layers below the surficial aquifer range in thickness from 350 to 600 feet and are composed of the Hawthorn Group. Beneath the Hawthorn Group, the Floridan Aquifer System ranges from 2,800 to 3,400 feet thick and consists of Suwannee Limestone, Avon Park Limestone, and the Oldsmar Formations.

k. Projected Water Quantities for Various Uses

The quantities of cooling water and potable water needed for Turkey Point Units 6 & 7 are still under development. At this time it is estimated that up to 90 million gallons per day (mgd) of reclaimed wastewater will be needed for make-up cooling water. In the event that reclaimed water is not available it is estimated at this time that up to 130 mgd of saltwater will be needed for make-up cooling water.

l. Water Supply Sources and Type

Potential water supply sources for Turkey Point Units 6 & 7 are still being analyzed. FPL has conducted an extensive water alternatives analysis to identify the universe of water alternatives for the project. Based on this analysis, FPL is investigating further the use of reclaimed water as the primary source of make-up cooling water for Turkey Points Units 6 & 7. Information regarding the water supply sources and type will be presented in future FPL Site Plans as this information becomes available.

m. Water Conservation Strategies

Turkey Point Units 6 & 7 is expected to use cooling towers, which significantly reduce the cooling water requirements. Reclaimed wastewater is being developed as the primary make-up cooling source. Using reclaimed wastewater allows for a secondary beneficial use of regional municipal wastewater that would otherwise be discharged to the ocean or injected into deep wells by the Miami Dade County Water and Sewer Department. Other water conservation strategies are still in development for Turkey Point Units 6 & 7. Information regarding these water conservation strategies will be presented in future FPL Site Plans as this information becomes available.

n. Water Discharges and Pollution Control

The water discharge strategy for the Turkey Point Units 6 & 7 is still under development, but use of an Underground Injection Control (UIC) system is being considered as the primary waste discharge alternative. Information regarding water discharge will be presented in future FPL Site Plans as this information becomes available.

EXHIBIT 28

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The delivery, storage, waste disposal and pollution control requirements for Turkey Point Units 6 & 7 are all currently under development. Information regarding these matters will be presented in future FPL Site Plans as this information becomes available.

p. Air Emissions and Control Systems

The normal operation of Turkey Point Units 6 & 7 will not create fossil fuel-related air emissions. In addition, emissions from emergency generators associated with Units 6 & 7 are expected to be insignificant. The air emissions and control system are still under development. Information regarding the air emissions and control system will be presented in future FPL Site Plans as this information becomes available.

q. Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by activities associated with the Turkey Point Units 6 & 7 are under evaluation. Predicted noise levels are not expected to result in adverse noise impacts in the vicinity of the Turkey Point Units 6 & 7.

r. Status of Applications

FPL is currently collecting data and developing permit applications. FPL expects to submit applicable local, state, and federal applications for the project during mid-to-late-2009. The Turkey Point Units 6 & 7 Unusual Use approval was issued by Miami Dade County in December 2007.

Preferred Site # 4: Cape Canaveral Plant, Brevard County

This site is located on the existing FPL Cape Canaveral Plant property in unincorporated Brevard County. The site is bound to the east by the Indian River Lagoon and on the west by a four lane highway (US. 1). The city of Port St. Johns is located less than a mile away. A rail line is located near the plant.

The existing 788 MW (summer) of generating capacity at FPL’s Cape Canaveral site occupies a portion of the 43 acres that are wholly owned by FPL. The generating capacity is made up of steam units (Units 1 and 2).

EXHIBIT 28

The Cape Canaveral Plant site has been listed as a Potential Site in previous FPL Site Plans for both CC and simple cycle generation options. FPL is proposing to convert the existing Cape Canaveral Plant, to be renamed the Cape Canaveral Next Generation Clean Energy Center (CCEC), into a modern, highly efficient, lower-emission next-generation clean energy center using the latest CC technology. The existing two (2) steam units will first be dismantled and removed from the site and will be replaced by a single new CC unit.

a. Geological Survey (USGS) Map

A USGS map of the Cape Canaveral plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the CCEC generating facilities at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The existing land uses on the site are primarily dedicated to electrical generation; i.e., FPL's existing Cape Canaveral power plant Units 1 & 2. The existing land uses that are adjacent to the site consist of single- and multi-family residences to the south and southwest, commercial property to the northwest, utility systems to the west, and a private medical/office facility to the north.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The natural environment surrounding the site includes the Indian River Lagoon to the east and upland scrub, pine and hardwoods to the north and south. Vegetation with the approximately 45-acre offsite construction laydown and parking area (located west of U.S. Highway 1) consists of open land, upland scrub, pine, hardwoods along with exotic plant species.

EXHIBIT 28

2. **Listed Species**

No adverse impacts to federally or state-listed terrestrial plants and animals are expected in association with construction at the Site, due to the existing developed nature of the Site and lack of suitable onsite habitat for listed species. Federal- or state-listed terrestrial plants and animals inhabiting the offsite construction laydown and parking area are limited to the state-listed gopher tortoise and the state- and federally-listed scrub jay. The warm water discharges from the plant attract manatees, an endangered species. FPL is working closely with state and federal wildlife agencies to ensure protection of the manatees during the conversion process and upon operation of the modernized plant.

3. **Natural Resources of Regional Significance Status**

The construction and operation of a natural gas-fired CC generating facility at this location is consistent with the existing use at the site and is not expected to have any adverse impacts on parks, recreation areas, or environmentally sensitive lands.

4. **Other Significant Features**

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design option is to convert the existing steam generating units (Units 1 & 2) with one new 1,219 MW (approximate) CC unit consisting of three new combustion turbines (CT), three new heat recovery steam generators (HRSG), and a new steam turbine. The new CC unit would be in-service in mid-2013. Natural gas delivered via pipeline is the primary fuel type for this unit with ultra-low sulfur light oil serving as a backup fuel.

g. Local Government Future Land Use Designations

Local government future land use designation for the site is “Public Utilities” and the area has been rezoned to GML-U.. Designations for the surrounding area are primarily “Community Commercial” and “Residential”. The Indian River Lagoon is to the east of the site.

h. Site Selection Criteria Process

The Cape Canaveral plant has been selected as a preferred site for a site conversion due to consideration of various factors including system load and economics.

EXHIBIT 28

Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues. However, there are environmental benefits of converting the existing steam units including a significant reduction in system air emissions and improved aesthetics at the site.

i. Water Resources

Condenser cooling for the steam cycle portion of the converted plant and auxiliary cooling will come from the existing cooling water intake system. Process, potable, and irrigation water for the converted plant will come from the existing City of Cocoa's potable water supply.

j. Geological Features of Site and Adjacent Areas

FPL's Cape Canaveral Plant is located on the Atlantic Coastal Ridge and is at an approximate elevation of 12 feet above mean sea level (msl). The land consists primarily of fine to medium sand that parallels the coast. There is a lack of shell as it was deposited during a time of transgression. The base of the sedimentary rocks is made up of a thick, primarily carbonate sequence deposited during the Jurassic age through the Pleistocene age. Starting in the Miocene age and continuing through the Holocene age, siliciclastic sedimentation became more predominant. The basement rocks in this area consist of low-grade metamorphic and igneous intrusives, which occur several thousand feet below land surface and are Precambrian, Paleozoic, and Mesozoic in age.

k. Projected Water Quantities for Various Uses

The estimated quantity of water required for processing is approximately 0.281 million gallons per day (mgd) for uses such as process water and service water. Approximately 619 million gallons per day (mgd) of cooling water would be cycled through the once-through cooling water system. Potable water demand is expected to average .001 mgd.

l. Water Supply Sources by Type

The converted plant will continue to use the Indian River Lagoon water as the source of once-through cooling water. Such needs for cooling water will comply with the existing St. John's River Water Management District (SJRWMD) Consumptive Use Permit (CUP). Process, potable, and irrigation water for the converted plant will come from the existing City of Cocoa's potable water supply.

m. Water Conservation Strategies Under Consideration

No additional water sources will be required as a result of the conversion project.

n. Water Discharges and Pollution Control

The converted site will utilize portions of the existing once-through cooling water systems for heat dissipation. The heat recovery steam generator blowdown will be mixed with the cooling water flow before discharge. Reverse osmosis (R/O) reject will be mixed with the plant's once-through cooling water system. Stormwater runoff will be collected and routed to stormwater ponds. The facility will employ a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

Natural gas for the converted unit will be transported to the site via a pipeline. New on-site gas compressors may be installed to raise the gas pressure of the existing pipeline for the converted unit. Ultra-low sulfur light fuel oil would be received by truck or barge from Port Canaveral and stored in an existing above-ground storage tank.

p. Air Emissions and Control Systems

The use of natural gas and ultra-low sulfur light fuel oil and combustion controls will minimize air emissions from the unit and ensure compliance with applicable emission limiting standards. Using these fuels minimizes emissions of sulfur dioxide (SO_2), particulate matter, and other fuel-bound contaminates. Combustion controls similarly minimize the formation of nitrogen oxides (NO_x) and the combustor design will limit the formation of carbon monoxide and volatile organic compounds. When firing natural gas, NO_x emissions will be controlled using dry-low NO_x combustion technology and selective catalytic reduction (SCR). Water injection and SCR will be used to reduce NO_x emissions during operations when using ultra-low sulfur light fuel oil as backup fuel. These design alternatives are equivalent to the Best Available Control Technology for air emissions, and minimize such emissions while balancing economic, environmental, and energy impacts. Taken together, the design of the converted CCEC plant will incorporate features that will make it among the most efficient and cleanest power plants in the State of Florida.

EXHIBIT 28

q. **Noise Emissions and Control Systems**

Noise from the operation of the new unit will be within allowable levels.

r. **Status of Applications**

A Site Certification Application (SCA) under the Florida Electrical Power Plant Siting Act was filed in December 2008 and is currently under review. The FPSC voted to approve the need for the conversion project and the final order was issued in September 2008.

Preferred Site # 5: Riviera Plant, Palm Beach County

This site is located on the existing FPL Riviera Plant property primarily within Riviera Beach, Palm Beach County (with a small portion of the Site in West Palm Beach). The site is bound to the east by the Lake Worth Lagoon (Intracoastal Waterway) and on the west by a four lane highway (US. 1). The site has barge access via the Port of Palm Beach. A rail line is located near the plant.

The current site generating capacity is made up of two (2) operational 300 MW (approximate) steam generating units (Units 3 & 4). Units 1 & 2 have been retired and dismantled and are no longer on the plant site.

The Riviera Plant site has been listed as a Potential Site in previous FPL Site Plans for both CC and simple cycle generation options. FPL is proposing to convert the existing Riviera Plant, to be renamed the Riviera Beach Next Generation Clean Energy Center (RBEC), into a modern, highly efficient, lower-emission next-generation clean energy center using the latest CC technology. The existing two steam units will first be removed from the site and will be replaced by a single new CC unit.

a. **U.S. Geological Survey (USGS) Map**

A USGS map of the Riviera site is found at the end of this chapter.

b.

c. **Proposed Facilities Layout**

A general layout of the RBEC generating facilities is found at the end of this chapter.

c. **Map of Site and Adjacent Areas**

An overview map of the site and adjacent areas is also found at the end of this chapter.

EXHIBIT 28

d. Existing Land Uses of Site and Adjacent Areas

The existing Riviera Plant currently consists of two 300 MW (approximate) units with conventional dual-fuel fired steam boilers and steam turbine units. The plant site includes minimal vegetation and a landscape buffer area south of the power plant. Adjacent land uses include port facilities and associated industrial activities, as well as light commercial and residential development.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The majority of the site is comprised of facilities related to electric power generation for the existing Riviera Plant. The site is located on the Intracoastal waterway which provides warm water refugia for manatees during cold winter days.

2. Listed Species

No adverse impacts to federally or state-listed terrestrial plants and animals are expected in association with construction at the Site, due to the existing developed nature of the Site and lack of suitable onsite habitat for listed species. The warm water discharges from the plant attract manatees, an endangered species. FPL is working closely with state and federal wildlife agencies to ensure protection of the manatees during the conversion process and upon operation of the new plant.

3. Natural Resources of Regional Significance Status

The construction and operation of a natural gas-fired CC generating facility at this location is consistent with the existing use at the site and is not expected to have any adverse impacts on parks, recreation areas, or environmentally sensitive lands.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design option is to convert the existing units (Units 3 & 4) to one new 1,207 MW (approximate) unit consisting of three new combustion turbines (CT), three new heat recovery steam generators (HRSG), and a new steam turbine. The new CC unit

EXHIBIT 28

would be in service in mid-2014. Natural gas delivered via pipeline is the primary fuel type for the unit with ultra-low sulfur light oil serving as a backup fuel.

g. Local Government Future Land Use Designations

Local government future land use designation for the site is "Utility". The Port of Palm Beach is to the north of the site. Designation to the west of the site is "Commercial". To the south of the site is "Residential" and is in the City of West Palm Beach.

h. Site Selection Criteria Process

The Riviera plant has been selected as a Preferred Site to consideration of various factors including system load and economics. Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues. However, there are environmental benefits of converting the existing steam units including a significant reduction in system air emissions and improved aesthetics at the site.

i. Water Resources

Water from the Lake Worth Lagoon (Intracoastal waterway) is currently used for once-through cooling water. The converted plant will utilize portions of the existing once through cooling water intake and discharge structures. Water for cooling pump seals and irrigation will come from three onsite surficial aquifer wells. Process and potable water for the converted plant will come from the existing City of Riviera Beach potable water supply.

j. Geological Features of Site and Adjacent Areas

FPL's Riviera Plant site is underlain by the surficial aquifer system. The Surficial aquifer system in eastern Palm Beach County is primarily composed of sand, sandstone, shell, silt, calcareous clay (marl), and limestone deposited during the Pleistocene and Pliocene Epochs. The sediments forming the aquifer system are the Pamlico Sand, Fort Thompson Formation (Pleistocene) and the Caloosahatchee Marl (Pleistocene and Pliocene). Permeable sediments in the upper part of the Tamiami Formation (Pliocene) are also part of the aquifer system. The sediments in the eastern portion of the county are appreciably more permeable than in the west due to better sorting and less silt and clay content.

EXHIBIT 28

The surficial aquifer is underlain by at least 600 feet the Hawthorn formation (confining unit). The Floridan Aquifer System underlies the Hawthorn formation.

k. Projected Water Quantities for Various Uses

The estimated quantity of water required for processing is approximately 0.232 mgd for uses such as process water and service water. Approximately 600 million gallons per day (mgd) of cooling water would be cycled through the once-through cooling water system. Potable water demand is expected to average .001 mgd.

l. Water Supply Sources by Type

The converted plant will continue to use the Lake Worth Lagoon water as the source of once-through cooling water. Water for cooling pump seals and irrigation will come from on-site surficial aquifer wells currently permitted by SFWMD. Process and potable water for the converted plant will come from the existing City of Riviera Beach's potable water supply.

m. Water Conservation Strategies Under Consideration

No additional water sources will be required as a result of the conversion project.

n. Water Discharges and Pollution Control

The converted plant will utilize portions of the existing once-through cooling water system for heat dissipation. The heat recovery steam generator blowdown will be mixed with the cooling water flow before discharge. Reverse osmosis (R/O) reject will be mixed with the plant's once-through cooling water system prior to discharge. Stormwater runoff will be collected and routed to stormwater ponds. The facility will employ a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

Natural gas for the converted unit will be transported to the site via a pipeline. New on-site gas compressors may be installed to raise the gas pressure of the existing pipeline to the appropriate level for the converted unit. Ultra-low sulfur light fuel oil would be received by truck, pipeline or barge from the Port of Palm Beach and stored in a new above-ground storage tank.

EXHIBIT 28

p. Air Emissions and Control Systems

The use of natural gas and ultra-low sulfur light fuel oil and combustion controls will minimize air emissions from the unit and ensure compliance with applicable emission limiting standards. Using these fuels minimizes emissions of sulfur dioxide (SO_2), particulate matter, and other fuel-bound contaminates. Combustion controls similarly minimize the formation of nitrogen oxides (NO_x) and the combustor design will limit the formation of carbon monoxide and volatile organic compounds. When firing natural gas, NO_x emissions will be controlled using dry-low NO_x combustion technology and selective catalytic reduction (SCR). Water injection and SCR will be used to reduce NO_x emissions during operations when using ultra-low sulfur light fuel oil as backup fuel. These design alternatives are equivalent to the Best Available Control Technology for air emissions, and minimize such emissions while balancing economic, environmental, and energy impacts. Taken together, the design of RBEC will incorporate features that will make it among the most efficient and cleanest power plants in the State of Florida.

q. Noise Emissions and Control Systems

Noise expected to be caused by unit construction at the site is expected to be below current noise levels for the residents nearest the site.

r. Status of Applications

A Site Certification Application (SCA) under the Florida Electrical Power Plant Siting Act was filed in February 2009 and is currently under review. The FPSC voted to approve the need for the conversion project and the final order was issued in September 2008.

Preferred Site # 6: DeSoto Next Generation Solar Energy Center, DeSoto County

The DeSoto site is located approximately 0.3 miles east of US 17 and immediately north of Bobay Road in Arcadia, Florida. The site is located in Section 27, Township 36 South, Range 25 East. FPL owns an approximately 13,000 acre parcel in DeSoto County. FPL has designated approximately 1,523 acres for development of a photovoltaic (PV) facility. The land surrounding the site is owned by FPL and acts as a buffer zone.

The DeSoto site has been selected as a Preferred Site for the addition of a 25 MW PV generation facility. The DeSoto Next Generation Solar Energy Center is expected to be in operation by the end of 2009.

EXHIBIT 28

a. U.S. Geological Survey (USGS) Map

A USGS map of the DeSoto Next Generation Solar Energy Center plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the DeSoto Next Generation Solar Energy Center generating facility at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

This property is owned by FPL. The site was inactive until November 2008 when construction of the DeSoto Next Generation Solar Energy Center was initiated. The site was previously dedicated to agricultural use. An approximately 400 acre portion of the site has been cleared and re-graded to accommodate the PV project. Prior to initiation of construction, no structures were present on the site and the majority of the vegetation was sod. Structures are now being built on the site for work associated with DeSoto Next Generation Solar Energy Center.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The site has been altered by construction. The surrounding land use is predominantly agriculture. FPL was able to design the PV facility to avoid impacts to most of the natural wetlands.

2. Listed Species

Prior to construction and operation of the new facility one listed species was observed at the site, the gopher tortoise. Gopher tortoises are classified as threatened by the Florida Fish and Wildlife Conservation Commission, but are not listed federally by the U.S. Fish and Wildlife Service. Gopher tortoise burrows were observed in the palmetto prairie and woodland pasture. Other listed species are known to utilize gopher tortoise burrows (commensal species), including the Eastern indigo snake (*Drymarchon corais couperi*; federally and state threatened), gopher frog (*Rana capito*; state species of special concern), and Florida mouse (*Podomys floridanus*; state species of special concern). A permit was obtained to relocate the gopher tortoises and any commensal species. Construction and operation at the site is not expected to affect any rare, endangered, or threatened species.

3. Natural Resources of Regional Significance Status

The construction and operation of the PV generating facility at this location is not expected to have any adverse impacts on parks or recreation areas. Construction will result in minimal wetland impacts under federal, state, or local agency permitting criteria.

4. Other Significant Features

FPL conducted an archeological and historical survey and no artifacts were discovered. FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design consists of 25 MW of PV technology. This site is also suitable for possible expansion of PV beyond the 25 MW facility. No mitigating options are deemed necessary at the site.

g. Local Government future Land Use Designations

The local government future land use designation for the 25 MW project site is Agriculture on the DeSoto County Future Land Use Map.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the installation of a PV technology due to consideration of various factors including prior FPL ownership of the land and its suitability for a PV facility of this magnitude.

i. Water Resource

No water will be required for use at the solar facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficient rainfall. Should this minimal water be required, it will be trucked to the site as needed.

j. Geological Features of the Site and Adjacent Areas

The dominant soil types within the site are Myakka, Smyrna, Immokalee, EauGallie, Basinger, and Valkaria fine sands. Basinger fine sand, depressional; and Anclote muckyfine sand, depressional. All the dominant soil types are considered poorly to very poorly drained.

k. Projected Water Quantities for Various Uses

The projected water use for the solar facility is expected to be minimal with water being used occasionally only to clean the PV panels.

l. Water Supply Sources and Type

The PV facility will use a small amount of water to occasionally clean the PV panels. This water will come from groundwater. FPL will obtain a consumptive use permit once the facility goes into operation.

m. Water Conservation Strategies

This PV facility does not require water use for daily operations.

n. Water Discharges and Pollution Control

There will not be any water discharges or pollution as a result of this facility operation.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The facility will use the sun for fuel. Therefore there will not be any fuel delivery, storage, waste, or pollution at the site.

p. Air Emissions and Control Systems

No air emissions will be emitted from this facility.

q. Noise Emissions and Control Systems

Noise expected during construction is expected to be below noise level allowed by DeSoto County. No noise will be emitted from this facility during operation.

r. Status of Applications

FPL obtained an Environmental Resource Permit (ERP) from the FDEP in October 2008. FPL received an Army Corps of Engineers permit in October 2008.

EXHIBIT 28

Preferred Site #7: Space Coast Next Generation Solar Energy Center, Brevard County

The Space Coast site (Site) is located at Section 13, Township 23 South, and Range 36 East, North of North Courtenay Parkway. FPL is leasing approximately 60 acres from Kennedy Space Center in Brevard County. This Space Coast site has been selected as a Preferred Site for the addition of a 10 MW PV generation facility. The Space Coast Next Generation Solar Energy Center is expected to be in operation by the end of 2010.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Space Coast Next Generation Solar Energy Center plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the Space Coast Next Generation Solar Energy Center generating facility is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The site is inactive. The Site was previously dedicated to agricultural use as citrus groves. There are no structures on the site and the majority of the vegetation is citrus grove.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The surrounding land use is predominantly agriculture. FPL was able to design the PV facility to avoid most of the impacts to natural wetlands.

2. Listed Species

Wildlife resources at the Site were evaluated in February 2008 through pedestrian surveys. There were no listed species observed.

EXHIBIT 28

3. Natural Resources of Regional Significance Status

The construction and operation of a PV generating facility at this location is not expected to have any adverse impacts on parks or recreation areas. Construction will result in minimal wetland impacts under federal, state, or local agency permitting criteria.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design consists of 10 MW of PV technology. No mitigating options are deemed necessary at the site.

g. Local Government future Land Use Designations

Future land use designation for the site is Spaceport Management as designated by the Brevard County Future Land Use Map.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the installation of a PV technology due to consideration of various factors including its suitability for a PV facility of this magnitude and the cooperation of the Kennedy Space Center.

i. Water Resource

No water will be required at the PV facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficant rainfall. Any such water would be brought to the site by truck.

j. Geological Features of the Site and Adjacent Areas

The surface and near-surface deposits of east-central Florida range from surficial unconsolidated sands to well indurated limestones and dolomites at depth. In ascending order the four main geologic units present in east-central Florida are: (i) Eocene limestones; (ii) Lower and Middle Miocene compact silt and clays; (iii) Upper Miocene and Pliocene silty and clayey sands; and (iv) Pleistocene and Recent age sands with interbedded shell layers.

EXHIBIT 28

k. Projected Water Quantities for Various Uses

The projected water use for the PV facility is expected to be minimal with water being used occasionally only to clean the PV panels.

l. Water Supply Sources and Type

At this time, it is expected that natural rainfall will be sufficient to keep the solar panels clean. In the event that additional water is required, a small amount of water may be occasionally trucked in to clean the PV panels.

m. Water Conservation Strategies

FPL constructed this PV facility knowing it would not use water for operation and would only need a minimal amount for cleaning the PV panels.

n. Water Discharges and Pollution Control

There will not be any water discharges or pollution as a result of this facility

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The facility will use the sun for fuel. Therefore there will not be any fuel delivery, storage, waste, or pollution at this site.

p. Air Emissions and Control Systems

No air emissions will be emitted from this facility.

q. Noise Emissions and Control Systems

Noise expected during construction is expected to be below noise levels allowed by Brevard County. No noise will be emitted from this facility during operation.

r. Status of Applications

FPL applied for an Environmental Resource Permit (ERP) from the St. Johns Water Management District and a U.S. Army Corps of Engineers permit in July 2008.

Preferred Site #8: Martin Next Generation Solar Energy Center, Martin County

The Martin Next Generation Solar Energy Center (MSEC) will be located on the existing FPL Martin Plant site in unincorporated Martin County, Florida. The Martin Plant site is located in southwestern Martin County about 40 miles northwest of West Palm Beach and about 1.3 miles east of Lake Okeechobee (Figure 2.1-1). The Martin Plant site is bounded by State Road (SR) 710 and a CSX Railroad line (east and north), a Florida East Coast Railway line and SFWMD L-65 Canal (west), and the St. Lucie Waterway (south).The MSEC Project will be constructed in an approximately 600-acre area (Project Area) within FPL's existing 11,300-acre Martin Plant site. The land surrounding the site is owned by FPL and acts as a buffer zone.

The site has been selected as a Preferred Site for the addition of approximately 75 MW of solar thermal generation. The facility will produce steam that will replace steam that would otherwise have been produced by burning natural gas in one of the existing CC units at the site, Martin Unit 8. The Martin Next Generation Solar Energy Center is expected to be in operation by the end of 2010.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Martin Next Generation Solar Energy Center plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the Martin Next Generation Solar Energy Center generating facility is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

Total site acreage for the existing Martin Plant site is approximately 11,300 acres, which represents land owned by FPL. The Martin Plant site consists of a 6,800-acre cooling pond (6,500 acres of water surface and 300 acres of embankment) and approximately 400 acres for existing Units 1 through 4, Unit 8, and associated facilities. Units 1 & 2 are nominal 800-MW steam electric generating units that use natural gas and low-sulfur residual oil. Units 3 & 4 are nominal 500-MW natural gas-fired CC units. Unit 8 is a natural gas fired 4-on-1 CC unit with a nominal capacity of 1,100 MW that began operation in 2005. Light oil is used as backup in Unit 8. The other onsite facilities include water and wastewater treatment facilities, residual and light fuel oil storage, switchyards and transmission lines, offices, warehouses, maintenance buildings, and other miscellaneous uses.

Adjacent areas include agricultural uses such as croplands, pastures, and groves account for much of the land use and cover within 5 miles of the Martin Plant site. Three types of wetlands, forested freshwater, non-forested freshwater, and mixed forested and forested freshwater also account for a great deal of nearby land use.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The portions of the Martin Plant site that will be affected by the construction of the MSEC are about 550 acres that will be utilized for solar arrays and construction facilities. The solar arrays will be located east of the existing Unit 8. Activities associated with construction will occupy about 100 acres. This will include construction laydown, parking, and trailers. These areas will be cleared of any vegetation. The area for the heat exchangers will be near Unit 8 and this area has been previously impacted by the construction of Units 3, 4, and 8.

2. Listed Species

Threatened and endangered species within the Project Area are limited to avian species and gopher tortoise. No listed species of plants were identified within the MSEC Project Area. Due to the presence of large areas of similar habitat both within the Northwest Mitigation Area and areas north of the existing transmission line ROW adjacent to the Project Area, and the highly mobile nature of protected avian species, no significant adverse impacts to federally or state listed animals are expected. Creation of wood stork foraging ponds and sandhill crane habitat within the Northwest Mitigation Area provides suitable habitat to offset the loss of shallow hydroperiod wetlands within the Project Area.

Gopher tortoises are classified as threatened by the FFWCC, but are not listed federally by the USFWS. Gopher tortoise burrows were observed in the palmetto prairie and woodland pasture. Other listed species are known to utilize gopher tortoise burrows (commensal species), including the Eastern indigo snake (*Drymarchon corais couperi*; federally and state threatened), gopher frog (*Rana capito*; state species of special concern), and Florida mouse (*Podomys floridanus*; state species of special concern). A permit was obtained to relocate the gopher tortoises and any commensal species. Construction and operation at the Site is not expected to affect any rare, endangered, or threatened species

3. Natural Resources of Regional Significance Status

The construction and operation of a solar thermal facility at this location is not expected to have any adverse impacts on parks or recreation areas. Construction will result in minimal wetland impacts under federal, state, or local agency permitting criteria.

4. Other Significant Features

The Florida Department of State, Division of Historical Resources, has determined that no significant archaeological or historical sites are recorded or are likely to be present within the Project Area. As a result no construction impacts on historic properties listed or eligible for listing in the National Register of Historic Places, or otherwise of historical or archaeological value, are anticipated.

f. Design Features and Mitigation Options

The design consists of approximately 75 MW of solar thermal technology. FPL has already undertaken an extensive wetland mitigation program on a 1,130-acre parcel northwest of the existing Martin Plant generating units. That mitigation program was deemed successful by the SFWMD in 2001. All wetland impacts associated with the MSEC have been fully mitigated through this now-successful wetland and upland mitigation effort.

g. Local Government future Land Use Designations

The Martin Plant site that includes Units 1 & 2 was developed prior to the county’s adoption of a future land use map. In 1982, at the time of the original land use plan map adoption, the portion of the Martin Plant site surrounding the existing units was designated Industrial. The Electric Utility Element of the Comprehensive Plan acknowledged FPL’s plans to construct two coal gasification plants at the Martin Plant site and encouraged the facilities to be developed under the industrial planned unit development [PUD(i)] zoning designation. In September 1988, FPL requested a comprehensive plan land use amendment to industrial for the licensing of the Martin CG/CC Project Area and a rezoning of that area to PUD(i). In August 1989, the Martin County Board of County Commissioners (BOCC) approved the comprehensive plan amendment and the rezoning request. In June 2008, with the BOCC approval of the rezoning, a PUD Zoning Agreement was executed between Martin County and FPL in which development standards and special conditions were addressed. Most of the special conditions were addressed during earlier phases of

EXHIBIT 28

developing the Martin Plant site. An amendment of the PUD Zoning Agreement was requested by FPL to allow renewable energy facilities to be located within the PUD area. Subsequent to the certification of the CG/CC Project, which includes the area of the MSEC, Martin County has amended its future land use element and map to designate 7,300 acres in the Martin Plant site as Public Utilities – Major Public Power Generation Facilities.

h. <u>Site Selection Criteria Process</u>

The site has been selected as a Preferred Site due to consideration of various factors including available land area and proximity to an existing generating unit (Martin Unit 8) to which the steam generated by the solar thermal facility could be fed.

i. <u>Water Resource</u>

There will be no water used at the solar thermal facility except the small amount needed to occasionally clean the solar mirrors. The additional water needed for mirror cleaning is already within the previously approved allocation of water for the Martin Plant site.

j. <u>Geological Features of the Site and Adjacent Areas</u>

Borings drilled in the area just east of the existing Unit 8 show that the predominant soil type is sand from the ground surface [approximately 30 feet above mean sea level (ft-msl)] to −70 ft-msl (negative number denotes feet below sea level). The sands vary in color from light to dark gray and brown. Clayey sand and sandy clay seams from a few inches to several feet in thickness are generally found at 10 ft-msl. A thin layer of greenish-gray sandy clay was found in the borings at approximately −25 ft-msl. The Pamlico and Anastasia Formations extend from the ground surface (20 to 30 ft-msl) to an average of −3 ft-msl. These strata consist of fine sands and silty sands with shell fragments. Thin beds of limestone and cemented sand occur sporadically at depths ranging from 2 to 4.5 ft-msl in localized areas; this zone may represent the boundary between the Pamlico and Anastasia Formations. In areas where the cemented sands and limestone are absent, it is not possible to differentiate the two formations.

The underlying Caloosahatchee Group extends to an average −80 ft-msl. This formation can be subdivided into two units, namely an upper limestone interbedded with sand and shell present to an average −12 ft-msl, and a lower unit of silty sand with shell fragments and shell beds to −80 ft-msl. The Tamiami Formation underlies

EXHIBIT 28

the Caloosahatchee from −105 ft-msl to −150 ft-msl. This formation consists of silty sand varying with depth to clayey sand from −72 ft-msl. The color of the formation also varies from gray in the sands to predominantly green in the clayey zone.

The top of the Hawthorn Group occurs at approximately −105 ft-msl to −150 ft-msl. These elevations are based on the logs of test wells and exploratory borings drilled in the area. The Hawthorn, approximately 550 ft thick, consists predominantly of greenish clay with subordinate amounts of shell, limestone, silt, and sand. Major limestone zones generally occur near the base of the formation. Due to very low vertical permeability, the Hawthorn acts as a confining bed overlying the Floridan Aquifer.

k. Projected Water Quantities for Various Uses

Washing mirrors requires about 50 gallons per 120 mirrors (i.e., a 50 meter section). Based on the amount of mirrors for the MSEC, about 75,000 gallons per washing will be required. This amount of water is estimated to be no more than about 2 million gallons per year for cleaning mirrors.

l. Water Supply Sources and Type

The plant water use for MSEC can be accommodated by the current authorization for water in the Conditions of Certification (PA89-27L). The amount of water required by the MSEC is estimated to not exceed about 2 million gallons per year for cleaning mirrors, or an annual average of about 5 gallons per minute (gpm). The usage will be intermittent, with maximum usage of about 75,000 gallons every 1 or 2 weeks during periods without rain and depending upon the reflectivity of the mirrors. The source of water for the MSEC is the existing demineralized water system.

m. Water Conservation Strategies

FPL plans to construct this solar thermal facility knowing it will use very little water for operation.

n. Water Discharges and Pollution Control

There will not be any water discharges or pollution as a result of this facility.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The facility will use the sun for fuel. Therefore, there will not be any fuel delivery, storage, waste, or pollution at the site from the operation of the solar thermal facility.

EXHIBIT 28

p. Air Emissions and Control Systems

There will be no SO_2, NO_x, or CO_2 emissions from the solar thermal facility and its operation will result in reductions of FPL system emissions for all three types of emissions.

There will be minor amounts of volatile organic compounds (VOCs) released from the expansion tanks as a result of decomposition products of heat transfer fluids (HTF). Based on reported values from FPL Energy SEGS facilities in California, the VOC emissions from the MSEC will be about 0.8 tons per year (TPY). This amount would classify these emissions as insignificant activities and the amount is well below the threshold requiring permitting under FDEP rules in 62-210.300, F.A.C. A generic exemption is that emissions of any regulated pollutant be less than 5 TPY. The 5 TPY applies to the "potential-to-emit" for the emission unit, which would be 8,760 hours/year unless restricted as an enforceable permit condition in a permit. The exemption covers the requirement to obtain construction permits required pursuant to Rule 62-210.300(1), F.A.C.

q. Noise Emissions and Control Systems

Noise during construction is expected to be below noise level allowed by Martin County. There will not be any noise from the solar thermal facility during operation.

r. Status of Applications

FPL submitted an application for a Site Certification Modification for the Martin Next Generation Solar Energy Center to the FDEP in May 2008. FPL received the site certification modification approval in August 2008.

IV.F.2 Potential Sites for Generating Options

Four sites are currently identified as Potential Sites for near-term future generation additions to meet FPL's capacity and energy needs.[3]

---

[3] As has been described in previous FPL Site Plans, FPL also considers a number of other sites as possible sites for future generation additions. These include the remainder of FPL's existing generation sites and other greenfield sites. Greenfield sites that FPL currently does not own, or for which FPL has not currently secured the necessary rights to, are not specifically identified as Potential Sites in order to protect the economic interests of FPL and its customers.

EXHIBIT 28

. These sites have been identified as Potential Sites due to considerations of location to FPL load centers, space, infrastructure, and/or accessibility to fuel and transmission facilities. These sites are suitable for different capacity levels and technologies.

Each of these Potential Sites offer a range of considerations relative to engineering and/or costs associated with the construction and operation of feasible technologies. In addition, each Potential Site has different characteristics that will require further definition and attention. Solely for the purpose of estimating water requirements for each site, it was assumed that either one dual-fuel (natural gas and light oil) simple cycle combustion turbine (CT) or a natural gas-fired CC unit would be constructed at the Potential Sites unless otherwise noted. A simple cycle CT would require approximately 50 gallons per minute (gpm) for both process and cooling water (assuming air cooling). A CC unit would require approximately 150 gpm for service and process water and approximately 14 million gallons per day (mgd) for cooling water depending upon the water source and associated water quality. If an existing power plant site is ultimately selected for converting an existing unit(s), the water requirements discussed above for a CC unit would be approximately correct for the converted unit. If a renewable energy generating technology, such as photovoltaic or solar thermal, is ultimately selected for one of these sites, the water requirements would be less than those for CT or CC facilities.

Permits are presently considered to be obtainable for each of these sites. No significant environmental constraints are currently known for any of these sites. The Potential Sites briefly discussed below are presented in alphabetical order. At this time FPL considers each site to be equally viable.

Potential Site # 1: West Broward, Broward County

FPL has identified the Andytown Substation property in western unincorporated Broward County as a potential site for the addition of new generating capacity and FPL refers to this potential site as the West Broward site. Current facilities on-site include an electric substation. The existing site is an area accessible to both natural gas and electrical transmission through existing structures or through additional lateral connections.

a. U.S. Geological Survey (USGS) Map

A USGS map of the site has been included at the end of this chapter.

EXHIBIT 28

b. **Land Uses**

The land uses for the site were designated as agricultural use.

c. **Environmental Features**

Extensive low-quality wetlands are present on the site. Construction and operation of a new facility on this site would not be expected to adversely affect any rare, endangered, or threatened species.

d. **Water Quantities**

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

e. **Supply Sources**

Groundwater from the shallow aquifer or a local source of reclaimed (reuse) water has been identified as potential water sources. The Floridan Aquifer has also been identified as a potential cooling water source.

Potential Site # 2: Fort Myers Plant, Lee County

FPL's existing 460-acre Fort Myers property is located just east of Interstate 75 in Lee County and is adjacent to the Caloosahatchee River. The existing facilities on the site include one 1,440 MW (approximate) CC unit, 12 gas turbines, each with an approximate capacity of 54 MW, and two combustion turbines, each with an approximate capacity of 160 MW.

a. **U.S. Geological Survey (USGS) Map**

A USGS map of the Fort Myers plant site is found at the end of this chapter.

b. **Land Uses**

The land on the site is currently dedicated to industrial use with surrounding grassy and landscaped areas. Much of the site has been used in recent years for direct plant construction activities. The adjacent land uses include light commercial and retail to the east of the property, plus some residential areas located toward the west.

c. **Environmental Features**

Mixed scrub with some hardwoods can be found to the east and further south.

EXHIBIT 28

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

e. Supply Sources

The available water source is the Caloosahatchee River and the available groundwater source is the sandstone aquifer.

Potential Site # 3: Lauderdale Plant, Broward County

The Lauderdale site is located in Eastern Broward County approximately 5 miles inland from Dania Beach and less than 2 miles west of Ft. Lauderdale International Airport. The site is bounded on the south by Dania Cutoff Canal, on the east by S.W. 30th Avenue, and on the North by I-595.

The existing approximately 1,700 MW of generating capacity at FPL's Lauderdale site occupies a portion of the approximately 210 acres that are wholly owned by FPL. The generating capacity is made up of two CC units (Units 4 & 5), and 24 simple cycle gas turbine (GT) units.

a. U.S. Geological Survey (USGS) Map

A USGS map of the site is found at the end of this chapter.

b. Land Uses

The existing power plant facilities are located on approximately 130 acres. The existing site has been in use since the 1920s and is adjacent to a county resource recovery project.

c. Environmental Features

To the north of the power plant is an area of mixed uplands with a scattering of small wetlands.

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

EXHIBIT 28

e. **Supply Sources**

Existing groundwater or the municipal water supply are potential water sources.

Potential Site # 4: Manatee Plant, Manatee County

The site for the Project is the existing FPL Manatee Plant 9,500-acre site, located in unincorporated north-central Manatee County. The existing power generating facilities are located in all or portions of Sections 18 and 19 of Township 33S, Range 20-E. The plant site lies approximately 5 miles east of Parrish, Florida. It is approximately 5 miles east of U.S. 301 and 9.5 miles east of Interstate Highway 75 (I-75). The existing plant is approximately 2.5 miles south of the Hillsborough-Manatee County line; a portion of the north property boundary of the plant site abuts the county line. State Road 62 (SR 62) is about 0.7 mile south of the plant, with the plant entrance road going north from that highway. This site is a possibility for an FPL solar thermal facility.

a. **U.S. Geological Survey (USGS) Map**

A map of the site is found at the end of this chapter.

b. **Land Uses**

Existing Land use on the site is agricultural. FPL is attempting to rezone the property to PD-PI which will allow for electrical generation.

c. **Environmental Features**

There are no significant environmental features on the site.

d. **Water Quantities**

Minimal amounts of water would be required for a solar thermal facility.

e. **Supply Sources**

The existing water supply could be used for the water required to clean the mirrors for a solar thermal facility.

EXHIBIT 28

CHAPTER V

Other Planning Assumptions & Information

EXHIBIT 28

(This page is left intentionally blank.)

EXHIBIT 28

Introduction

The Florida Public Service Commission (FPSC), in Docket No. 960111-EU, specified certain information that was to be included in an electric utility's Ten Year Power Plant Site Plan filing. Among this specified information was a group of 12 items listed under a heading entitled "Other Planning Assumptions and Information". These 12 items basically concern specific aspects of a utility's resource planning work. The FPSC requested a discussion or a description of each of these items.

These 12 items are addressed individually below as separate "Discussion Items".

Discussion Item # 1: Describe how any transmission constraints were modeled and explain the impacts on the plan. Discuss any plans for alleviating any transmission constraints.

FPL's resource planning work considers two types of transmission limitations/constraints: external limitations and internal limitations. External limitations deal with FPL's ties to its neighboring systems. Internal limitations deal with the flow of electricity within the FPL system.

The external limitations are important since they affect the development of assumptions for the amount of external assistance that is available to the FPL system as well as the amount and price of economy energy purchases. Therefore, these external limitations are incorporated both in the reliability analysis and economic analysis aspects of resource planning. The amount of external assistance which is assumed to be available is based on the projected transfer capability to FPL from outside its system as well as historical levels of available assistance. In its reliability analyses, FPL models this amount of external assistance as an additional generator within FPL's system which provides capacity in all but the peak load months. The assumed amount and price of economy energy are based on historical values and projections from production costing models.

Internal transmission limitations are addressed by identifying potential geographic locations for potential new units that minimize adverse impacts to the flow of electricity within FPL's system. The internal transmission limitations are also addressed by developing the direct costs for siting new units at different locations and by evaluating the cost impacts created by the new unit/unit location combination on the operation of existing units in the FPL system. Both of these site- and system-related transmission costs are developed for each different

EXHIBIT 28

unit/unit location option or groups of options. In addition, transfer limits for capacity and energy that can be imported into the Southeastern region of FPL's system are also developed for use in FPL's production costing analyses. (A further discussion of the Southeastern Florida region and the need to maintain a regional balance between generation and transmission contributions is found in Chapter III.)

FPL's annual transmission planning work determines transmission additions needed to address limitations and to maintain/enhance system reliability. FPL's planned transmission facilities to interconnect and integrate FPL's resource plans and those that must be certified under the Transmission Line Siting Act are presented in Chapter III.

Discussion Item # 2: Discuss the extent to which the overall economics of the plan were analyzed. Discuss how the plan is determined to be cost-effective. Discuss any changes in the generation expansion plan as a result of sensitivity tests to the base case load forecast.

FPL typically performs economic analyses of competing resource plans using as an economic criterion FPL's levelized system average electric rates (i.e., a Rate Impact Measure or RIM approach). In addition, for analyses in which DSM levels are not changed, FPL uses the equivalent criterion of the cumulative present value of revenue requirements for the FPL system.[4]

The load forecast that is presented in FPL's 2009 Site Plan was developed in January 2009. FPL has not performed sensitivity analyses on forecasts that differ from this recently developed load forecast.

---

[4] FPL's basic approach in its resource planning work is to base decisions on a lowest electric rate basis. However, when DSM levels are considered a "given" in the analysis, the lowest rate basis and the lowest system revenue requirements basis are identical. In such cases FPL evaluates options on the simpler – to – calculate (but equivalent) lowest system revenue requirements basis.

EXHIBIT 28

Discussion Item # 3: Explain and discuss the assumptions used to derive the base case fuel forecast. Explain the extent to which the utility tested the sensitivity of the base case plan to high and low fuel price scenarios. If high and low fuel price sensitivities were performed, explain the changes made to the base case fuel price forecast to generate the sensitivities. If high and low fuel price scenarios were performed as part of the planning process, discuss the resulting changes, if any, in the generation expansion plan under the high and low fuel price scenario. If high and low fuel price sensitivities were not evaluated, describe how the base case plan is tested for sensitivity to varying fuel prices.

The basic assumptions FPL used in deriving its fuel price forecasts are discussed in Chapter III of this document. FPL's 2008 resource planning work utilized up to four different fuel cost forecasts (and four different environmental compliance cost forecasts). Detailed discussions of those fuel cost forecasts, and the results of utilizing them on the resource plans being analyzed in each filing, were presented to the FPSC in FPL's filings for Determination of Need for WCEC Unit 3 and the conversions of FPL's existing Cape Canaveral and Riviera plants. In addition, FPL used different fuel and environmental compliance cost forecasts in the 2008 nuclear cost recovery filings for the nuclear uprates of its existing nuclear units and for the new Turkey Point Units 6 & 7.

The resource plan presented in this Site Plan is largely the result of those prior analyses. For that reason, this resource plan, with the recently developed January 2009 load forecast, has not been further tested for different fuel cost forecasts.

Discussion Item # 4: Describe how the sensitivity of the plan was tested with respect to holding the differential between oil/gas and coal constant over the planning horizon.

As described above in the answer to Discussion Item # 3, FPL used up to four fuel forecasts in the filings for Determination of Need, and/or cost recovery filings, for a variety of new units as described in the previous question. While these forecasts did not represent a constant cost differential between oil/gas and coal, a variety of fuel cost differentials were represented in these forecasts.

EXHIBIT 28

Discussion Item # 5: Describe how generating unit performance was modeled in the planning process.

The performance of existing generating units on FPL's system was modeled using current projections for scheduled outages, unplanned outages, capacity output ratings, and heat rate information. Schedule 1 in Chapter I, and Schedule 8 in Chapter III, present the current and projected capacity output ratings of FPL's existing units. The values used for outages and heat rates are generally consistent with the values FPL has used in planning studies in recent years.

In regard to new unit performance, FPL utilized current projections for the capital costs, fixed and variable operating & maintenance costs, capital replacement costs, construction schedules, heat rates, and capacity ratings for all construction options in its resource planning work. A summary of this information for the new capacity options FPL projects to add over the planning horizon is presented on the Schedule 9 forms in Chapter III.

Discussion Item # 6: Describe and discuss the financial assumptions used in the planning process. Discuss how the sensitivity of the plan was tested with respect to varying financial assumptions.

In its 2008 resource planning work, FPL used two sets of key financial assumptions. A 44.2% debt and 55.8% equity FPL capital structure was used throughout this work. In its early 2008 analyses, FPL used a 6.43% projected debt, an equity return of 11.75%, and after-tax discount rate of 8.4% for generation costs and 8.3% for all other costs. In its analyses later in 2008, FPL used 6.6% projected debt, an equity return of 11.75%, and after-tax discount rate of 8.35%. The change in the discount rate assumption is due partly as a result of the change in the cost of debt assumption and partly because FPL no longer assumes that the federal manufacturing tax credit would likely apply to new generating units built in the time frame discussed in this analysis. This latter assumption change also resulted in the same discount rate (8.35%) being applied to both generation and non-generation costs in the analyses presented in this filing.

EXHIBIT 28

Discussion Item # 7: Describe in detail the electric utility's Integrated Resource Planning process. Discuss whether the optimization was based on revenue requirements, rates, or total resource cost.

FPL's integrated resource planning (IRP) process is described in detail in Chapter III of this document.

The standard basis for comparing the economics of competing resource plans in FPL's basic IRP process is the impact of the plans on FPL's electricity rate levels with the intent of minimizing FPL's levelized system average rate (i.e., a Rate Impact Measure or RIM approach). As discussed in response to Discussion Item # 2, both the electricity rate perspective and the cumulative present value of system revenue requirement perspective are identical when DSM levels are unchanged between competing plans. Therefore, in planning work in which DSM levels were unchanged, the equivalent cumulative present value of revenue requirements perspective was utilized.

Discussion Item # 8: Define and discuss the electric utility's generation and transmission reliability criteria.

FPL uses two system reliability criteria in its resource planning work that addresses generation, purchase, and DSM options. One of these is a minimum 20% Summer and Winter reserve margin. The other reliability criterion is a maximum of 0.1 days per year loss-of-load-probability (LOLP). These reliability criteria are discussed in Chapter III of this document.

In regard to transmission reliability analysis work, FPL has adopted transmission planning criteria that are consistent with the planning criteria established by the Florida Reliability Coordinating Council (FRCC). The FRCC has adopted transmission planning criteria that are consistent with the Reliability Standards established by the North American Electric Reliability Council (NERC).The *NERC Reliability Standards* are available on the internet (http://www.nerc.com/.)

In addition, FPL has developed a *Facility Connection Requirements* (FCR) document as well as a *Facility Rating Methodology* document that are also available on on the internet https://www.oatioasis.com/FPL /FPLdocs/Nov,2008 Revised FCR.docl.

EXHIBIT 28

Generally, FPL limits its transmission facilities to 100% of the applicable thermal rating. In regards to the normal and contingency voltage criteria for FPL stations, it is provided below:

	Normal/Contingency	
Voltage Level (kV)	**Vmin (p.u.)**	**Vmax (p.u.)**
69, 115, 138	0.95/0.95	1.05/1.07
230	0.95/0.95	1.06/1.07
500	0.95/0.95	1.07/1.09
Turkey Point (*)	1.01/1.01	1.06/1.06
St. Lucie (*)	1.00/1.00	1.06/1.06

(*) Voltage range criteria for FPL's Nuclear Power Plants

There may be isolated cases for which FPL may have determined it is acceptable to deviate from the general criteria stated above. There are several factors could influence this criteria, such as the overall potential customers that may be impacted, the probability of an outage actually occurring, or transmission system performance, as well as others.

Discussion Item # 9: Discuss how the electric utility verifies the durability of energy savings for its DSM programs.

The impact of FPL's DSM programs on demand and energy consumption is revised periodically. Engineering models, calibrated with field-metered data, are updated when significant efficiency changes occur in the marketplace. Participation trends are tracked for all of the FPL DSM programs in order to adjust impacts each year for changes in the mix of efficiency measures being installed by program participants.

Survey data is collected from non-participants in order to establish the baseline efficiency. Participant data is compared against non-participant data to establish the demand and energy saving benefits of the utility program versus what would be installed in the absence of the program. For these DSM measures which involve the utilization of load management, FPL conducts periodic tests of the load control equipment to ensure that it is functioning correctly.

EXHIBIT 28

Discussion Item # 10: Discuss how strategic concerns are incorporated in the planning process.

The Executive Summary chapter provides a discussion of two system concerns that are typically addressed in FPL's resource planning work: (1) maintaining/enhancing fuel diversity in the FPL system, and (2) maintaining a balance between load and generating capacity in Southeastern Florida. In addition, two other relatively recent items will also influence FPL's resource planning efforts. One of these items is the Executive Orders directive issued in 2007 by Governor Crist calling for reduction in greenhouse gas emissions and greater contribution from renewable energy sources. As previously discussed in both the Executive Summary chapter and Chapter III, FPL's resource planning has already taken positive steps in regard to both of these issues. The other item is the appropriate level of renewable energy contributions to a utility system in Florida, an issue that is currently being discussed by the Florida Legislature. The outcome of these discussions regarding Renewable Portfolio Standards (RPS) is not known at the time the 2009 Site Plan is being written. However, once the RPS outcome is known, FPL will take appropriate steps in its resource planning work. Those steps will likely be discussed next year in FPL's 2010 Site Plan.

In addition to these system concerns/issues, there are other strategic factors FPL typically considers when choosing between resource options. These include the following: (1) technology risk; (2) environmental risk, and (3) site feasibility. The consideration of these factors may include both economic and non-economic aspects.

Technology risk is an assessment of the relative maturity of competing technologies. For example, a prototype technology which has not achieved general commercial acceptance has a higher risk than a technology in wide use and, therefore, is less desirable.

Environmental risk is an assessment of the relative environmental acceptability of different generating technologies and their associated environmental impacts on the FPL system, including environmental compliance costs. Technologies regarded as more acceptable from an environmental perspective for a plan are those which minimize environmental impacts for the FPL system as a whole through highly efficient fuel use and state of the art controls.

Site feasibility assesses a wide range of economic, regulatory, and environmental factors related to successfully developing and operating the specified technology at the site in question. Projects that are more acceptable have sites with few barriers to successful development.

EXHIBIT 28

All of these factors play a part in FPL's planning and decisions, including its decisions to construct capacity or to purchase power.

Discussion Item # 11: Describe the procurement process the electric utility intends to utilize to acquire the additional supply-side resources identified in the electric utility's ten-year site plan.

As has been previously discussed, elements of FPL's capacity additions include the construction of new generating capacity at the West County Energy Center (WCEC) site, WCEC Units 1, 2, and 3. These generation construction projects were selected after evaluating competing bids received in response to Requests for Proposals (RFP) issued by FPL. The FPSC subsequently approved FPL's decision to construct these new combined cycle (CC) units in Determination of Need dockets.

In regard to the Conversions projects at FPL's existing Cape Canaveral and Riviera plants, the conversion projects were also evaluated using the competing bids received in response to the RFP issued for WCEC Unit 3. In addition, bids from competing vendors were also evaluated for FPL's new solar thermal and PV projects.

The nuclear capacity additions, both the nuclear uprates and the new nuclear units, do not lend themselves to an RFP approach involving bids from third parties who would build new nuclear generation capacity. For these nuclear projects, FPL's procurement activities were conducted to ensure the best combination of quality and cost for the delivered products.

Construction capacity addition decisions for non-nuclear generation for years beyond those presented in this document are expected to be conducted in a manner consistent with the Commission's Bid Rule.

Identification of self-build options, beyond those units already approved by the FPSC and Governor and Siting Board or units for which FPL may be then seeking approval, in future FPL Site Plans will not be an indication that FPL has pre-judged any capacity solicitation it may conduct. The identification of future capacity units is required of FPL in its Site Plan filings and represents those alternatives that appear to be FPL's best, most cost-effective self-build options at the time. FPL reserves the right to refine its planning analyses and to

EXHIBIT 28

identify other self-build options. Such refined analyses have the potential to yield a variety of self-build options, some of which might not require an RFP. If an RFP is issued for Supply options, FPL reserves the right to choose the best alternative for its customers, even if that option is not an FPL self-build option.

Discussion Item # 12: Provide the transmission construction and upgrade plans for electric utility system lines that must be certified under the Transmission Line Siting Act (403.52 – 403.536, F. S.) during the planning horizon. Also, provide the rationale for any new or upgraded line.

(1) FPL identified the need for a new 230kV transmission line (by June 2009) that required certification under the Transmission Line Siting Act which was issued on April 2006. The new line, when completed, will connect FPL's St. Johns Substation to FPL's proposed Pringle Substation (also shown on Table III.E.1 in Chapter III). The construction of this line is necessary to serve existing and future customers in the Flagler and St. Johns areas in a reliable and effective manner.

(2) FPL has identified the need for a new 230kV transmission line (by December 2012) that required certification under the Transmission Line Siting Act which was issued on November 2008. The new line will connect FPL's Manatee Substation to FPL's proposed BobWhite Substation (also shown on Table III.E.1 in Chapter III). The construction of this line is necessary to serve existing and future customers in the Manatee and Sarasota areas in a reliable and effective manner.

EXHIBIT 28

(This page is intentionally left blank.)

EXHIBIT 29

FPL

Ten Year Power Plant Site Plan

2010-2019

Submitted To:

Florida Public
Service Commission

Miami, Florida
April 2010

EXHIBIT 29

(This page is intentionally left blank.)

EXHIBIT 29

Table of Contents

EXHIBIT 29

EXHIBIT 29

List of Figures and Tables

EXHIBIT 29

EXHIBIT 29

List of Schedules

EXHIBIT 29

Overview of the Document

Chapter 186, Florida Statutes, requires that each electric utility in the State of Florida with a minimum existing generating capacity of 250 megawatts (MW) must annually submit a Ten Year Power Plant Site Plan. This plan should include an estimate of the utility's future electric power generating needs, a projection of how these estimated generating needs would be met, and disclosure of information pertaining to the utility's preferred and potential power plant sites. The information contained in this Site Plan is compiled and presented in accordance with rules 25-22.070, 25-22.071, and 25-22.072, Florida Administrative Code (F.A.C.).

This Ten Year Power Plant Site Plan (Site Plan) document is based on Florida Power & Light Company's (FPL) integrated resource planning (IRP) analyses that were carried out in 2009 and that were on-going in the first Quarter of 2010. The forecasted information presented in this plan addresses the 2010–2019 time frame.

Site Plans are long-term planning documents and should be viewed in this context. A Site Plan contains tentative information, especially for the latter years of the ten-year time horizon, and all of this information is subject to change at the discretion of the utility. Much of the data submitted is preliminary in nature and is presented in a general manner. Specific and detailed data will be submitted as part of the Florida site certification process, or through other proceedings and filings, at the appropriate time.

This document is organized in the following manner:

Chapter I – Description of Existing Resources

This chapter provides an overview of FPL's current generating facilities. Also included is information on other FPL resources including purchased power, demand side management, and FPL's transmission system.

Chapter II – Forecast of Electric Power Demand

FPL's load forecasting methodology, and its forecast of seasonal peaks and annual energy usage, is presented in Chapter II.

Chapter III – Projection of Incremental Resource Additions

This chapter discusses FPL's integrated resource planning (IRP) process and outlines FPL's projected resource additions, especially new power plants, based on FPL's IRP work in 2009 and

EXHIBIT 29

early 2010.

Chapter IV – Environmental and Land Use Information

This chapter discusses environmental information as well as Preferred and Potential site locations for additional electric generation facilities.

Chapter V – Other Planning Assumptions and Information

This chapter addresses twelve “discussion items” which pertain to additional information that is included in a Site Plan filing.

EXHIBIT 29

FPL
List of Abbreviations
Used in FPL Forms

Reference	***Abbreviation***	***Definition***
Unit Type	BIT	Bituminous Coal
	CC	Combined Cycle
	CT	Combustion Turbine
	GT	Gas Turbine
	IC	Internal Combustion
	NP	Nuclear Power
	PV	Photovoltaic
	ST	Steam Unit
Fuel Type	UR	Uranium
	BIT	Bituminous Coal
	FO2	#1, #2 or Kerosene Oil (Distillate)
	FO6	#4,#5,#6 Oil (Heavy)
	NG	Natural Gas
	No	None
	SUB	Sub Bituminous Coal
	Pet	Petroleum Coke
Fuel Transportation	No	None
	PL	Pipeline
	RR	Railroad
	TK	Truck
	WA	Water
Unit/Site Status	OT	Other
	P	Planned Unit
	T	Regulatory approval received but not under construction
	U	Under construction, less than or equal to 50% Complete
	V	Under construction, more than 50% Complete

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

Executive Summary

Florida Power & Light Company's (FPL) 2010 Ten Year Power Plant Site Plan (Site Plan) presents FPL's current plans to augment and enhance its electric generation capability (owned or purchased) as part of its efforts to meet its projected incremental resource needs for the 2010 - 2019 time period. By design, the primary focus of this document is on supply side additions; i.e., electric generation capability and the sites for these additions. The supply side additions discussed in this document are resources projected to be needed after accounting for FPL's demand side management (DSM) contributions and the significant energy efficiency contributions from the latest, enhanced federal appliance and lighting efficiency standards. The projected impacts of the federal appliance and lighting efficiency standards are already reflected in FPL's load forecast presented in this document. The projected impacts of FPL's DSM contributions are addressed as projected reductions to the forecasted load.

The resource plan that is presented in FPL's 2010 Site Plan contains five key similarities to the resource plan presented in FPL's 2009 Site Plan. These similarities are especially applicable to the early years of the ten-year period. Conversely, there are three specific factors that are driving changes in FPL's resource plans. In addition, there are other factors that will continue to influence FPL's on-going resource planning work. A brief discussion of these similarities, changes, and other factors is provided below.

I. Similarities to the Resource Plan Presented in the 2009 Site Plan:

There are five key similarities in the current resource plan presented in this document compared to the resource plan presented in the 2009 Site Plan.

Similarity # 1: A third highly efficient combined cycle (CC) generating unit will be added to FPL's system in 2011.

One similarity to FPL's 2009 Site Plan is the addition of a third new highly efficient natural gas-fired CC generating unit at FPL's West County Energy Center (WCEC) site in 2011. FPL placed in-service two 1,219 MW (Summer) CC units at the WCEC site in 2009. These units are identified as WCEC Units 1 and 2. The WCEC Units 1 and 2 were approved by the Florida Public Service Commission (FPSC) in June 2006. Site Certification for these units under the Florida Electric Power Plant Siting Act was approved by the Governor and the Cabinet serving as the Siting Board in December 2006.

EXHIBIT 29

FPL is currently constructing the third new CC unit, WCEC Unit 3, at this site. This new CC unit is projected to go into commercial operation by mid-2011. The WCEC Unit 3 was approved by the FPSC in September 2008 and Site Certification for this unit was obtained in November 2008.

Similarity # 2: Additional renewable energy generation facilities will be installed on FPL's system in 2010.

In 2009, FPL completed construction, and began operation, of a 25 MW (nameplate rating) photovoltaic (PV) generation facility in DeSoto County. This was the first of three renewable energy installations that FPL committed to place in-service in the near-term. The other two renewable energy installations are a 10 MW (nameplate rating) PV facility in Brevard County and a 75 MW (nameplate rating) solar thermal facility in Martin County. The latter two projects are currently under construction and are scheduled to begin commercial operation in 2010.

Similarity # 3: Generating capacity at FPL's four existing nuclear generation units will increase in 2011 and 2012.

FPL will be adding approximately 400 MW of increased generating capacity from its existing Turkey Point and St. Lucie nuclear power plants. This increased capacity is scheduled to come in-service in the 2011 and 2012 time period. The need for these nuclear capacity "uprates" was approved by the FPSC in January 2008. The Final Order for the Site Certification was issued in September 2008 for the St. Lucie uprates and in October 2008 for the Turkey Point uprates.

Similarity # 4: A number of existing generating units will be placed temporarily on Inactive Reserve.

In 2009, FPL began to temporarily take a number of its existing generating units out of active service and place them on Inactive Reserve status until their continued operation is again needed. This practice will continue in 2010 and is currently projected to continue beyond 2010. The specific generating units that will be placed on Inactive Reserve status are discussed in Chapter III of this document.

Similarity # 5: This Site Plan continues to reflect the modernizations of FPL's existing Cape Canaveral and Riviera plant sites in 2013 and 2014.

FPL's 2009 Site Plan projected that the modernizations of FPL existing generating units at these two sites would occur in 2013 (Cape Canaveral) and 2014 (Riviera). FPL received need

EXHIBIT 29

determination approval from the FPSC for both of these modernizations in 2008. FPL's 2010 Site Plan continues to show this same projection for resource planning purposes. As FPL has recently stated, FPL has suspended work on the modernization projects.

II. Factors That Are Driving Changes in FPL's Resource Plan:

There are three primary factors that are driving the changes in FPL's 2010 resource plan compared to the resource plan presented in FPL's 2009 Site Plan. These three factors, and their impacts on the resource plan, are summarized below and are addressed in more detail in Chapters II and III of this document.

Factor # 1: FPL's forecast of projected load is lower in the long-term than the 2009 load forecast.

The first factor that is driving changes in FPL's resource plan is FPL's new long-term load forecast that was prepared in February 2010. This new forecast projects lower growth in electrical demand and energy starting in 2015 compared to the 2009 load forecast that was shown in FPL's 2009 Site Plan. As a result of this new lower load forecast, FPL's current projected need for new resources in the 2010 – 2019 time period is significantly lower than had been projected in 2009.

Factor # 2: The FPSC has significantly increased goals for demand side management (DSM) resources that FPL must meet in the 2010 – 2019 time period.

The second factor that is driving changes in the current resource plan is the FPSC's decision in late 2009 to impose significantly higher goals for DSM resources for FPL to add in the 2010 – 2019 period. The amount of demand (MW) reduction from the new DSM goals far exceeds the 2009 projection of FPL's remaining resource needs through 2019.[1] Now, with FPL's lower 2010 load forecast, and the commensurately lower 2010 projection of resource needs, the amount by which the MW reductions from the new DSM goals exceeds FPL's resource needs is even larger. The new level of DSM goals has other significant implications for resource planning as indicated in the following section.

---

[1] It is the demand (MW) reduction aspect of DSM programs, not the energy (MWh) aspect that enables DSM to meet future resource needs; i.e., avoid the need for new generating units.

EXHIBIT 29

Factor # 3: Due to regulatory and commercial developments in 2009, the Turkey Point 6 & 7 project schedule is under review. For planning purposes, it is now assumed that the in-service dates will not be within the ten year reporting window of this Site Plan.

In recent Site Plans, FPL discussed its plans for pursuing additional nuclear capacity (beyond the above-mentioned nuclear uprates) through the addition of new nuclear units. These previous Site Plans reflected the addition of two new nuclear units at FPL's existing Turkey Point plant site, with these new units, Turkey Point Units 6 & 7, assumed to be placed in-service in 2018 and 2020, respectively. FPL received need determination approval from the FPSC for these units in early 2008. The assumed 2018 and 2020 in-service dates represented the earliest possible dates that FPL foresaw that these new units could become operational.

Beginning in late 2009, FPL began a review of project schedule, costs, and feasibility to determine the best path forward for the Turkey Point Units 6 & 7 project in light of the most current information. A revised plan based on that review will include the steps necessary to maintain progress in creating the option for new nuclear units while maintaining an appropriate control of risk exposure. Although the revised plan is not yet completed, it has become evident that, for planning purposes, it would not be appropriate to reflect the assumed in-service dates of Turkey Point Units 6 & 7 within the period covered by this Ten Year Site Plan.

III. Resulting Changes in FPL's Resource Plan Compared to the Resource Plan Presented in the 2009 Site Plan:

The factors discussed above contribute to two significant changes in FPL's resource plan presented in this document compared to the resource plan presented in FPL's 2009 Site Plan. The changes are summarized below.

Resulting Change # 1: FPL's 2010 Site Plan now projects no additional new generating units in the 2015 through 2019 time period.

FPL's lower February 2010 load forecast significantly reduces FPL's projected resource needs. And, as previously mentioned, the FPSC-imposed new goals for DSM, especially the new MW goals, already greatly exceeded the resource needs that FPL had previously projected, even using the higher load forecast that FPL utilized in 2009. The combination of these two factors results in FPL having no need for additional resources through the 2019 reporting period addressed in this Site Plan, beyond the previously mentioned WCEC 3 unit, the modernizations

EXHIBIT 29

of the Cape Canaveral and Riviera sites, and the nuclear uprates. All of these capacity additions are currently projected to be completed by 2014.

Therefore, as shown by Table ES-1 that is presented at the end of this Executive Summary, FPL projects no new FPL generation unit additions from 2015 through 2019.

Resulting Change # 2: For planning purposes, the assumed in-service dates for the new Turkey Point Units 6 & 7 have moved beyond the 2010 – 2019 reporting frame of this Site Plan document.

As stated above, FPL's ongoing review of the Turkey Point Units 6 & 7 project indicates that, for planning purposes, it is no longer appropriate to reflect assumed in-service dates for the Turkey Point Units 6 & 7 within the 2010 – 2019 reporting time frame of this Site Plan. This is a result of slower than anticipated progress in a number of critical project areas. As a result, FPL's 2010 Site Plan does not include either of the new nuclear units as part of its resource plan in 2010 – 2019.

FPL recognizes that the addition of new nuclear units will result in significant system fuel savings, system emission savings, (including CO_2), and gains in system fuel diversity. For these reasons, FPL is continuing to pursue the licenses that will be necessary to construct new nuclear units at Turkey Point. At the time this document is being prepared, FPL is evaluating what the revised in-service dates for Turkey Point Units 6 & 7 should be for planning purposes. FPL will address those revised in-service dates for planning purposes in its May 3, 2010 nuclear cost recovery filing to the FPSC.

IV. Additional Factors Influencing FPL's Resource Planning Work:

In addition to the factors described above, other items will also influence FPL's resource planning work. Among these other items are two that FPL typically refers to as on-going system concerns that FPL has considered in its resource planning work for a number of years. These two on-going system concerns are: (1) maintaining/enhancing fuel diversity in the FPL system, and (2) maintaining a balance between load and generating capacity in Southeastern Florida.

A third factor that will influence FPL's on-going resource planning efforts is the Executive Order directive issued in 2007 by Governor Crist, calling for reductions in greenhouse gas emissions and for increased contribution from renewable energy sources.

EXHIBIT 29

A fourth factor that could affect FPL’s resource planning is the possibility of the establishment of a Florida standard for renewable energy or clean energy. A Renewable Portfolio Standard (RPS) proposal was prepared by the FPSC, and then sent to the Florida Legislature for consideration, with a possible change to a Clean Portfolio Standard (CPS), during the 2009 legislative session. However, no RPS or CPS legislation was enacted during the 2009 legislative session. RPS or CPS legislation, or other legislative initiatives regarding renewable or clean energy contributions, may occur in the future. If such legislation is enacted during 2010 or in later years, FPL will then determine what steps need to be taken to address the legislation. Such steps would then be discussed in FPL’s Site Plan in the year following the enactment of such legislation.

Table ES-1 presents a current projection of the changes in the generating resources portion of FPL’s resource plan based on the factors and changes discussed above. As such, this table does not specifically identify the impacts of the new DSM Goals, but these impacts are reflected in the reserve margin values presented in the table. The table also presents the impacts of the temporary placement of specific existing generating units on Inactive Reserve and the beginning of the return to active service of these generating units in the latter portion of the ten-year planning period.

EXHIBIT 29

Table ES-1: Projected Capacity Changes and Reserve Margins for FPL

Projected Capacity Changes and Reserve Margins for FPL (1)

		Net Capacity Changes (MW)		***Reserve Margin (%)***	
Year	***Projected Capacity Changes***	***Winter (2)***	***Summer (3)***	***Winter***	***Summer***
2010	Martin Next Generation Solar Energy Center (Solar Thermal) (7)	---	---		
	Space Coast Next Generation Solar Energy Center (PV) (6)	---	---		
	Changes to Existing Purchases (4)	---	(50)		
	Riviera Unit 3 - offline for modernization	(280)	(277)		
	Riviera Unit 4 - offline for modernization	(291)	(288)		
	Cape Canaveral Unit 1 - offline for modernization	---	(396)		
	Cape Canaveral Unit 2 - offline for modernization	---	(396)		
	Changes to Existing Units	149	15		
	Inactive Reserve of Existing Units - offline (8)	(775)	(769)	43.1%	23.7%
2011	Changes to Existing Purchases (4)	(90)	(45)		
	Cape Canaveral Unit 1 - offline for modernization	(398)	---		
	Cape Canaveral Unit 2 - offline for modernization	(398)	---		
	West County Unit 3 (5)	---	1,219		
	Inactive Reserve of Existing Units - offline (8)	(394)	(1,171)		
	Changes to Existing Units	0	0	35.9%	25.4%
2012	Changes to Existing Purchases (4)	---	(100)		
	West County Unit 3 (5)	1,335	---		
	Changes to Existing Units	3	3		
	Inactive Reserve of Existing Units - offline (8)	(783)	---		
	Existing Nuclear Units Capacity Uprates - St. Lucie 1	103	103		
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	---	88		
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	---	104	38.2%	25.2%
2013	Changes to Existing Purchases (4)	(180)	---		
	Cape Canaveral Next Generation Clean Energy Center	---	1,210		
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	88	---		
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	104	---		
	Existing Nuclear Units Capacity Uprates - Turkey Point 4	104	104	37.5%	31.7%
2014	Cape Canaveral Next Generation Clean Energy Center	1,355	---		
	Riviera Beach Next Generation Clean Energy Center	---	1,212	37.8%	30.8%
2015	Riviera Beach Next Generation Clean Energy Center	1,344	---	40.9%	29.7%
2016	Changes to Existing Purchases (4)	(931)	(1,306)	34.4%	22.0%
2017	Changes to Existing Purchases (4)	(375)	---	30.7%	20.4%
2018	Inactive Reserve of Existing Units - online (8)	0	392	28.6%	19.9%
2019	Inactive Reserve of Existing Units - online (8)	394	387	28.4%	19.8%
	TOTALS =	**84**	**39**		

(1) Additional information about these resulting reserve margins and capacity changes are found on Schedules 7 & 8 respectively.

(2) Winter values are forecasted values for January of the year shown. FPL's actual 2010 Winter peak was significantly higher than forecasted.

(3) Summer values are forecasted values for August of the year shown.

(4) These are firm capacity and energy contracts with QF, utilities, and other entities. See Table I.B.1 and Table I.B.2 for more details.

(5) All new unit additions are scheduled to be in-service in June of the year shown. All additions assumed to start in June are included in the Summer reserve margin calculation starting in that year and in the Winter reserve margin calculation starting with the next year.

(6) Because of the intermittent nature of the photovoltaics (PV) resource, FPL is currently assigning no firm capacity benefit to these generating additions. FPL will reassess this once actual operating data from the PV facilities at these locations is available. This location-specific information is needed in order to gauge consistent output during the peak hours which are accounted for in FPL's reserve margin calculations.

(7) The Martin solar thermal facility is designed to provide steam for FPL's existing Martin Unit 8 combined cycle unit, thus reducing FPL's use of natural gas. No additional capacity (MW) will result from the operation of the solar thermal facility.

(8) A number of existing FPL power plants are being temporarily removed from service and placed on Inactive Reserve status. FPL plans to return these units to active service in the future as needed. The timing of the return of these units to full-time active status is uncertain at this time primarily due to the uncertainty regarding FPL's future load. However, for planning purposes, FPL is showing in this document that these units begin to return to active service starting in 2018.

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

CHAPTER I

Description of Existing Resources

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

I. Description of Existing Resources

FPL's service area contains approximately 27,650 square miles and has a population of approximately 8.7 million people. FPL served an average of 4,499,067 customer accounts in thirty-five counties during 2009. These customers were served from a variety of resources including: FPL-owned fossil and nuclear generating units, non-utility owned generation, demand side management (DSM), and interchange/purchased power.

I.A. FPL-Owned Resources

The existing FPL generating resources are located at sixteen generating sites distributed geographically around its service territory and also include partial ownership of one unit located in Georgia and two units located in Jacksonville, Florida. The current generating facilities consist of four nuclear units, three coal units, fourteen combined cycle (CC) units, seventeen fossil steam units, forty-eight combustion gas turbines, one simple cycle combustion turbine and one photovoltaic facility. The location of these eighty-eight firm generating units is shown on Figure I.A.1 and in Table I.A.1. Table I.A.2 provides a "break down" of the capacity provided by the combustion turbine (CT) and steam turbine (ST) components of FPL's existing CC units.

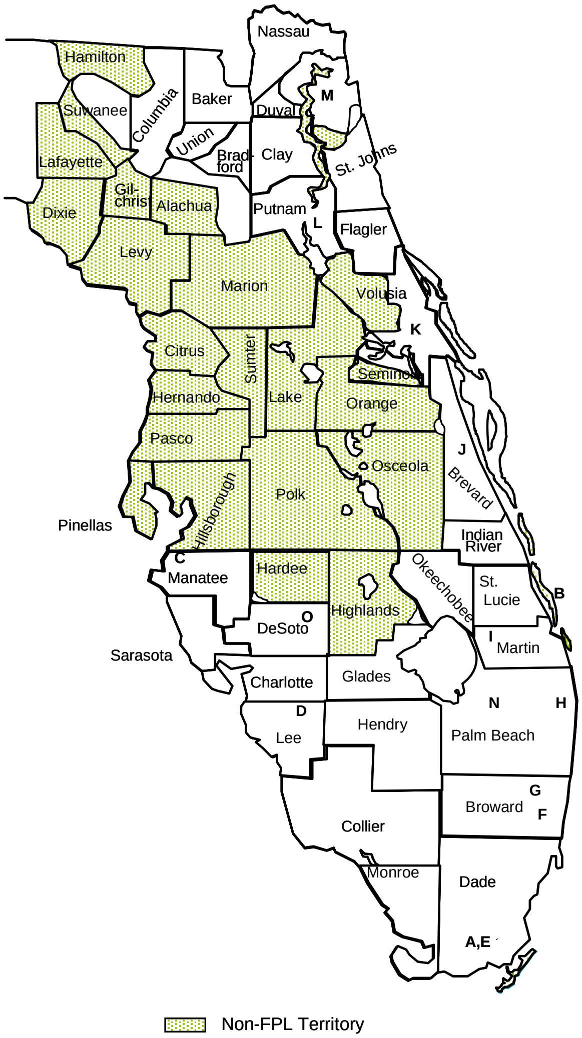
FPL's bulk transmission system is comprised of 6,727 circuit miles of transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL's 585 substations in Florida.

The existing FPL system, including generating plants, major transmission stations, and transmission lines, is shown on Figure I.A.2. In addition, Figure I.A.3 shows FPL's interconnection ties with other utilities.

EXHIBIT 29

FPL Generating Resources by Location

Location/ Map Key	Plant Name	Number of Units	Summer MW
A	Turkey Point	5	3,322
B	St. Lucie *	2	1,553
C	Manatee	3	2,735
D	Fort Myers	2	1,755
E	Cutler	2	205
F	Lauderdale	2	884
G	Port Everglades	4	1,205
H	Riviera	2	565
I	Martin	5	3,695
J	Cape Canaveral	2	792
K	Sanford	3	2,050
L	Putnam	2	498
M	SJRPP **	2	254
N	West County Energy Center	2	2,438
O	DeSoto ***	1	25
	Scherer ****	1	646
	Gas Turbines	48	1,908
Total System Generating Capacity =		**88**	**24,530**
System Firm Generating Capacity =		**87**	**24,505**



* Represents FPL's ownership share: St Lucie nuclear: 100% unit 1, 85% unit 2: St. Johns River: 20% of two units.

** SJRPP = St. John's River Power Park

*** The 25 MW of PV at DeSoto is considered as non-firm generating capacity.

**** The Scherer unit is located in Georgia and is not shown on this map.

Figure I.A.1: Capacity Resources by Location (as of December 31, 2009)

EXHIBIT 29

Table I.A.1: Capacity Resource by Unit Type (as of December 31, 2009)

Unit Type/ Plant Name	Location	Number of Units	Fuel	Summer MW
Nuclear				
Turkey Point	Florida City, FL	2	Nuclear	1,386
St. Lucie *	Hutchinson Island, FL	2	Nuclear	1,553
Total Nuclear		**4**		**2,939**
Coal Steam				
SJRPP **	Jacksonville, FL	2	Coal	254
Scherer	Monroe County, Ga	1	Coal	646
Total Coal Steam		**3**		**900**
Combined-Cycle * **				
Lauderdale	Dania, FL	2	Gas/Oil	884
Martin	Indiantown,FL	2	Gas	938
Martin	Indiantown,FL	1	Gas/Oil	1,105
Sanford	Lake Monroe, FL	2	Gas	1,912
Putnam	Palatka, FL	2	Gas/Oil	498
Fort Myers	Fort Myers, FL	1	Gas	1,440
Manatee	Parrish,FL	1	Gas	1,111
Turkey Point	Florida City, FL	1	Gas	1,148
West County Energy Center		2	Gas/Oil	2,438
Total Combined Cycle		**14**		**11,474**
Oil/Gas Steam				
Cape Canaveral	Cocoa, FL	2	Oil/Gas	792
Cutler	Miami, FL	2	Gas	205
Manatee	Parrish, FL	2	Oil/Gas	1,624
Martin	Indiantown,FL	2	Oil/Gas	1,652
Port Everglades	Port Everglades, FL	4	Oil/Gas	1,205
Riviera	Riviera Beach, FL	2	Oil/Gas	565
Sanford	Lake Monroe, FL	1	Oil/Gas	138
Turkey Point	Florida City, FL	2	Oil/Gas	788
Total Oil/Gas Steam		**17**		**6,969**
Gas Turbines(GT)/Diesels(IC)				
Lauderdale (GT)	Dania, FL	24	Gas/Oil	840
Port Everglades (GT)	Port Everglades, FL	12	Gas/Oil	420
Fort Myers (GT)	Fort Myers, FL	12	Oil	648
Total Gas Turbines/Diesels		**48**		**1,908**
Combustion Turbines * **				
Fort Myers ****	Fort Myers, FL	1	Gas/Oil	315
Total Combustion Turbines		**1**		**315**
PV				
DeSoto *****	DeSoto, FL	1	Solar Energy	25
Total PV		**1**		**25**
Total System Generating Capacity as of December 31, 2009 =		**88**		**24,530**
System Firm Generating Capacity as of December 31, 2009 =		**87**		**24,505**

* Total capability of each unit is 853/839 MW. FPL's ownership share of St. Lucie 1 and 2 is 100% and 85%, respectively. Capabilities shown represent FPL's output share from each of the units (approx. 92.5% and exclude the Orlando Utilities Commission (OUC) and Florida Municipal Power Agency (FMPA) combined portion of approximately 7.44776% per unit.

** Represents FPL's ownership share: SJRPP coal: 20% of two units

*** The Combined Cycles and Combustion Turbines are broken down by components on Table 1.A.2.

**** This unit consists of two combustion turbines.

***** The 25 MW of PV at DeSoto is considered non-firm generating capacity.

EXHIBIT 29

Table I.A.2: Combined Cycle and Combustion Turbine Components

Combined-Cycle

	Summer MW *								
Plant Name/ Unit No.	CT A	CT B	CT C	CT D	CT E	CT F	Steam 1	Steam 2	Total Unit MW
Ft Myers 2	158	158	158	158	158	158	59	432	1,440
Lauderdale 4	158	158	---	---	---	---	127	---	442
Lauderdale 5	158	158	---	---	---	---	127	---	442
Manatee 3	164	164	164	164	---	---	457	---	1,111
Martin 3	163	163	---	---	---	---	144	---	469
Martin 4	163	163	---	---	---	---	144	---	469
Martin 8	160	160	160	160	---	---	464	---	1,105
Putnam 1	70	70	---	---	---	---	110	---	249
Putnam 2	70	70	---	---	---	---	110	---	249
Sanford 4	161	161	161	161	---	---	316	---	958
Sanford 5	160	160	160	160	---	---	315	---	954
Turkey Point 5	174	174	174	174	---	---	451	---	1,147
West County Energy Center 1	243	243	243	---	---	---	492	---	1,219
West County Energy Center 2	243	243	243	---	---	---	492	---	1,219

Combustion Turbines

Ft. Myers 3	158	158	---	---	---	---	---	---	315

This table shows the breakdown of total MW for each unit by CT and steam component.

* The total MW values shown in this table may differ slightly from values shown in other tables due to rounding of per-component values.

EXHIBIT 29

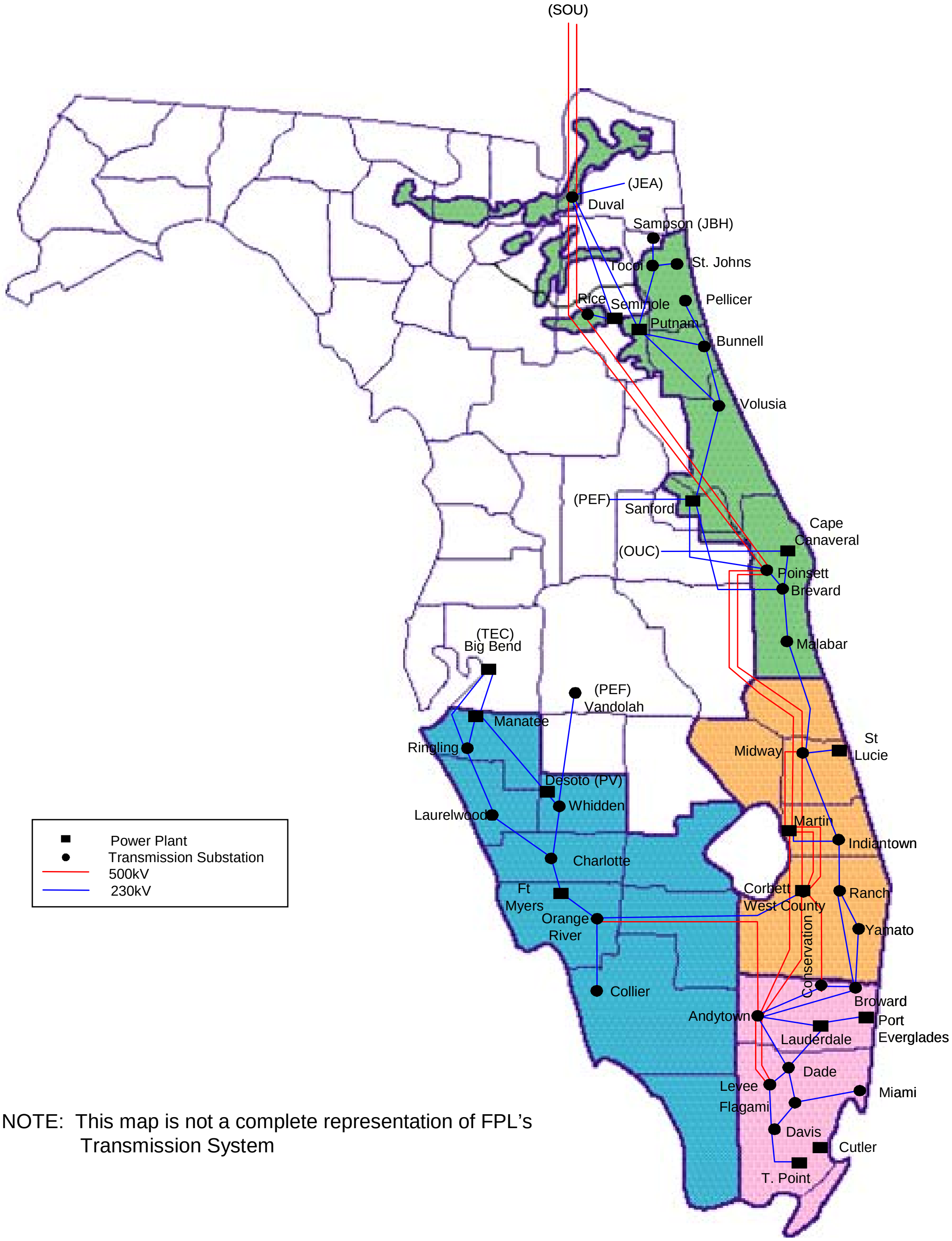
Table 1.A.3: Purchase Power Resources by Contract (as of December 31, 2009)

	Location (City or County)	**Fuel**	**Summer MW**
I. Purchases from QF's: Cogeneration/Small Power Production Facilities			
Cedar Bay Generating Co.	Duval County	Coal (Cogen)	250
Indiantown Cogen., LP	Martin County	Coal (Cogen)	330
Broward South	Broward County	Solid Waste	4
Broward North	Broward County	Solid Waste	57
Palm Beach SWA	Palm Beach County	Solid Waste	50
		Total:	**691**
II. Purchases from Utilities:			
UPS from Southern Company	Various	Coal	931
SJRPP	Jacksonville, FL	Coal	381
		Total:	**1,312**
III. Other Purchases:			
Reliant/Indian River	Brevard County	Oil	250
Oleander (Extension)	Brevard County	Gas	156
Williams	Outside of Florida	Gas	106
			512
	Total Net Firm Generating Capability:		**2,515**

Non-Firm Energy Purchases (MWH)

Plant Name	**Location (City or County)**	**Fuel**	**Energy (MWH) Delivered to FPL in 2009**
Okeelanta	Palm Beach	Bagasse/Wood	265,929
Broward South	Broward	Garbage	130,430
Tomoka Farms	Volusia	Landfill Gas	16,436
Tropicana	Manatee	Natural Gas	53,517
Calnetix	Palm Beach	Natural Gas	44
Georgia Pacific	Putnam	Paper by-product	2,855
Rothenbach Park	Sarasota	PV	317
Customer Owned PV	Various	PV	84

EXHIBIT 29



NOTE: This map is not a complete representation of FPL's Transmission System

Figure I.A.2: FPL Substation and Transmission System Configuration

EXHIBIT 29

FPL Interconnection Diagram

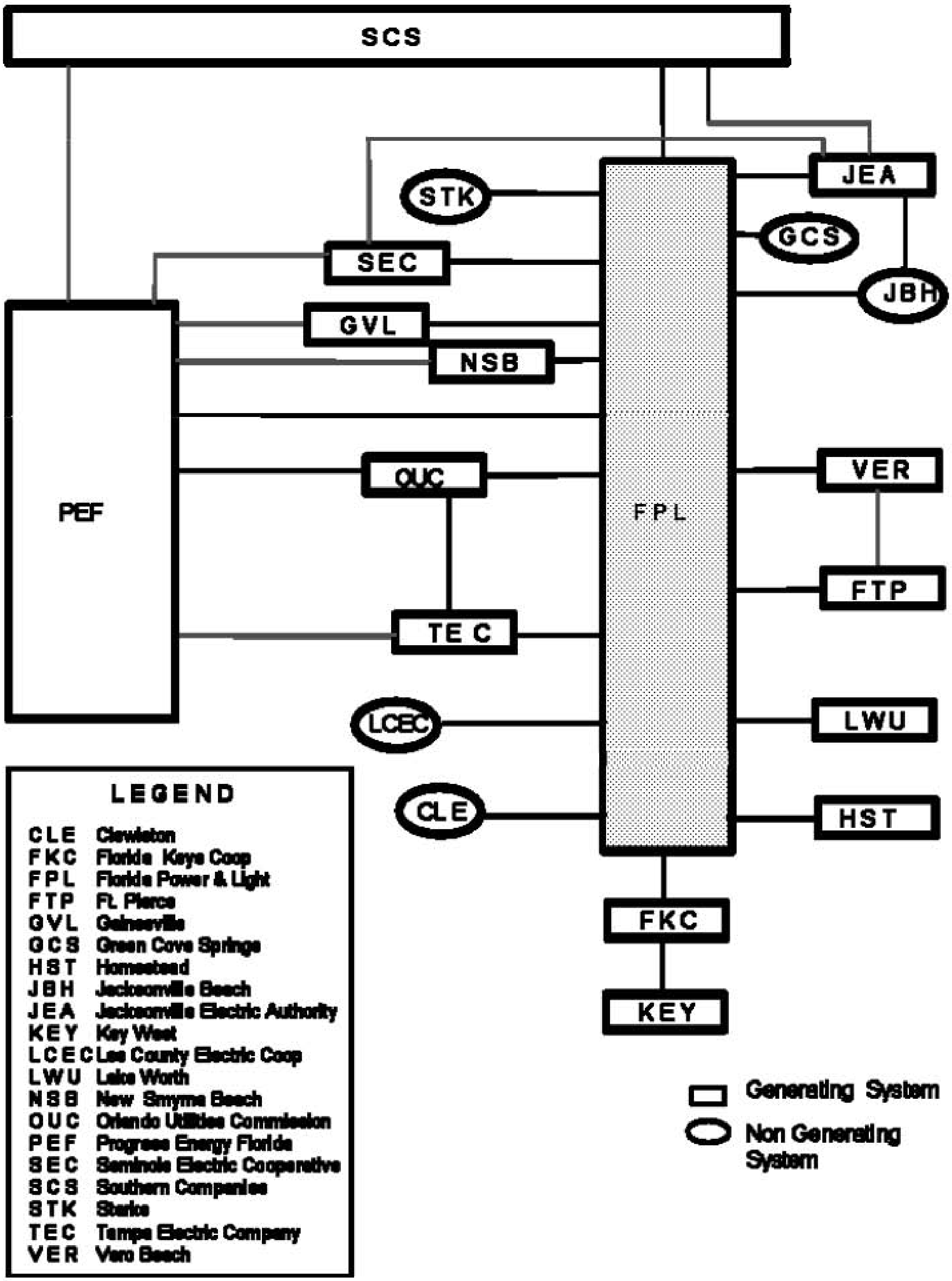


Figure I.A.3: FPL Interconnection Diagram

EXHIBIT 29

I.B Firm Capacity Power Purchases

Purchases from Qualifying Facilities (QF):

Firm capacity power purchases are an important part of FPL's resource mix. FPL currently has contracts with five qualifying facilities; i.e., cogeneration/small power production facilities, to purchase firm capacity and energy as shown in Table I.A.2, Table I.B.1, and I.B.2.

A cogeneration facility is one which simultaneously produces electrical and thermal energy, with the thermal energy (e.g., steam) being used for industrial, commercial, or cooling and heating purposes. A small power production facility is one which does not exceed 80 MW (unless it is exempted from this size limitation by the Solar, Wind, Waste, and Geothermal Power Production Incentives Act of 1990) and uses as its primary energy source (at least 50%) solar, wind, waste, geothermal, or other renewable resources.

Purchases from Utilities:

FPL has a Unit Power Sales (UPS) contract to purchase 931 MW, with a minimum of 380 MW, of coal-fired generation from the Southern Company (Southern) through May 2010. At the expiration of this contract, another contract with Southern will result in FPL receiving 930 MW from June 2010 through the end of December 2015. This capacity will be supplied by Southern from a mix of gas-fired and coal-fired units.

In addition, FPL has contracts with the Jacksonville Electric Authority (JEA) for the purchase of 381 MW (Summer) and 375 MW (Winter) of coal-fired generation from the St. John's River Power Park (SJRPP) Units No. 1 and No. 2. However, due to Internal Revenue Service (IRS) regulations, the total amount of energy that FPL may receive from this purchase is limited. FPL currently assumes, for planning purposes, that this limit will be reached in the first half of 2016. Once this limit is reached, FPL will be unable to receive firm capacity and energy from these purchases. (However, FPL will continue to receive firm capacity and energy from its ownership portion of the SJRPP units.)

These purchases are shown in Table I.A.2, Table I.B.1, and Table I.B.2. FPL also has ownership interest in the SJRPP units. The ownership amount is reflected in FPL's installed capacity shown on Figure I.A.1, in Table I.A.1, and on Schedule 1.

EXHIBIT 29

Other Purchases:

FPL has other firm capacity purchase contracts with a variety of Non-QF suppliers. These purchases are generally near-term in nature. Table I.B.1 and I.B.2 present the Summer and Winter MW, respectively, resulting from all firm purchased power contracts discussed above through the year 2019.

EXHIBIT 29

Table I.B.1: FPL's Firm Purchased Power Summer MW

Summary of FPL's Firm Capacity Purchases: Summer MW (for August of Year Shown)

I. Purchases from QF's:

Cogeneration/Small Power Production Facilities	Contract Start Date	Contract End Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Broward South	01/01/93	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward South	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward South	01/01/97	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward North	04/01/92	12/31/10	45	0	0	0	0	0	0	0	0	0
Broward North	01/01/93	12/31/26	7	7	7	7	7	7	7	7	7	7
Broward North	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward North	01/01/97	12/31/26	3	3	3	3	3	3	3	3	3	3
Cedar Bay Generating Co.	01/25/94	12/31/24	250	250	250	250	250	250	250	250	250	250
Indiantown Cogen., LP	12/22/95	12/01/25	330	330	330	330	330	330	330	330	330	330
Palm Beach SWA	04/01/92	03/31/10	0	0	0	0	0	0	0	0	0	0
Palm Beach SWA-extension	04/01/12	04/01/32	0	0	55	55	55	55	55	55	55	55
		QF Purchases Sub Total:	**640**	**595**	**650**	**650**	**650**	**650**	**650**	**650**	**650**	**650**

II. Purchases from Utilities:

	Contract Start Date	Contract End Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
UPS Replacement	06/01/10	12/31/15	930	930	930	930	930	930	0	0	0	0
SJRPP	04/02/82	4/1/2016 *	375	375	375	375	375	375	0	0	0	0
		Utility Purchases Sub Total:	**1,305**	**1,305**	**1,305**	**1,305**	**1,305**	**1,305**	**0**	**0**	**0**	**0**

Total of QF and Utility Purchases =	**1,945**	**1,900**	**1,955**	**1,955**	**1,955**	**1,955**	**650**	**650**	**650**	**650**

III. Other Purchases:

	Contract Start Date	Contract End Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Oleander (Extension)	06/01/07	05/31/12	155	155	0	0	0	0	0	0	0	0
		Other Purchases Sub Total:	**155**	**155**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Total "Non-QF" Purchase Sub-Total =	**1,460**	**1,460**	**1,305**	**1,305**	**1,305**	**1,305**	**0**	**0**	**0**	**0**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Summer Firm Capacity Purchases Total MW:	**2,100**	**2,055**	**1,955**	**1,955**	**1,955**	**1,955**	**650**	**650**	**650**	**650**

* Contract End Date shown does not represent the actual contract date. Instead, this date represents a projection of the date at which FPL's ability to receive further capacity and energy from this purchase will be suspended due to IRS regulations.

EXHIBIT 29

Table I.B.2: FPL's Firm Purchased Power Winter MW

Summary of FPL's Firm Capacity Purchases: Winter MW (for January of Year Shown)

I. Purchases from QF's:

Cogeneration/Small Power Production Facilities	Start Date	End Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Broward South	01/01/93	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward South	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward South	01/01/97	12/31/26	1	1	1	1	1	1	1	1	1	1
Broward North	04/01/92	12/31/10	45	0	0	0	0	0	0	0	0	0
Broward North	01/01/93	12/31/26	7	7	7	7	7	7	7	7	7	7
Broward North	01/01/95	12/31/26	2	2	2	2	2	2	2	2	2	2
Broward North	01/01/97	12/31/26	3	3	3	3	3	3	3	3	3	3
Cedar Bay Generating Co.	01/25/94	12/31/24	250	250	250	250	250	250	250	250	250	250
Indiantown Cogen., LP	12/22/95	12/01/25	330	330	330	330	330	330	330	330	330	330
Palm Beach SWA	04/01/92	03/31/10	50	0	0	0	0	0	0	0	0	0
Palm Beach SWA-extension	04/01/12	04/01/32	0	0	0	55	55	55	55	55	55	55
QF Purchases Sub Total:			**690**	**595**	**595**	**650**	**650**	**650**	**650**	**650**	**650**	**650**

II. Purchases from Utilities:

	Start Date	End Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
UPS from Southern Co.	07/20/88	05/31/10	926	0	0	0	0	0	0	0	0	0
UPS Replacement	06/01/10	12/31/15	0	930	930	930	930	930	0	0	0	0
SJRPP	04/02/82	4/1/2016 *	375	375	375	375	375	375	375	0	0	0
Utility Purchases Sub Total:			**1,301**	**1,305**	**1,305**	**1,305**	**1,305**	**1,305**	**375**	**0**	**0**	**0**

Total of QF and Utility Purchases =	**1,991**	**1,900**	**1,900**	**1,955**	**1,955**	**1,955**	**1,025**	**650**	**650**	**650**

III. Other Purchases:

	Contract Start Date	Contract End Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Oleander (Extension)	06/01/07	05/31/12	180	180	180	0	0	0	0	0	0	0
Other Purchases Sub Total:			**180**	**180**	**180**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

"Non-QF" Purchase Sub-Total =	**1,481**	**1,485**	**1,485**	**1,305**	**1,305**	**1,305**	**375**	**0**	**0**	**0**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Winter Firm Capacity Purchases Total MW:	**2,171**	**2,080**	**2,080**	**1,955**	**1,955**	**1,955**	**1,025**	**650**	**650**	**650**

* Contract End Date shown does not represent the actual contract date. Instead, this date represents a projection of the date at which FPL's ability to receive further capacity and energy from this purchase will be suspended due to IRS regulations.

EXHIBIT 29

I.C Non-Firm (As Available) Energy Purchases

FPL purchases non-firm (as-available) energy from several cogeneration and small power production facilities. Table I.C.1 shows the amount of energy purchased in 2009 from these facilities.

Table I.C.1: As-Available Energy Purchases From Non-Utility Generators in 2009

Project	*County*	*Fuel*	*In-Service Date*	*Energy (MWH) Delivered to FPL in 2009*
Okeelanta	Palm Beach	Bagasse/Wood	11/95	265,929
Broward South	Broward	Garbage	9/09	130,430
Tomoka Farms	Volusia	Landfill Gas	7/98	16,436
Tropicana	Manatee	Natural Gas	2/90	53,517
Calnetix	Palm Beach	Natural Gas	7/05	44
Georgia Pacific	Putnam	Paper by-product	2/94	2,855
Rothenbach Park	Sarasota	PV	10/07	317
Customer Owned PV	Various	PV	Various	84

I.D. Demand Side Management (DSM)

FPL has sought out and implemented cost-effective DSM programs since 1978. These programs include a number of conservation/energy efficiency and load management initiatives. FPL's DSM efforts through 2009 have resulted in a cumulative Summer peak reduction of approximately 4,257 MW at the generator and an estimated cumulative energy saving of approximately 51,056 Gigawatt-hour (GWh) at the generator. After accounting for reserve margin requirements, FPL's DSM efforts through 2009 have eliminated the need to construct the equivalent of approximately 13 new 400 MW generating units.

In late 2009, the Florida Public Service Commission (FPSC) imposed new goals for DSM implementation for the period 2010 through 2019. The FPSC-imposed DSM goals for FPL were significantly higher (approximately 225%) than the amount of DSM that was projected in 2009 to meet 100% of FPL's remaining resource needs through 2019. This 2009 projection of FPL's resource needs was based on FPL's 2009 load forecast.

FPL's 2010 load forecast for the 2010 – 2019 time period is substantially lower than FPL's 2009 load forecast. As a result of this lower load forecast, FPL's projected

EXHIBIT 29

resource needs for 2010 – 2019 have also been lowered substantially below the 2009 projection. Consequently, the amount by which the FPSC-imposed DSM goals exceed FPL’s projected resource needs has increased even further.

The impact of this fact on FPL’s resource plan is discussed (along with other factors that impact the resource plan) in Chapter III of this document. Also, a discussion of FPL’s DSM programs is presented in Chapter III.

EXHIBIT 29

Schedule 1

Existing Generating Facilities
As of December 31, 2009

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel Pri.	Fuel Alt.	Fuel Transport. Pri.	Fuel Transport. Alt.	Alt. Fuel Days Use	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen.Max. Nameplate KW	Net Capability[1/] Winter MW	Net Capability[1/] Summer MW
Cape Canaveral		Brevard County											
		19/24S/36F									804,100	796	792
	1		ST	FO6	NG	WA	PL	Unknown	Apr-65	Unknown	402,050	398	396
	2		ST	FO6	NG	WA	PL	Unknown	May-69	Unknown	402,050	398	396
Cutler		Miami Dade County											
		27/55S/40E									236,500	207	205
	5		ST	NG	No	PL	No	Unknown	Nov-54	Unknown	75,000	69	68
	6		ST	NG	No	PL	No	Unknown	Jul-55	Unknown	161,500	138	137
DeSoto[2/]		DeSoto County	Photovoltaic										
	1	27/36S/25E									25,000	25	25
			PV	N/A	N/A	N/A	N/A	Unknown	10/27/2009	Unknown	25,000	25	25
Fort Myers		Lee County											
		35/43S/25E									2,895,890	2,660	2,403
	2		CC	NG	No	PL	No	Unknown	Jun-02	Unknown	1,775,390	1,570	1,440
	3A & B		CT	NG	FO2	PL	PL	Unknown	Jun-03	Unknown	376,380	370	315
	1-12		GT	FO2	No	PL	No	Unknown	May-74	Unknown	744,120	720	648
Lauderdale		Broward County											
		30/50S/42E									1,873,968	1,930	1,724
	4		CC	NG	FO2	PL	PL	Unknown	May-93	Unknown	526,250	485	442
	5		CC	NG	FO2	PL	PL	Unknown	Jun-93	Unknown	526,250	485	442
	1-12		GT	NG	FO2	PL	PL	Unknown	Aug-70	Unknown	410,734	480	420
	13-24		GT	NG	FO2	PL	PL	Unknown	Aug-72	Unknown	410,734	480	420
Manatee		Manatee County											
		18/33S/20E									2,951,110	2,831	2,735
	1		ST	FO6	NG	WA	PL	Unknown	Oct-76	Unknown	863,300	822	812
	2		ST	FO6	NG	WA	PL	Unknown	Dec-77	Unknown	863,300	822	812
	3		CC	NG	No	PL	No	Unknown	Jun-05	Unknown	1,224,510	1,187	1,111

1/ These ratings are peak capability.

2/ The capacity shown for the PV facility at DeSoto is considered as non-firm generating capacity due to the intermittent nature of the solar resource.

EXHIBIT 29

Schedule 1

Existing Generating Facilities
As of December 31, 2009

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel Pri.	Fuel Alt.	Fuel Transport Pri.	Fuel Transport Alt.	Alt. Fuel Days Use	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen.Max. Nameplate KW	Net Capability [1/] Winter MW	Net Capability [1/] Summer MW
Martin		Martin County											
		29/29S/38E									4,317,510	3,840	3,695
	1		ST	FO6	NG	PL	PL	Unknown	Dec-80	Unknown	934,500	832	826
	2		ST	FO6	NG	PL	PL	Unknown	Jun-81	Unknown	934,500	832	826
	3		CC	NG	No	PL	No	Unknown	Feb-94	Unknown	612,000	498	469
	4		CC	NG	No	PL	No	Unknown	Apr-94	Unknown	612,000	498	469
	8*		CC	NG	FO2	PL	PL	Unknown	Jun-05	Unknown	1,224,510	1,180	1,105
Port Everglades		City of Hollywood											
		23/50S/42E									1,665,334	1,691	1,625
	1		ST	FO6	NG	WA	PL	Unknown	Jun-60	Unknown	225,250	214	213
	2		ST	FO6	NG	WA	PL	Unknown	Apr-61	Unknown	225,250	214	213
	3		ST	FO6	NG	WA	PL	Unknown	Jul-64	Unknown	402,050	389	387
	4		ST	FO6	NG	WA	PL	Unknown	Apr-65	Unknown	402,050	394	392
	1-12		GT	NG	FO2	PL	PL	Unknown	Aug-71	Unknown	410,734	480	420
Putnam		Putnam County											
		16/10S/27E									580,008	536	498
	1		CC	NG	FO2	PL	WA	Unknown	4/1/1978	Unknown	290,004	268	249
	2		CC	NG	FO2	PL	WA	Unknown	8/1/1977	Unknown	290,004	268	249
Riviera		City of Riviera Beach											
		33/42S/43E									620,840	571	565
	3		ST	FO6	NG	WA	PL	Unknown	Jun-62	Unknown	310,420	280	277
	4		ST	FO6	NG	WA	PL	Unknown	Mar-63	Unknown	310,420	291	288
Sanford		Volusia County											
		16/19S/30E									2,533,970	2,217	2,050
	3		ST	FO6	NG	WA	PL	Unknown	May-59	Unknown	156,250	140	138
	4		CC	NG	No	PL	No	Unknown	Oct-03	Unknown	1,188,860	1,040	958
	5		CC	NG	No	PL	No	Unknown	Jun-02	Unknown	1,188,860	1,037	954

1/ These ratings are peak capability.

* Martin 8 A and B combustion turbine units went into service on 6/14/2001 and the conversion to Combined Cycle went into service 6/30/2005.

EXHIBIT 29

Schedule 1

Existing Generating Facilities
As of December 31, 2009

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						Fuel		Alt. Fuel	Commercial	Expected	Gen.Max.	Net Capability [1]	
	Unit		Unit	Fuel		Transport		Days	In-Service	Retirement	Nameplate	Winter	Summer
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Use	Month/Year	Month/Year	KW	MW	MW
Scherer 2/		Monroe, GA									680,368	652	646
	4		BIT	SUB	No	RR	No	Unknown	Jul-89	Unknown	680,368	652	646
St. Johns River Power Park [3]		Duval County 12/15/28E (RPC4)									271,836	250	254
	1		BIT	BIT	Pet	RR	WA	Unknown	Mar-87	Unknown	135,918	125	127
	2		BIT	BIT	Pet	RR	WA	Unknown	May-88	Unknown	135,918	125	127
St. Lucie		St. Lucie County 16/36S/41E									1,573,775	1,579	1,553
	1		NP	UR	No	TK	No	Unknown	May-76	Unknown	850,000	853	839
	2	[4]	NP	UR	No	TK	No	Unknown	Jun-83	Unknown	723,775	726	714
Turkey Point		Miami Dade County 27/57S/40E									3,548,550	3,405	3,322
	1		ST	FO6	NG	WA	PL	Unknown	Apr-67	Unknown	402,050	398	396
	2		ST	FO6	NG	WA	PL	Unknown	Apr-68	Unknown	402,050	394	392
	3		NP	UR	No	TK	No	Unknown	Nov-72	Unknown	759,970	717	693
	4		NP	UR	No	TK	No	Unknown	Jun-73	Unknown	759,970	717	693
	5		CC	NG	FO2	PL	PL	Unknown	May-07	Unknown	1,224,510	1,179	1,148
West County Energy Center		Palm Beach County 29&32/43S/40E									2,733,600	2,670	2,438
	1		CC	NG	FO2	PL	PL	Unknown	Aug-09	Unknown	1,366,800	1,335	1,219
	2		CC	NG	FO2	PL	PL	Unknown	Nov-09	Unknown	1,366,800	1,335	1,219
Total System Generating Capacity as of December 31, 2009 [5] =												**25,860**	**24,530**
System Firm Generating Capacity as of December 31, 2009 [6] =												**25,835**	**24,505**

1/ These ratings are peak capability.
2/ These ratings represent Florida Power & Light Company's share of Scherer Unit No. 4, adjusted for transmission losses.
3/ The net capability ratings represent Florida Power & Light Company's share of St. Johns River Park Unit No. 1 and No. 2, excluding Jacksonville Electric Authority (JEA) share of 80%.
4/ Total capability of each unit is 853/839 MW. FPL's ownership share of St. Lucie 1 and 2 is 100%(853/839) and 85% (714/726) respectively as shown above. FPL's share of the deliverable capacity from each unit is approx. 92.5% and exclude the Orlando Utilities Commission (OUC) and Florida Municipal Power Agency (FMPA) combined portion of approximately 7.44776% per unit.
5/ The Total System Generating Cpacity value shown includes FPL-owned firm and non-firm generating capacity.
6/ The System Firm Generating Capacity value shown includes only firm generating capacity.

EXHIBIT 29

CHAPTER II

Forecast of Electric Power Demand

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

II. Forecast of Electric Power Demand

II. A. Overview of the Load Forecasting Process

Long-term (20-year) forecasts of sales, net energy for load (NEL), and peak loads are typically developed on an annual basis for resource planning work at FPL. New long-term forecasts were developed by FPL in early 2010 that replaced the previous long-term load forecasts that were used by FPL during 2009 in much of its resource planning work and which were presented in FPL's 2009 Site Plan. These new load forecasts are utilized throughout FPL's 2010 Site Plan. These forecasts are a key input to the models used to develop FPL's integrated resource plan. The following pages describe how forecasts are developed for each component of the long-term forecast: sales, NEL, and peak loads.

Consistent with past forecasts, the primary drivers to develop these forecasts include economic conditions and weather.

The projections for the national and Florida economies are obtained from the consulting firm IHS Global Insight. Population projections are obtained from the Bureau of Economic and Business Research (BEBR) of the University of Florida. These inputs are quantified and qualified using statistical models in terms of their impact on the future demand for electricity.

Weather is always a key factor that affects FPL's energy sales and peak demand. Two sets of weather variables are developed and used in FPL's forecasting models:

1. Cooling and Heating Degree-Hours are used to forecast energy sales.
2. Temperature data, along with Cooling and Heating Degree-Hours, are used to forecast Summer and Winter peaks.

The Cooling and Heating Degree-Hours are used to capture the changes in the electric usage of weather-sensitive appliances such as air conditioners and electric space heaters. A composite temperature hourly profile is derived using hourly temperatures across FPL's service territory. Miami, Ft. Myers, Daytona Beach, and West Palm Beach are the locations from which temperatures are obtained. In developing the composite hourly profile, these regional temperatures are weighted by regional energy sales. This composite temperature is used to derive Cooling and Heating Degree-Hours, which are based on starting point temperatures of 72^{o} F and 66^{o} F degrees, respectively. Similarly,

EXHIBIT 29

composite temperature and hourly profile of temperatures are used for the Summer and Winter peak models.

II. B. Comparison of FPL’s Current and Previous Load Forecasts

While reflecting somewhat lower growth in the later years of the forecast, FPL’s current load forecast is generally in line with the load forecast presented in its 2009 Site Plan. There are two primary factors that are driving the current load forecast: projected population growth, and the lingering effects of the economic recession in Florida.

The customer forecast is based on recent population projections. Population projections are derived from the University of Florida’s January 2010 population projections which are lower than prior projections. In fact, in 2009, Florida’s population declined for the first time since World War II. According to the University of Florida, net migration has fallen to a record low as a result of the economic slowdown and is expected to remain at historically low levels through 2010, then gradually increase. Consequently, FPL is projecting that customer growth in 2010 will be significantly below its historical average. As population growth recovers, a modest rebound in customer growth is projected in 2011 and 2012. However, population growth is not expected to reach the level historically experienced in Florida until 2014. As a result of lower growth, the total number of customers projected in the current load forecast is below the levels projected in FPL’s 2009 Site Plan.

Consistent with the economic assumptions incorporated into the 2009 Site Plan, the state’s economy continues to suffer the lingering effects of an economic recession. Over the last year, Florida has lost nearly a quarter-of-a-million jobs and is second only to California in the number of mortgage foreclosures. The severity of current economic conditions suggests that Florida’s economic recovery will be gradual. By 2012, the state’s economy is projected to resume a more historically typical rate of growth.

Although the projected load growth in the later years of the forecast is generally below that presented in FPL’s 2009 Site Plan, the total growth projected for the ten-year reporting period of this document is still significant. The Summer peak is projected to increase to 25,785 MW by 2019, an increase of 3,434 MW over the 2009 actual Summer peak. Likewise, NEL is projected to reach 131,712 GWH in 2019, an increase of 20,408 GWH from the actual 2009 value.

EXHIBIT 29

II.C. Long-Term Sales Forecasts

Long-term forecasts of electricity sales were developed for each revenue class and are adjusted to match the NEL forecast. The results of these sales forecasts for the years 2010 - 2019 are presented in Schedules 2.1 - 2.3 which appear at the end of this chapter. Econometric models are developed for each revenue class using the statistical software package MetrixND. The methodologies used to develop energy sales forecasts for each jurisdictional revenue class and NEL forecast are outlined below.

1. Residential Sales

Residential electric usage per customer is estimated by using an econometric model. Residential sales are a function of: Cooling Degree-Hours, Heating Degree-Hours, lagged Cooling Degree-Hours, lagged Heating Degree-Hours, real price of electricity (a 12-month moving average), Florida real household disposable income, a variable designed to reflect the impact of empty homes, and a dummy variable for the specific month of November 2005. The impact of weather is captured by the Cooling Degree-Hours, Heating Degree-Hours, and the one month lag of these variables. The price of electricity plays a role in explaining electric usage, because electricity, like all other goods and services, will be used in greater or lesser quantities depending upon its price. To capture economic conditions, the model includes Florida's real household disposable income. The housing crisis has also had an impact on use per customer. Consequently, the model includes a variable designed to capture the impact of empty homes. A dummy variable for November 2005 was included because an analysis of residuals identified that data point as an outlier. Residential energy sales are forecasted by multiplying the residential use per customer forecast by the number of residential customers forecasted.

2. Commercial Sales

The commercial sales forecast is also developed using an econometric model. Commercial sales are a function of the following variables: Florida real household disposable income, commercial real price of electricity (a 12-month moving average), Cooling Degree-Hours, Heating Degree-Hours, lagged Cooling Degree-Hours, a variable designed to reflect the impact of empty homes, seasonal dummy variables for the months of February and December, a dummy variable for the specific month of January 2007, and an autoregressive term. Cooling Degree-Hours, Heating Degree-Hours, and the one month lag of Cooling Degree-Hours are used to capture weather-sensitive load in the commercial sector.

EXHIBIT 29

3. Industrial Sales

The industrial class is comprised of two distinct groups; very small accounts (those with less than 20 kW of demand) and large, traditionally industrial customers. As such, the forecast is developed using a separate econometric model for each group of industrial customer. The small industrial sales model utilizes the following variables: Florida Housing Starts, Cooling Degree-Hours, lagged Cooling Degree-Hours, industrial real price of electricity (a 12-month moving average), and an autoregressive and seasonal autoregressive terms. The Cooling Degree-Hour is used to capture the weather-sensitive load in this group of industrial customers. Florida Housing Starts are reflective of construction activity which comprises a significant portion of this group. The large industrial sales model utilizes the following variables: Florida Housing Starts, industrial real price of electricity (a 12-month moving average), dummy variables for October and November 2004, and an autoregressive term.

4. Railroad and Railways Sales and Street and Highway Sales

The projections for railroad and railways sales are based on historical average use per customer because the number of customers is projected to remain the same. This class consists solely of Miami-Dade County’s Metrorail system.

The forecast for street and highway sales is developed using historical usage patterns and multiplying these usage levels by the number of forecasted customers.

5. Other Public Authority Sales

This revenue class is a closed class with no new customers being added. This class consists of sports fields and a government account. The forecast for this class is based on historical knowledge of its usage characteristics.

6. Total Sales to Ultimate Customer

Sales forecasts by revenue class are summed to produce a total sales forecast.

7. Sales for Resale

Sales for resale (wholesale) customers are composed of municipalities and/or electric co-operatives. These customers differ from jurisdictional customers in that they are not the ultimate users of the electricity they buy. Instead, they resell this electricity to their own customers. Currently there are four customers in this class: the Florida Keys Electric Cooperative; City of Key West; Metro-Dade County; and Lee County

EXHIBIT 29

Electric Cooperative. In addition, FPL will begin making sales to Seminole Electric Cooperative under a long term agreement in June 2014.

FPL provides service to the Florida Keys Electric Cooperative under a long-term partial requirements contract. The sales to Florida Keys Electric Cooperative are forecasted using a regression model.

FPL’s sales to the City of Key West are expected to terminate in 2013. Forecasted sales to the City of Key West are based on assumptions regarding their contract demand and expected load factor.

Metro-Dade County sells 60 MW to Florida Progress. Line losses are billed to Metro-Dade under a wholesale contract.

Lee County has contracted with FPL for FPL to supply a portion of their load beginning in January 2010 and for FPL to supply their total load beginning in January 2014 through December 2033. Forecasted sales to Lee County are based on assumptions regarding their contract demand and expected load factor.

Seminole Electric Cooperative’s contract for delivery of 75 MW expired in December 2009. A new contract included in the forecast is for delivery of 200 MW to Seminole Electric beginning in June 2014.

II.D. Net Energy for Load (NEL)

An econometric model is developed to produce a NEL per customer forecast. The key inputs to the model are: the real price of electricity (a 12-month moving average), Cooling and Heating Degree-Hours, and Florida real household disposable income. In addition, the model also includes variables for mandated energy efficiency and a variable designed to capture the impact of empty homes. Seasonal dummies are included for the months of February, July, and December.

The mandated energy efficiency variables are included to capture the impacts of the 2005 National Energy Policy Act, the 2007 Energy Independence and Security Act, and compact florescent light bulbs. The estimated impact of these programs for the 2010 to 2019 time period is a reduction, on average, of 7,592 GWh per year. The increase in the number of empty homes resulting from the current housing slump has affected use per

EXHIBIT 29

customer and is captured in a separate variable. The forecast was also adjusted for additional load estimated from hybrid cars, beginning in 2010, which resulted in an increase of approximately 322 GWh by the end of the ten-year reporting period.

The NEL forecast is developed by multiplying the NEL per customer forecast by the total number of customers forecasted. Once the NEL forecast is obtained, total billed sales are computed using a historical ratio of sales to NEL. The sales by class forecasts previously discussed are then adjusted to match the total billed sales. The forecasted NEL values for 2010 – 2019 are presented in Schedule 3.3 that appears at the end of this chapter.

II.E. System Peak Forecasts

The rate of absolute growth in FPL system peak load has been a function of the size of the customer base, varying weather conditions, projected economic conditions, changing patterns of customer behavior (including an increased stock of electricity-consuming appliances), and more efficient appliances and lighting. FPL developed the peak forecast models to capture these behavioral relationships. Impacts of the 2005 National Energy Policy Act, the 2007 Energy Independence and Security Act, and the impact of compact fluorescent light bulbs are taken into account in developing the peak forecast. The estimated impact of these federal mandates for the 2010 to 2019 time frame is a reduction of approximately 883 MW (Summer) and 334 MW (Winter) in 2010, and approximately 1,746 MW (Summer) and 941 MW (Winter) by 2019. The forecast was also adjusted for additional load estimated from hybrid cars which resulted in an increase of approximately 65 MW in the Summer and 8 MW in the Winter by the end of the ten-year reporting period.

The forecasting methodology of Summer, Winter, and monthly system peaks is discussed below. The forecasted values for Summer and Winter peak loads for the years 2010 – 2019 are presented in Schedules 3.1 and 3.2 as well as in Schedules 7.1 and 7.2.

1. <u>System Summer Peak</u>

The Summer peak forecast is developed using an econometric model. The variables included in the model are the real price of electricity, Florida real household disposable income, Cooling Degree-Hours in the two days prior to the peak, the average temperature on the day of the peak, and a variable for mandated energy

EXHIBIT 29

efficiency. The model is based on the Summer peak contribution per customer and is, therefore, multiplied by total customers to derive FPL's system Summer peak.

2. System Winter Peak

Like the system Summer peak model, this model is also an econometric model. The model consists of two weather-related variables: the average temperature on the peak day and Heating Degree-Hours for the prior day as well as for the morning of the Winter peak day. In addition, Florida real household disposable income is a variable used in the model. A dummy variable for the year 1996 is also utilized. The forecasted results are adjusted for the impact of mandated energy efficiency. The model is based on the Winter peak contribution per customer and is, therefore, multiplied by total customers to derive FPL's system Winter peak.

3. Monthly Peak Forecasts

The forecasting process for monthly peaks consists of the following actions:

a. Develop the historical seasonal factor for each month by using ratios of historical monthly peaks to the appropriate seasonal peak.

b. Apply the monthly ratios to their respective seasonal peak forecast to derive the peak forecast by month. This process assumes that the seasonal factors remain unchanged over the forecasting period.

II.F. The Hourly Load Forecast

Forecasted values for system hourly load for the period 2010-2019 are produced using a System Load Forecasting "shaper" program. This model uses years of historical FPL hourly system load data to develop load shapes for weekdays, weekend days, and holidays. The model allows calibration of hourly values where the peak is maintained or where both the peak and minimum load-to-peak ratio is maintained.

II.G. Uncertainty

In order to address uncertainty in the forecasts of aggregate peak demand and NEL, FPL first evaluates the assumptions underlying the forecasts. FPL takes a series of steps in evaluating the input variables, including comparing projections from different sources, identifying outliers in the series, and assessing the series' consistency with past

EXHIBIT 29

forecasts. In addition, FPL reviews factors which may affect the input variables. This may require reviewing data from local economic development boards or from FPL's own Customer Service Business Unit. Other factors which may be considered include demographic trends and housing characteristics such as starts, size, and vintage of homes.

Uncertainty is also addressed in the modeling process. Generally, econometric models are used to forecast the aggregate peak demand and NEL. During the modeling process, the relevant statistics (goodness of fit, F-statistic, P-values, mean absolute deviation (MAD), mean absolute percentage error (MAPE), etc.) are scrutinized to ensure that the models adequately explain historical variation. Once a forecast is developed, it is compared with past forecasts. Deviations from past forecasts are examined in light of changes in input assumption to ensure that the drivers underlying the forecast are well understood. Finally, forecasts of aggregate peak demand and NEL are compared with their actual values as they become available. An ongoing process of variance analyses is performed. To the extent that the variance analysis identifies large unexplained deviations between the forecast and actual values, revisions to the econometric model may be considered.

The inherent uncertainty in load forecasting is addressed in different ways in regard to FPL's overall resource planning and operational planning work. In regard to FPL's resource planning work, FPL's utilization of a 20% reserve margin criterion (approved by the FPSC) is designed, in part, to maintain reliable electric service to FPL's customers in light of forecasting uncertainty. In regard to operational planning, an extreme weather load forecast for the projected Summer peak day is produced based on maximum historical temperatures on the day of the Summer peak. Likewise, an extreme weather Winter peak forecast is developed by considering minimum historical temperatures at the time of the Winter peak. Statistical analysis on the distribution of historical weather data is performed to evaluate and understand the impact of extreme weather on the peaks and on NEL, and the likelihood of experiencing extreme weather.

It should be noted that despite the downturn in the economy, and negative growth in Florida's population during 2009, FPL experienced a near record Summer peak of 22,351 MW, and an all-time peak of 24,339 MW during the 2009-2010 Winter peak period. These peaks were driven by extreme weather.

EXHIBIT 29

II.H. DSM

The effects of FPL's DSM implementation to-date are assumed to be imbedded in the actual usage data for forecasting purposes. Any change in usage pattern, be it the impact of FPL's DSM efforts, price impact, or weather impact, is reflected in the actual observed load data. Therefore, energy efficiency impacts, whether market-driven or as a result of FPL's DSM programs, are assumed to be included in the historical usage data for peaks and NEL.

The impacts of incremental energy efficiency that FPL plans to implement in the future, plus the impacts of FPL's cumulative and incremental load management programs, are accounted for as "line item reductions" to the forecasts as part of the IRP process as shown in Schedules 7.1 and 7.2. After making these adjustments to the load forecasts, the resulting "firm" load forecast is then used in FPL's IRP work.

EXHIBIT 29

Schedule 2.1
History and Forecast of Energy Consumption
And Number of Customers by Customer Class

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Rural & Residential			**Commercial**		
Year	Population 1/	Members per Household	GWh 2/	Average 3/ No. of Customers	Average kWh Consumption Per Customer	GWh 2/	Average 3/ No. of Customers	Average kWh Consumption Per Customer
2000	7,603,964	2.23	46,320	3,413,953	13,568	37,001	415,293	89,097
2001	7,754,846	2.22	47,588	3,490,541	13,633	37,960	426,573	88,989
2002	7,898,628	2.21	50,865	3,566,167	14,263	40,029	435,313	91,955
2003	8,079,316	2.21	53,485	3,652,663	14,643	41,425	444,650	93,163
2004	8,247,442	2.20	52,502	3,744,915	14,020	42,064	458,053	91,832
2005	8,469,602	2.21	54,348	3,828,374	14,196	43,468	469,973	92,490
2006	8,620,855	2.21	54,570	3,906,267	13,970	44,487	478,867	92,901
2007	8,729,806	2.19	55,138	3,981,451	13,849	45,921	493,130	93,121
2008	8,771,694	2.20	53,229	3,992,257	13,333	45,561	500,748	90,987
2009	8,731,397	2.20	53,950	3,984,490	13,540	45,025	501,055	89,860
2010	8,773,235	2.20	52,160	3,987,834	13,080	44,652	500,788	89,164
2011	8,833,618	2.20	53,365	4,015,281	13,290	45,009	502,102	89,642
2012	8,916,643	2.20	54,310	4,053,020	13,400	45,632	505,780	90,221
2013	9,043,647	2.20	55,783	4,110,748	13,570	46,484	512,042	90,781
2014	9,186,256	2.20	57,670	4,175,571	13,811	47,787	520,279	91,849
2015	9,322,630	2.20	58,471	4,237,559	13,798	48,713	528,609	92,153
2016	9,455,432	2.20	58,782	4,297,924	13,677	49,228	536,766	91,712
2017	9,584,118	2.20	59,418	4,356,417	13,639	50,012	544,669	91,821
2018	9,709,760	2.20	60,450	4,413,527	13,696	51,158	552,418	92,607
2019	9,833,269	2.20	61,316	4,469,668	13,718	52,185	560,044	93,180

Historical Values (2000 - 2009):

1/ Population represents only the area served by FPL.

2/ Actual energy sales include the impacts of existing conservation. These values are at the meter.

3/ Average No. of Customers is the annual average of the twelve month values.

Projected Values (2010 - 2019):

1/ Population represents only the area served by FPL.

2/ Forecasted energy sales do not include the impact of incremental conservation. These values are at the meter.

3/ Average No. of Customers is the annual average of the projected twelve month values.

EXHIBIT 29

Schedule 2.2
History and Forecast of Energy Consumption And Number of Customers by Customer Class

(1)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Industrial						
Year	GWh 2/	Average 3/ No. of Customers	Average kWh Consumption Per Customer	Railroads & Railways GWh	Street & Highway Lighting GWh 2/	Other Sales to Public Authorities GWh	Total 4/ Sales to Ultimate Consumers GWh
2000	3,768	16,411	229,578	81	408	381	87,959
2001	4,091	15,445	264,872	86	419	67	90,212
2002	4,057	15,533	261,199	89	420	63	95,523
2003	4,004	17,029	235,135	93	425	64	99,496
2004	3,964	18,512	214,139	93	413	58	99,095
2005	3,913	20,392	191,873	95	424	49	102,296
2006	4,036	21,211	190,277	94	422	49	103,659
2007	3,774	18,732	201,499	91	437	53	105,415
2008	3,587	13,377	268,168	81	423	37	102,919
2009	3,245	10,084	321,796	80	422	34	102,755
2010	3,348	9,276	360,993	89	382	36	100,668
2011	3,464	9,587	361,297	89	378	35	102,340
2012	3,530	10,232	345,009	89	383	34	103,979
2013	3,567	10,727	332,540	89	391	33	106,347
2014	3,578	10,964	326,355	89	401	33	109,558
2015	3,560	11,079	321,320	89	412	33	111,278
2016	3,534	11,156	316,775	89	425	33	112,089
2017	3,519	11,237	313,110	89	437	33	113,508
2018	3,513	11,534	304,559	89	451	33	115,693
2019	3,509	11,957	293,465	89	464	33	117,596

Historical Values (2000 - 2009):

2/ Actual energy sales include the impacts of existing conservation. These values are at the meter.

3/ Average No.of Customers is the annual average of the twelve month values.

4/ GWh Col. (16) = Col. (4) + Col. (7) + Col. (10) + Col. (13) + Col. (14) + Col. (15).

Projected Values (2010 - 2019):

2/ Forecasted energy sales do not include the impact of incremental conservation.

3/ Average No. of Customers is the annual average of the projected twelve month values.

4/ GWh Col. (16) = Col. (4) + Col. (7) + Col. (10) + Col. (13) + Col. (14) + Col. (15).

EXHIBIT 29

Schedule 2.3
History and Forecast of Energy Consumption And Number of Customers by Customer Class

(1) Year	(17) Sales for Resale GWh	(18) Utility Use & Losses GWh	(19) Net[5/] Energy For Load GWh 2/	(20) Average[3/] No. of Other Customers	(21) Total Average[3/,6/] Number of Customers
2000	970	7,059	95,989	2,693	3,848,350
2001	970	7,222	98,404	2,722	3,935,281
2002	1,233	7,443	104,199	2,792	4,019,805
2003	1,511	7,386	108,393	2,879	4,117,221
2004	1,531	7,467	108,093	3,029	4,224,509
2005	1,506	7,498	111,301	3,156	4,321,895
2006	1,569	7,909	113,137	3,218	4,409,563
2007	1,499	7,401	114,315	3,276	4,496,589
2008	993	7,092	111,004	3,348	4,509,730
2009	1,155	7,394	111,304	3,439	4,499,067
2010	2,046	7,172	109,886	3,435	4,501,332
2011	2,145	7,150	111,634	3,398	4,530,367
2012	2,166	7,372	113,516	3,438	4,572,470
2013	2,059	7,493	115,899	3,499	4,637,017
2014	4,846	8,068	122,471	3,580	4,710,393
2015	5,484	7,980	124,742	3,675	4,780,922
2016	5,513	8,070	125,672	3,779	4,849,624
2017	5,555	8,173	127,236	3,888	4,916,211
2018	5,602	8,370	129,665	3,999	4,981,479
2019	5,648	8,468	131,712	4,111	5,045,779

Historical Values (2000 - 2009):

2/ Actual energy sales include the impacts of existing conservation. These values are at the meter.

3/ Average No.of Customers is the annual average of the twelve month values.

5/ GWh Col. (19) = Col. (16) + Col. (17) + Col. (18). Actual NEL include the impacts of existing conservation and agrees to Col. (8) on schedule 3.3.

6/ Total Col. (21) = Col. (5) + Col. (8) + Col. (11) + Col. (20).

Projected Values (2010 - 2019):

2/ Forecasted energy sales do not include the impact of incremental conservation and agrees to Col. (2) on Schedule 3.3.

3/ Average No.of Customers is the annual average of the projected twelve month values.

5/ GWh Col. (19) = Col. (16) + Col. (17) + Col. (18).

6/ Total Col. (21) = Col. (5) + Col. (8) + Col. (11) + Col. (20).

EXHIBIT 29

Schedule 3.1
History and Forecast of Summer Peak Demand: Base Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
August of Year	Total	Wholesale	Retail	Interruptible	Res. Load Management	Residential Conservation	C/I Load Management	C/I Conservation	Net Firm Demand
2000	17,808	161	17,647	0	719	645	467	451	16,622
2001	18,754	169	18,585	0	737	697	488	481	17,529
2002	19,219	261	18,958	0	770	755	489	517	17,960
2003	19,668	253	19,415	0	781	799	577	554	18,310
2004	20,545	258	20,287	0	783	847	588	578	19,174
2005	22,361	264	22,097	0	790	895	600	611	20,971
2006	21,819	256	21,563	0	809	948	635	640	20,375
2007	21,962	261	21,701	0	954	982	715	683	20,293
2008	21,060	181	20,879	0	974	1035	735	708	19,351
2009	22,351	212	22,139	0	985	1084	793	734	20,573
2010	21,922	381	21,541	0	1,026	115	884	92	19,805
2011	21,788	386	21,402	0	1,039	135	954	121	19,540
2012	22,139	391	21,748	0	1,055	160	1,038	154	19,732
2013	22,332	352	21,980	0	1,073	187	1,131	192	19,751
2014	23,575	1,178	22,397	0	1,091	215	1,227	231	20,812
2015	23,924	1,200	22,724	0	1,109	242	1,321	268	20,985
2016	24,344	1,225	23,119	0	1,125	267	1,406	302	21,244
2017	24,774	1,253	23,521	0	1,140	289	1,483	333	21,528
2018	25,328	1,283	24,045	0	1,153	309	1,554	362	21,949
2019	25,785	1,314	24,470	0	1,165	328	1,619	388	22,284

Historical Values (2000 - 2009):

Col. (2) - Col. (4) are actual values for historical summer peaks. As such, they incorporate the effects of conservation (Col. 7 & Col. 9), and may incorporate the effects of load control if load control was operated on these peak days. Therefore, Col. (2) represents the actual Net Firm Demand.

Col. (5) - Col. (9) for 2000 through 2009 represent actual DSM capabilities starting from January 1988 and are annual (12-month) values.
Note that the values for FPL's former Interruptible Rate are incorporated into Col. (8), which also includes Business On Call (BOC), CILC and Commercial /Industrial Demand Reduction (CDR).

Col. (11) represents a HYPOTHETICAL "Net Firm Demand" if the load control values had definitely been exercised on the peak. Col. (11) is derived by the formula:Col. (10) = Col.(2) - Col.(6) - Col.(8).

Projected Values (2010 - 2019):

Col. (2) - Col.(4) represent FPL's forecasted peak w/o incremental conservation or cumulative load control. The effects of conservation implemented prior to 2010 are incorporated into the load forecast.

Col. (5) - Col. (9) represent all incremental conservation,current load management and incremental load management. These values are projected August values and the conservation values are based on projections with a 1/2010 starting point for use with the 2010 load forecast.

Col (8) represents FPL's Business On Call, CDR,CILC, and Curtailable programs/rates.

Col. (10) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented on the peak. Col. (10) is derived by using the formula: Col. (10) = Col. (2) - Col. (5) - Col. (6) - Col. (7) - Col. (8) - Col. (9).

EXHIBIT 29

Schedule 3.2
History and Forecast of Winter Peak Demand:Base Case

(1) January of Year	(2) Total	(3) Firm Wholesale	(4) Retail	(5) Interruptible	(6) Res. Load Management	(7) Residential Conservation	(8) C/I Load Management	(9) C/I Conservation	(10) Net Firm Demand
2000	17,057	142	16,915	0	741	434	438	176	15,878
2001	18,199	150	18,049	0	791	459	448	183	16,960
2002	17,597	145	17,452	0	811	500	457	196	16,329
2003	20,190	246	19,944	0	847	546	453	206	18,890
2004	14,752	211	14,541	0	857	570	532	230	13,363
2005	18,108	225	17,883	0	862	583	542	233	16,704
2006	19,683	225	19,458	0	870	600	550	240	18,263
2007	16,815	223	16,592	0	894	620	577	249	15,344
2008	18,055	163	17,892	0	879	644	635	279	16,541
2009	20,081	162	19,919	0	951	678	764	295	18,366
2010	20,550	376	20,174	0	937	71	768	41	18,734
2011	20,647	381	20,266	0	943	78	784	55	18,788
2012	20,861	386	20,475	0	949	87	804	72	18,949
2013	21,138	392	20,746	0	957	97	827	93	19,163
2014	22,152	1,060	21,092	0	966	108	854	116	20,108
2015	22,745	1,284	21,461	0	975	121	882	141	20,627
2016	23,118	1,311	21,807	0	984	132	908	164	20,929
2017	23,488	1,341	22,147	0	993	143	933	186	21,232
2018	23,889	1,374	22,514	0	1,001	154	957	208	21,569
2019	24,293	1,409	22,884	0	1,007	163	977	225	21,921

Historical Values (2000 - 2009):

Col. (2) - Col. (4) are actual values for historical winter peaks. As such, they incorporate the effects of conservation (Col. 7 & Col. 9), and may incorporate the effects of load control if load control was operated on these peak days. Therefore, Col. (2) represents the actual Net Firm Demand.

Col. (5) - Col. (9) for 2000 through 2009 represent actual DSM capabilities starting from January 1988 and are annual (12-month) values.
Note that the values for FPL's former Interruptible Rate are incorporated into Col. (8), which also includes Business On Call (BOC), CILC and Commercial /Industrial Demand Reduction (CDR).

Col. (10) represents a HYPOTHETICAL "Net Firm Demand" if the load control values had definitely been exercised on the peak. Col. (11) is derived by the formula:Col. (10) = Col.(2) - Col.(6) - Col.(8) - Col.(9).

Projected Values (2010 - 2019):

Col. (2) - Col.(4) represent FPL's forecasted peak w/o incremental conservation or cumulative load control. The effects of conservation implemented prior to 2010 are incorporated into the load forecast.

Col. (5) - Col. (9) represent all incremental conservation,current load management and incremental load management. These values are projected August values and the conservation values are based on projections with a 1/2010 starting point for use with the 2010 load forecast.

Col (8) represents FPL's Business On Call, CDR,CILC, and Curtailable programs/rates.

Col. (10) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented on the peak. Col. (10) is derived by using the formula: Col. (10) = Col. (2) - Col. (5) - Col. (6) - Col. (7) - Col. (8) - Col. (9).

EXHIBIT 29

Schedule 3.3
History of Annual Net Energy for Load - GWh: Base Case

(All values are "at the generator" values except for Col (8))

(1) Year	(2) = (5) + (3) + (4) Total Net Energy For Load without DSM	(3) Residential Conservation	(4) C/I Conservation	(5) **Actual** Net Energy For Load	(6) Sales for Resale GWh	(7) Utility Use & Losses	(8) = (5) - (6) - (7) **Actual** Total Billed Retail Energy Sales (GWh)	(9) Load Factor(%)
2000	99,097	1,674	1,434	95,989	970	7,059	87,959	61.4%
2001	101,739	1,789	1,545	98,404	970	7,222	90,212	59.9%
2002	107,755	1,917	1,639	104,199	1,233	7,443	95,523	61.9%
2003	112,160	2,008	1,759	108,393	1,511	7,386	99,496	62.9%
2004	112,034	2,106	1,834	108,093	1,531	7,467	99,095	59.9%
2005	115,440	2,205	1,934	111,301	1,506	7,498	102,296	56.8%
2006	117,490	2,312	2,041	113,137	1,569	7,909	103,659	59.2%
2007	118,894	2,373	2,206	114,315	1,499	7,401	105,415	59.4%
2008	115,755	2,485	2,267	111,004	993	7,092	102,919	60.0%
2009	116,221	2,581	2,336	111,304	1,155	7,394	107,671	59.4%

Historical Values (2000 - 2009):

Col. (2) represents derived "Total Net Energy For Load w/o DSM". The values are calculated using the formula: Col. (2) = Col. (3) + Col. (4) + Col. (5).

Col.(3) & Col.(4) for 2000 through 2009 are DSM values starting in January 1988 and are annual (12-month) values. Col. (3) and Col. (4) for 2009 are "estimated actuals" and are also annual (12-month) values. The values represent the total GWh reductions actually experienced each year .

Col. (5) is the **actual** Net Energy for Load (NEL) for years 2000 - 2009.

Col. (8) is the Total Retail Billed Sales. The values are calculated using the formula: Col. (8) = Col. (5) - Col. (6) - Col. (7). These values are at the meter.

Col. (9) is calculated using Col. (5) from this page and Col. (2), "Total", from Schedule 3.1 using the formula: Col. (9) = ((Col. (5)*1000) / ((Col.(2) * 8760)
Adjustments are made for leap years.

Forecast of Annual Net Energy for Load - GWh: Base Case

(All values are "at the generator"values except for Col (8))

(1) Year	(2) **Forecasted** Net Energy For Load without DSM	(3) Residential Conservation	(4) C/I Conservation	(5) = (2) - (3) - (4) Net Energy For Load Adjusted for DSM	(6) Sales for Resale GWh	(7) Utility Use & Losses	(8) = (2) - (6) - (7) **Forecasted** Total Billed Retail Energy Sales (GWh) without DSM	(9) Load Factor(%)
2010	109,886	193	141	109,552	2,046	7,172	100,668	57.2%
2011	111,634	360	252	111,021	2,145	7,150	102,340	58.5%
2012	113,516	578	398	112,540	2,166	7,372	103,979	58.4%
2013	115,899	827	563	114,509	2,059	7,493	106,347	59.2%
2014	122,471	1,091	739	120,641	4,846	8,068	109,558	59.3%
2015	124,742	1,340	906	122,496	5,484	7,980	111,278	59.5%
2016	125,672	1,564	1,055	123,053	5,513	8,070	112,089	58.8%
2017	127,236	1,767	1,190	124,279	5,555	8,173	113,508	58.6%
2018	129,665	1,959	1,318	126,387	5,602	8,370	115,693	58.4%
2019	131,712	2,142	1,440	128,130	5,648	8,468	117,596	58.3%

Projected Values (2010 - 2019):

Col. (2) represents Forecasted Net Energy for Load w/o DSM values. The values are extracted from Schedule 2.3, Col. (19).

Col. (3) & Col. (4) are forecasted values of the reduction on sales from incremental conservation and are mid-year (6-month) values.
The effects of conservation implemented prior to 2010 are incorporated into the load forecast.

Col. (5) is the forecasted Net Energy for Load (NEL) after adjusting for DSM impacts DSM for years 2010 - 2019. Col.(5) = Col.(2) - Col.(3) - Col.(4)

Col. (8) is the Total Retail Billed Sales. The values are calculated using the formula: Col. (8) = Col. (2) - Col. (6) - Col. (7). These values are at the meter.

Col. (9) is calculated using Col. (2) from this page and Col. (2), "Total", from Schedule 3.1. Col. (9) = ((Col. (2)*1000) / ((Col. (2) * 8760)
Adjustments are made for leap years.

EXHIBIT 29

Schedule 4
Previous Year Actual and Two-Year Forecast of Retail Peak Demand and Net Energy for Load (NEL) by Month

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2009 ACTUAL		2010 FORECAST		2011 FORECAST	
Month	Total Peak Demand MW	NEL GWh	Total Peak Demand MW	NEL GWh	Total Peak Demand MW	NEL GWh
JAN	19,378	7,982	20,550	7,883	20,647	8,144
FEB	20,081	7,299	17,985	7,142	18,070	7,400
MAR	15,347	7,899	17,108	8,010	17,189	8,245
APR	17,145	8,751	17,437	8,453	17,331	8,656
MAY	19,210	9,334	19,494	9,408	19,375	9,582
JUN	22,351	10,632	20,983	10,458	20,855	10,605
JUL	21,138	10,636	21,481	10,633	21,350	10,755
AUG	21,015	11,434	21,922	11,166	21,788	11,274
SEP	20,334	10,772	21,264	10,780	21,135	10,856
OCT	21,014	9,981	19,809	9,631	19,688	9,684
NOV	19,226	8,676	17,447	8,406	17,530	8,472
DEC	16,122	7,908	17,158	7,915	17,239	7,960
TOTALS		111,304		109,886		111,634

* Forecasted Peaks & NEL do not include the impacts of cumulative load management and incremental conservation and are consistent with values shown in Col. (19) of Schedule 2.3 and Col. (2) of Schedule 3.3.

EXHIBIT 29

CHAPTER III

Projection of Incremental Resource Additions

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

III. Projection of Incremental Resource Additions

III.A FPL's Resource Planning:

FPL developed an integrated resource planning (IRP) process in the early 1990s and has since utilized this approach, in whole or in part as analysis needs warranted, to determine when new resources are needed, what the magnitude of the needed resources are, and what type of resources should be added. The timing and type of new power plants, the primary subjects of this document, are determined as part of the IRP process work.

This section describes FPL's basic IRP process. Some of the key assumptions, in addition to a new load forecast, that were used in FPL's 2009 and early 2010 resource planning work are also discussed.

Four Fundamental Steps of FPL's Resource Planning:

There are 4 fundamental steps to FPL's resource planning. These steps can be described as follows:

Step 1: Determine the magnitude and timing of FPL's new resource needs;

Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of FPL's resource needs (i.e., identify competing options and resource plans);

Step 3: Evaluate the competing options and resource plans in regard to system economics and non-economic factors; and,

Step 4: Select a resource plan and commit, as needed, to near-term options.

Figure III.A.1 graphically outlines the 4 steps.

EXHIBIT 29

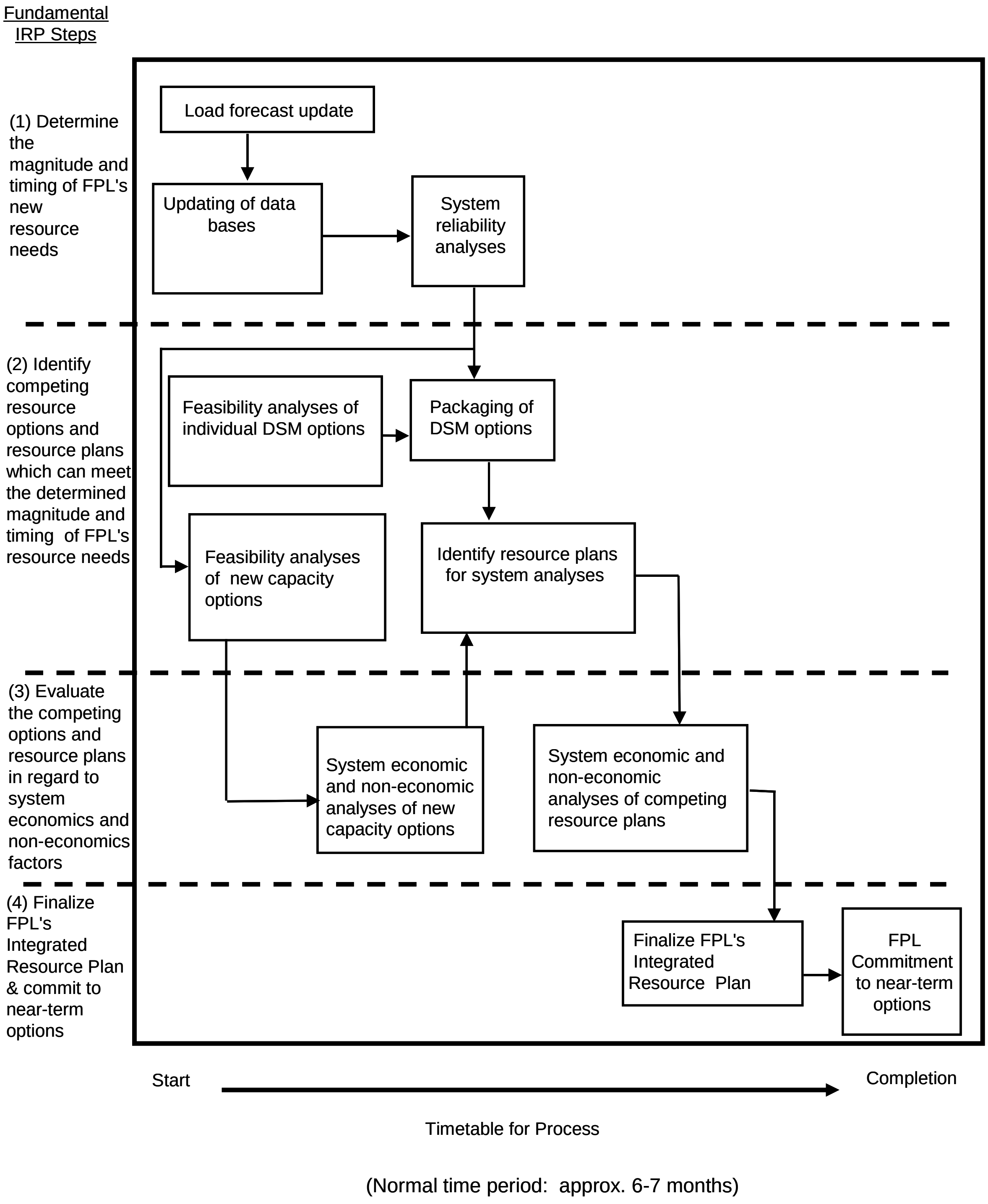


Figure III.A.1: Overview of FPL's IRP Process

EXHIBIT 29

Step 1: Determine the Magnitude and Timing of FPL's New Resource Needs:

The first of the four resource planning steps, determining the magnitude and timing of FPL's resource needs, is essentially a determination of the amount of capacity or megawatts (MW) of load reduction, new capacity additions, or a combination of both load reduction and new capacity additions that are needed to maintain system reliability. Also determined in this step is when the MW are needed to meet FPL's reliability criteria. This step is often referred to as a reliability assessment, or resource adequacy, analysis for the utility system.

Step 1 typically starts with an updated load forecast. Several databases are also updated in this first fundamental step, not only with the new information regarding forecasted loads, but also with other information that is used in many of the fundamental steps in resource planning. Examples of this new information include, but are not limited to: delivered fuel price projections, current financial and economic assumptions, and power plant capability and reliability assumptions. FPL also includes key assumptions regarding three specific resource areas: (1) near-term construction capacity additions, (2) firm capacity power purchases, and (3) DSM implementation.

The first of these assumptions is based on new generating capacity additions that have been approved by the Florida Public Service Commission (FPSC) through Determination of Need proceedings that evaluated both the need for, and the cost-effectiveness of, each of the new capacity additions. These generating capacity additions have also either received the necessary Site Certification approvals from either the Secretary of the Florida Department of Environmental Protection (FDEP) or the Governor and Cabinet (acting as the Siting Board) or, as in the case of the new nuclear units, are in the process of receiving the necessary state and federal approvals. Several new generating unit additions will occur in the 2010 – 2019 reporting time frame of this document.

These generating unit additions include:

- The completion of a third gas-fired CC unit at FPL's West County Energy Center (WCEC) site which is scheduled to come in-service in mid-2011. This new unit, WCEC Unit 3, will add approximately 1,219 MW (Summer) of generation capacity. FPSC approval for this unit was obtained in September 2008 (PSC Order 08-0237-FOF-EI) and site certification was granted in November 2008.

EXHIBIT 29

- A new photovoltaic (PV) facility that is currently under construction in Brevard County and which is projected to be completed and in-service in 2010. This PV facility, named the Space Coast Next Generation Solar Energy Center, is projected to have a nameplate rating of 10 MW. The FPSC approved the eligibility of expenditures for this PV facility to be recovered through the Environmental Cost Recovery Clause (ECRC) in August 2008 (PSC Order 08-0941-PAA-EI). The Space Coast Next Generation Solar Energy Center received the Army Corps of Engineers permit in December 2008 and received the Environmental Resource Permit in April 2009.
- A new solar thermal facility at FPL's existing Martin plant site is also under construction and projected to be brought into service in 2010. This solar thermal facility, named the Martin Next Generation Solar Energy Center, which does not add to the capacity (MW) of the Martin plant, is projected to be able to produce up to 75 MW of steam capability, thus reducing use of fossil fuels by FPL when the solar thermal facility is producing steam. The FPSC approved the eligibility of expenditures for this solar thermal facility to be recovered through the ECRC in August 2008 (PSC Order 08-0941-PAA-EI). FPL received the site certification modification approval in August 2008.
- Two existing generating plants, each consisting of two older fossil fuel-fired steam generating units, are currently projected to be modernized by removing the existing generating units and replacing them with new, highly efficient CC units. The new plant at FPL's Cape Canaveral site is projected to be placed in-service in 2013. This new CC unit is projected to have a peak output of 1,210 MW. This new plant will be called the Cape Canaveral Next Generation Clean Energy Center. The new plant at FPL's Riviera site is projected to be placed in-service in 2014. This new CC unit is projected to have a peak output of 1,212 MW. This new plant will be called the Riviera Beach Next Generation Clean Energy Center. These conversions were approved by the FPSC in September 2008 (PSC Order 08-0591-FOF-EI). The site certification application for Cape Canaveral was filed in December 2008 and granted in October 2009. The site certification application for Riviera Beach was filed in February 2009 and granted in November 2009.

  As FPL has recently stated, work on these modernization projects has been suspended.

- In addition, FPL will be adding approximately 400 MW of generating capacity at its existing nuclear power plants at the Turkey Point and St. Lucie sites. This added capacity is scheduled to come in-service in 2011 and 2012, respectively. These

EXHIBIT 29

capacity "uprates" were approved by the FPSC in January 2008 (PSC Order 08-0021-FOF-EI). The Final Order for the Site Certification was issued in September 2008 for the St. Lucie uprates and October 2008 for the Turkey Point uprates.

These new generating units and generating capacity additions were selected for a variety of reasons including cost-effectiveness, significant system fuel savings, fuel diversity, and significant system emission reductions, including greenhouse gas emission reductions. In addition, the solar projects will increase the contribution of renewable energy sources towards meeting the electricity needs of FPL's customers.

The second of these assumptions involves firm capacity power purchases. FPL's current projection of firm capacity purchases is very similar to the projection shown in FPL's 2009 Site Plan, after accounting for the fact that the contracts for several purchases presented in the 2009 Site Plan have now ended. These firm capacity purchases are from a combination of utility and independent power producers. Details, including the annual total capacity values for these purchases, are presented in Chapter I in Tables I.B.1 and I.B.2. These purchased capacity amounts were incorporated in FPL's resource planning work.

The third of these assumptions involves a projection of the amount of additional demand side management (DSM) that is anticipated to be implemented annually over the ten-year period. Since 1994, FPL's resource planning work has assumed that, at a minimum, the DSM MW called for in FPL's approved DSM Goals will be achieved as planned. The resource plan presented in FPL's 2010 Site Plan accounts for the new DSM goals.

The amount of DSM included in the 2010 Site Plan is different than the amount included in the 2009 Site Plan. In late 2009, the FPSC imposed significantly higher goals for DSM resources for FPL to add in the 2010 – 2019 period. The amount of demand (MW) reduction from the new DSM goals far exceeds (i.e., is more than double) the 2009 projection of FPL's remaining resource needs through 2019. Now, with FPL's lower long-term 2010 load forecast, and the commensurately lower 2010 projection of resource needs, the amount by which the MW reductions from the new DSM goals exceeds FPL's resource needs is even larger.

These key assumptions, plus the other updated information described above, are then applied in the first fundamental step: the determination of the magnitude and the timing of FPL's future resource needs. This determination is accomplished by system reliability

EXHIBIT 29

analyses which for FPL are currently based on dual planning criteria of a minimum peak period reserve margin of 20% (FPL applies this to both Summer and Winter peaks) and a maximum loss-of-load probability (LOLP) of 0.1 day per year. Both of these criteria are commonly used throughout the utility industry.

Historically, two types of methodologies, deterministic and probabilistic, have been employed in system reliability analysis. The calculation of excess firm capacity at the annual system peaks (reserve margin) is the most common method, and this relatively simple deterministic calculation can be performed on a spreadsheet. It provides an indication of the adequacy of a generating system's capacity resources compared to its load during peak periods. However, deterministic methods do not take into account probabilistic-related elements such as the impact of individual unit failures. For example: two 50 MW units which can be counted on to run 90% of the time are more valuable in regard to utility system reliability than is one 100 MW unit which can also be counted on to run 90% of the time. Probabilistic methods also recognize the value of being part of an interconnected system with access to multiple capacity sources.

For this reason, probabilistic methodologies have been used to provide an additional perspective on the reliability of a generating system. There are a number of probabilistic methods that are being used to perform system reliability analyses. Of these, the most widely used is loss-of-load probability or LOLP. Simply stated, LOLP is an index of how well a generating system may be able to meet its demand (i.e., a measure of how often load may exceed available resources). In contrast to reserve margin, the calculation of LOLP looks at the daily peak demands for each year, while taking into consideration such probabilistic events as the unavailability of individual generators due to scheduled maintenance or forced outages.

LOLP is expressed in units of the "number of times per year" that the system demand could not be served. The standard for LOLP accepted throughout the industry is a maximum of 0.1 day per year. This analysis requires a more complicated calculation methodology than does the reserve margin analysis. LOLP analyses are typically carried out using computer software models such as the Tie Line Assistance and Generation Reliability (TIGER) program used by FPL.

The result of the first fundamental step of resource planning is a projection of how many new MW of resources are needed to meet both reserve margin and LOLP criteria, and thus maintain system reliability, and of when the MW are needed. Information regarding

EXHIBIT 29

the timing and magnitude of these resource needs is used in the second fundamental step: identifying resource options and resource plans that can meet the determined magnitude and timing of FPL’s resource needs.

Step 2: Identify Resource Options and Plans That Can Meet the Determined Magnitude and Timing of FPL’s Resource Needs:

The initial activities associated with this second fundamental step of resource planning generally proceed concurrently with the activities associated with Step 1. During Step 2, feasibility analyses of new capacity options are conducted to determine which new capacity options appear to be the most competitive on FPL’s system. These analyses also establish capacity size (MW) values, projected construction/permitting schedules, and operating parameters and costs. In similar analyses, feasibility analyses of new DSM options and/or continued growth in existing DSM options are typically conducted.

The individual new resource options emerging from these feasibility options are then typically “packaged” into different resource plans which are designed to meet the system reliability criteria. In other words, resource plans are created by combining individual resource options so that the timing and magnitude of FPL’s new resource needs are met. The creation of these competing resource plans is typically carried out using spreadsheet, dynamic programming, and/or linear and non-linear programming techniques.

At the conclusion of the second fundamental resource planning step, a number of different combinations of new resource options (i.e., resource plans) of a magnitude and timing necessary to meet FPL’s resource needs are identified.

Step 3: Evaluate the Competing Options and Resource Plans in Regard to System Economics and Non-Economic Factors:

At the completion of fundamental steps 1 & 2, the most viable new resource options have been identified, and these resource options have been combined into a number of resource plans which meet the magnitude and timing of FPL’s resource needs. The stage is set for evaluating these resource options and resource plans. In 2009, once the resource plans were developed, FPL utilized the P-MArea production cost model and a Fixed Cost Spreadsheet to perform the economic analyses. The P-MArea model is the

EXHIBIT 29

model used by FPL to develop the Fuel Cost Budget and to conduct other production cost-related analyses.

FPL also utilized several other models in the economic evaluation portion of its resource planning work. For analyses of individual DSM options, FPL typically uses its DSM cost-effectiveness model which is an FPL spreadsheet model utilizing the FPSC's approved methodology for analyzing the cost-effectiveness of individual DSM measures/programs, and its non-linear programming model for analyzing the potential for lowering system peak loads through additional load management capacity. FPL then utilizes its linear programming model to develop DSM portfolios.

The basic economic analyses of the competing resource plans focus on total system economics. The standard basis for comparing the economics of competing resource plans is their relative impact on FPL's electricity rate levels, with the intent of minimizing FPL's leveled system average rate (i.e., a Rate Impact Measure or RIM methodology). However, in cases in which the DSM contribution was assumed as a given and the only competing options were new generating units and/or purchase options, comparisons of competing resource plans' impacts on electricity rates and on system revenue requirements are equivalent. Consequently, the competing options and plans in such cases were evaluated on a cumulative present value revenue requirement (CPVRR) basis.

Other factors are also included in FPL's evaluation of resource options and resource plans. While these factors may have an economic component or impact, they are often discussed in quantitative, but non-economic terms, such as percentages, tons, etc. rather than in terms of dollars. These factors are often referred to by FPL as "system concerns" that include (but are not necessarily limited to) maintaining/enhancing fuel diversity in the FPL system, system emission levels, and maintaining a regional balance between load and generating capacity, particularly in Southeastern Florida. In conducting the evaluations needed to determine which resource options and resource plans are best for FPL's system, both the economic and non-economic evaluations are conducted with an eye to whether the system concern is positively or negatively impacted by a given resource option or resource plan.

EXHIBIT 29

Step 4: Finalizing FPL's Current Resource Plan

The results of the previous three fundamental steps were used to develop the future generation plan. This plan is presented in the following section.

III.B Incremental Resource Additions/Changes

FPL's projected incremental generation capacity additions/changes for 2010 through 2019 are depicted in Table III.B.1. These capacity additions/changes result from a variety of actions including: changes to existing units (which are frequently achieved as a result of plant component replacements during major overhauls), temporarily removing older, less efficient generating units from active service and placing them into Inactive Reserve status until their continued operation is again needed, changes in the amounts of purchased power being delivered under existing contracts as per the contract schedules or by entering into new purchase contracts, increases in generating capacity at FPL's four existing nuclear units, the projected modernizations of FPL's steam generating units at its existing Cape Canaveral and Riviera sites into new, very fuel-efficient CC generating units, and by construction of approved new generating units such as West County Energy Center (WCEC) Unit 3.

As shown in Table III.B.1, the capacity additions consist primarily of construction of one new CC unit, the projected modernization of existing steam units into new CC units, and capacity increases at FPL's existing nuclear generating units. (The DSM additions that are consistent with the DSM goals imposed by the FPSC through 2019 are not explicitly presented in this table, but have been accounted for in FPL's resource planning work. In addition, the projected MW reductions from these DSM additions are reflected in the projected reserve margin values shown in the table.)

This table also shows the addition of the previously discussed 85 MW of new solar facilities (10 MW of PV and 75 MW of solar thermal). However, as indicated in the table and its footnotes, these new solar facilities are not projected to contribute new firm capacity. There are two reasons for this. First, one of these facilities – the 75 MW solar thermal facility at the Martin site – is designed not to add new capacity, but to serve solely as a "fuel substitute" facility. (When sufficient sunlight is available, the solar thermal facility will produce steam that would otherwise have been produced by burning fossil fuels.) Second, in regard to the new PV facility that has a 10 MW nameplate rating, it is unclear at this time what the output of this facility will consistently be during FPL's late afternoon Summer and early morning Winter peak hours. Consequently, FPL is not

EXHIBIT 29

assigning a firm capacity value (i.e., those values reflected in Table III.B.1) to this PV facility at this time. Once FPL has actual operating experience with this PV facility, it will evaluate what an appropriate firm capacity value for this facility should be. However, FPL’s economic and non-economic analyses fully capture the system fuel and emission savings from both of these two new solar facilities.

The significantly lower long-term load forecast, coupled with the approved additions of highly efficient new natural gas-fired and nuclear generating capacity, and the new DSM goals imposed by the FPSC, allow the opportunity for FPL to temporarily remove some older, less efficient generating capacity from active service, resulting in savings in operational and maintenance costs. A number of such units are/will be on Inactive Reserve status in 2010. These units are: Cutler Units 5 & 6, Sanford Unit 3, Port Everglades Units 1 & 2, and Turkey Point Unit 2. In 2011, Port Everglades Units 3 & 4 are also projected to be placed on Inactive Reserve. These generating units will continue to be maintained and will be returned to active service when needed. The timing of the return of these units is uncertain at this time primarily due to the uncertainty regarding FPL’s future load. However, for planning purposes, FPL is showing in this document that these units begin to return to active service starting in the latter years of the ten-year reporting period, 2018 and 2019.

In addition, the existing Cape Canaveral and Riviera units that would be removed as part of the projected modernization work, will initially be placed on Inactive Reserve status, then would be completely removed from service in preparation for the construction of the new CC units at those sites if the modernization projects proceed.

Finally, as shown in the table below, FPL is currently projecting no additional new generating units beyond those discussed above for the years 2015 through 2019. This result is primarily driven by the combination of the lower long-term 2010 load forecast and the higher DSM goals.[2]

---

[2] For purposes of establishing a Standard Offer Contract, and using the same forecasts and other assumptions presented in this document, FPL projects that it’s next fossil-fueled new generating unit would be a Greenfield 3x1 H CC with a 2025 in-service date. Details of that unit are not provided in this Site Plan because its projected in-service date is beyond the 2010-2019 time period addressed in this document.

EXHIBIT 29

Table III.B.1: Projected Capacity Changes for FPL

Projected Capacity Changes and Reserve Margins for FPL (1)

		Net Capacity Changes (MW)	
Year	***Projected Capacity Changes***	***Winter*** (2)	***Summer*** (3)
2010	Martin Next Generation Solar Energy Center (Solar Thermal) (7)	---	---
	Space Coast Next Generation Solar Energy Center (PV) (6)	---	---
	Changes to Existing Purchases (4)	---	(50)
	Riviera Unit 3 - offline for modernization	(280)	(277)
	Riviera Unit 4 - offline for modernization	(291)	(288)
	Cape Canaveral Unit 1 - offline for modernization	---	(396)
	Cape Canaveral Unit 2 - offline for modernization	---	(396)
	Changes to Existing Units	149	15
	Inactive Reserve of Existing Units - offline (8)	(775)	(769)
2011	Changes to Existing Purchases (4)	(90)	(45)
	Cape Canaveral Unit 1 - offline for modernization	(398)	---
	Cape Canaveral Unit 2 - offline for modernization	(398)	---
	West County Unit 3 (5)	---	1,219
	Inactive Reserve of Existing Units - offline (8)	(394)	(1,171)
	Changes to Existing Units	0	0
2012	Changes to Existing Purchases (4)	---	(100)
	West County Unit 3 (5)	1,335	---
	Changes to Existing Units	3	3
	Inactive Reserve of Existing Units - offline (8)	(783)	---
	Existing Nuclear Units Capacity Uprates - St. Lucie 1	103	103
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	---	88
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	---	104
2013	Changes to Existing Purchases (4)	(180)	---
	Cape Canaveral Next Generation Clean Energy Center	---	1,210
	Existing Nuclear Units Capacity Uprates - St. Lucie 2	88	---
	Existing Nuclear Units Capacity Uprates - Turkey Point 3	104	---
	Existing Nuclear Units Capacity Uprates - Turkey Point 4	104	104
2014	Cape Canaveral Next Generation Clean Energy Center	1,355	---
	Riviera Beach Next Generation Clean Energy Center	---	1,212
2015	Riviera Beach Next Generation Clean Energy Center	1,344	---
2016	Changes to Existing Purchases (4)	(931)	(1,306)
2017	Changes to Existing Purchases (4)	(375)	---
2018	Inactive Reserve of Existing Units - online (8)	0	392
2019	Inactive Reserve of Existing Units - online (8)	394	387
	TOTALS =	**84**	**39**

(1) Additional information about these resulting reserve margins and capacity changes are found on Schedules 7 & 8 respectively.

(2) Winter values are forecasted values for January of the year shown. FPL's actual 2010 Winter peak was significantly higher than forecasted.

(3) Summer values are forecasted values for August of the year shown.

(4) These are firm capacity and energy contracts with QF, utilities, and other entities. See Table I.B.1 and Table I.B.2 for more details.

(5) All new unit additions are scheduled to be in-service in June of the year shown. All additions assumed to start in June are included in the Summer reserve margin calculation starting in that year and in the Winter reserve margin calculation starting with the next year.

(6) Because of the intermittent nature of the photovoltaics (PV) resource, FPL is currently assigning no firm capacity benefit to these generating additions. FPL will reassess this once actual operating data from the PV facilities at these locations is available. This location-specific information is needed in order to gauge consistent output during the peak hours which are accounted for in FPL's reserve margin calculations.

(7) The Martin solar thermal facility is designed to provide steam for FPL's existing Martin Unit 8 combined cycle unit, thus reducing FPL's use of natural gas. No additional capacity (MW) will result from the operation of the solar thermal facility.

(8) A number of existing FPL power plants are being temporarily removed from service and placed on Inactive Reserve status. FPL plans to return these units to active service in the future as needed. The timing of the return of these units to full-time active status is uncertain at this time primarily due to the uncertainty regarding FPL's future load. However, for planning purposes, FPL is showing in this document that these units begin to return to active service starting in 2018.

EXHIBIT 29

III.C Issues Impacting FPL's Resource Planning Work

As indicated in the Executive Summary, FPL's resource planning efforts in 2010 will continue to be influenced by three factors: (i) a new lower long-term load forecast, (ii) significantly increased DSM goals for the 2010-2019 time frame, and (iii) regulatory and commercial developments regarding FPL's new nuclear units, Turkey Point 6 & 7.

In addition, there are other items that will also influence FPL's resource planning work. Among these other items are two that FPL typically refers to as on-going system concerns that FPL has considered in its resource planning work for a number of years. These two on-going system concerns are: (1) maintaining/enhancing fuel diversity in the FPL system, and (2) maintaining a balance between load and generating capacity in Southeastern Florida.

A third factor that will influence FPL's on-going resource planning efforts is the Executive Order directive issued in 2007 by Governor Crist, calling for reductions in greenhouse gas emissions and for increased contribution from renewable energy sources.

A fourth factor that could affect FPL's resource planning is the future establishment of Florida standards for renewable or clean energy contributions to a utility system. A Renewable Portfolio Standard (RPS) proposal was prepared by the FPSC, and sent to the Florida Legislature for consideration, with a possible change to a Clean Portfolio Standard (CPS), during the 2009 legislative session. However, no RPS or CPS legislation was enacted during the 2009 legislative session. RPS or CPS legislation, or other legislative initiatives regarding renewable or clean energy contributions, may occur in the future. If such legislation is enacted in 2010 or later years, FPL will then determine what steps need to be taken to address the legislation. Such steps would then be discussed in FPL's Site Plan in the year following the enactment of such legislation.

These four (4) factors that impact FPL's on-going resource planning work are briefly discussed below.

1. <u>System Fuel Diversity</u>

FPL is currently dependent upon using natural gas to generate slightly more than half of the electricity it delivers to its customers. In the future, the percentage of FPL's electricity that is generated by natural gas is projected to increase. Therefore, FPL is continually seeking opportunities to maintain and enhance the fuel diversity of its system.

EXHIBIT 29

In 2007, FPL sought approval from the FPSC to add two new advanced technology coal units to its system. These two new units would have been placed in-service in 2013 and 2014. However, due to concerns over greenhouse gas emissions, FPL was unable to obtain approval for these units. Consequently, FPL does not believe that new advanced technology coal units are viable fuel diversity enhancement options in Florida for the foreseeable future.

Therefore, FPL has turned its attention to nuclear energy, renewable energy, and more efficient ways in which to generate electricity using natural gas in order to enhance its fuel diversity. In regard to nuclear energy, FPL obtained approval to increase capacity at each of its four existing nuclear units. In total, these capacity “uprates” will add approximately 400 MW of capacity and energy for FPL’s customers beginning in the 2011/2012 time period. In 2008, the FPSC approved both the need for these uprates and the ability to recover uprates-related expenditures.

FPL also has been involved in activities to investigate adding or maintaining renewable resources as a part of its generation supply. One of these activities is a variety of discussions with the owners of existing facilities aimed at maintaining or extending current agreements that are scheduled to end during the ten-year reporting period of this document. Another activity is to periodically issue a request for proposals to solicit cost-effective new renewable projects from outside parties. Also, as previously discussed, FPL sought and received approval from the FPSC in 2008 to add 110 MW through three new FPL-owned solar facilities, one solar thermal facility and two PV facilities. One 25 MW PV facility began commercial operation in 2009. The remaining two solar facilities are scheduled to be in-service by the end of 2010. FPL’s efforts to utilize renewable energy are discussed further in Section III.F.

In regard to using natural gas more efficiently, FPL received approvals in 2008 from the FPSC to build a third highly efficient CC unit at its West County Energy Center site (WCEC Unit 3) and to convert the older steam generating units at its existing Cape Canaveral and Riviera plant sites to new, highly efficient CC units. WCEC Unit 3 is currently projected to go in-service in 2011.

In the future, FPL will continue to identify and evaluate alternatives that may maintain or enhance system fuel diversity. FPL also plans to maintain the ability to utilize fuel oil at those existing units that have that capability, although cost factors currently limit the expected use of these facilities. Furthermore, FPL has traditionally purchased the gas

EXHIBIT 29

transportation capacity required for new natural gas generating units from an existing natural gas pipeline company. As an alternative, FPL sought approval in 2009 from the FPSC for the construction of a new natural gas pipeline in Florida capable of serving future generation needs. Such a third pipeline was projected to have potential benefits for FPL and its customers by increasing the diversity of FPL's fuel supply sources, increasing the physical reliability of the pipeline delivery system, and enhancing competition among pipelines. However, the application for an FPL-owned pipeline was denied by the FPSC in 2009. FPL is currently re-evaluating how natural gas can be delivered to its system in the future.

2. <u>Southeastern Florida Imbalance</u>

In recent years, an imbalance had developed between regionally installed generation and peak load in Southeastern Florida. A significant amount of energy required in the Southeastern Florida region during peak periods was being provided through the transmission system from plants located outside the region. FPL's prior planning work concluded that either additional installed generating capacity in this region, or transmission capacity capable of delivering additional electricity from outside the region, would be required to address this imbalance.

Partly because of the lower transmission-related costs resulting from their location, four recent capacity addition decisions (Turkey Point Unit 5 and WCEC Units 1, 2, & 3) were evaluated as the most cost-effective options to meet FPL's capacity needs in the near-term. Adding these units will significantly reduce the imbalance between generation and load in Southeastern Florida.

In addition, FPL will be adding increased capacity at FPL's existing two nuclear units at Turkey Point in 2011 and 2012 and is currently projected to increase the generating capacity at its Riviera site through a modernization of that site in 2014. These generating unit additions in Southeastern Florida are expected to address the imbalance for most, if not all, of the 2010-2019 reporting period addressed in this document even after accounting for temporarily placing some of the existing generating units in the region on Inactive Reserve status. However, the Southeastern Florida imbalance will remain a consideration in FPL's on-going resource planning work.

3. <u>Governor Crist's Executive Order</u>

The Executive Order directive issued in 2007, particularly the portions of the directive that call for significant increases in renewable, non-emitting energy, and decreases in

EXHIBIT 29

greenhouse gas emissions, are being addressed by FPL in a variety of ways. With respect to renewable energy, FPL's efforts to build its own renewable energy facilities were mentioned above in regard to fuel diversity and are also discussed in more detail in Section III.F.

These renewable energy efforts have the potential to help lower greenhouse gas emissions. In addition, significant reductions, particularly of carbon dioxide (CO_2), will be accomplished in the ten-year reporting time frame of this document by the approved capacity uprates at FPL's four existing nuclear power plants. Further reductions in greenhouse gas emissions are also expected from increasing the overall fuel efficiency of FPL's system through the addition of WCEC Unit 3 and the currently projected modernizations of FPL's existing Cape Canaveral and Riviera plant sites. FPL will also continue to look for cost-effective ways to further improve the efficiency of its system that will lead to even more greenhouse gas emission reductions.

FPL's system CO_2 emission rate (amount of CO_2 emitted per MWh of electricity generated) is already relatively low due in large part to the overall efficiency of FPL's system. The efforts described above have the potential not only to continue the trend of steadily lowering FPL's already low CO_2 emission rate, but also to begin to lower total system CO_2 emissions despite continued growth in population.

4. Renewable Portfolio or Clean Energy Standards (RPS or CPS)

At the time this document is being prepared, Florida does not have a Renewable or Clean Energy Portfolio Standard (RPS or CPS). An RPS proposal was prepared by the FPSC and sent to the Florida Legislature for their consideration, with a possible change to a Clean Portfolio Standard (CPS), during the 2009 legislative session. However, no RPS or CPS legislation was enacted during that session. RPS or CPS legislation, or other legislative initiatives regarding renewable or clean energy contributions, may occur in the future. If such legislation is enacted in 2010 or in a later year, FPL will then determine what steps need to be taken to address the legislation. Such steps would then be discussed in FPL's Site Plan in the year following the enactment of such legislation.

III.D Demand Side Management (DSM)

As previously discussed in Chapter I, and earlier in this chapter, the FPSC in late 2009 imposed significantly higher DSM goals for FPL for 2010 – 2019 than are needed to meet 100% of FPL's remaining resource needs through 2019. In addition, the FPSC ordered

EXHIBIT 29

FPL to spend up to $15.5 million per year to promote DSM-based applications of solar water heating and photovoltaics (PV).

The DSM goals recently imposed by the FPSC have three components: Summer MW reductions, Winter MW reductions, and GWh reductions. Table III.D.1 presents the Summer MW reduction component of these goals. (The Summer MW component, and to a much lesser degree the Winter MW reduction component, impacts FPL's need for future resources such as those discussed in this document. The GWh reduction component has no impact on FPL's need for future resources.)

Table III.D.1: FPL's Summer MW Reduction Goals for DSM

(at the Generator)

Year	Cumulative Summer MW DSM Goals for FPL (at Generator)
2010	110
2011	253
2012	419
2013	599
2014	783
2015	955
2016	1,111
2017	1,251
2018	1,379
2019	1,498

By March 30, 2010, FPL is required to petition the FPSC for approval of the DSM Plan it proposes to implement to meet the DSM goals and renewable energy expenditure mandates. At the time this Site Plan is being prepared, FPL was still developing its DSM Plan that it will petition the FPSC for approval to implement. FPL expects that the FPSC approval process for its DSM Plan will likely take several months. Therefore, FPL does not expect to know with certainty what its portfolio of approved DSM programs will be until mid-2010 at the earliest. FPL expects to provide a description of its approved DSM programs in its 2011 Site Plan.

FPL has sought out and implemented cost-effective DSM programs since 1978. These programs include both conservation initiatives and load management. FPL's DSM efforts through 2009 have resulted in a cumulative Summer peak reduction of approximately 4,257 MW at the generator and an estimated cumulative energy saving of approximately

EXHIBIT 29

51,055 Gigawatt Hour (GWh) at the generator. Accounting for reserve margin requirements, FPL's DSM efforts through 2009 have eliminated the need to construct approximately 13 new 400 MW generating units.

FPL has consistently been among the leading utilities nationally in DSM achievement. For example, according to the U.S. Department of Energy's 2007 data (the last year for which the DOE data was available at the time this Site Plan is being developed), FPL ranked # 1 nationally in energy efficiency demand reduction and # 2 nationally in load management demand reduction. And, importantly, FPL has achieved these significant DSM accomplishments while minimizing the impact on electric rates for all of its customers.

FPL's intent is to address the FPSC's DSM goals and funding mandate for DSM-based solar applications, to continue its national leadership role in DSM, and to continue to minimize the electric rate impact resulting from its DSM efforts.

III.E Transmission Plan

The transmission plan will allow for the reliable delivery of the required capacity and energy to FPL's retail and wholesale customers. The following table presents FPL's proposed future additions of 230 kV bulk transmission lines that must be certified under the Transmission Line Siting Act.

Table III.E.1: List of Proposed Power Lines

(1) Line Ownership	**(2) Terminals (To)**	**(3) Terminals (From)**	**(4) Line Length CKT. Miles**	**(5) Commercial In-Service Date (Mo/Yr)**	**(6) Nominal Voltage (KV)**	**(7) Capacity (MVA)**
FPL	St. Johns 1/	Pringle	25	Dec - 13	230	759
FPL	Manatee 2/	BobWhite	30	Dec - 12	230	1190

1/ Final order certifying the corridor was issued on April 21, 2006. This project is to be completed in two phases. Phase I consisted of 4 miles of new 230kV line (Pringle to Pellicer) and was completed in May-2009. Phase II consists of 21 miles of new 230kV line (St. Johns to Pellicer) and is scheduled to be completed by Dec-2013.

2/ Final order certifying the corridor was issued on November 6, 2008. This project consists of 30 miles of new 230kV line (Manatee to Bobwhite) and is scheduled to be completed by Dec-2012

EXHIBIT 29

In addition, there will be transmission facilities needed to connect several of FPL's projected generating capacity additions to the system transmission grid. These transmission facilities for the projected generating capacity additions at the West County Energy Center site Unit 3, the capacity increases (uprates) at the existing St. Lucie and Turkey Point nuclear sites, and the Cape Canaveral and Riviera Beach modernizations are described on the following pages.

Certain new generation additions will not need new transmission facilities. These generation additions include the Martin Next Generation Solar Energy Center and the Space Coast Next Generation Solar Energy Center. The Martin solar thermal facility does not add any new generation capacity at the site and, therefore, no new transmission facilities are required. The Space Coast facility is an addition of 10 MW of PV generation that will be connected at distribution voltage at the Grissom substation. No new transmission facilities are needed.

In regard to the existing generating units that are projected to be temporarily placed on Inactive Reserve status in 2010 and 2011, there are no projected impacts to FPL's transmission system from these units because these units can be returned to active service with adequate notice.

EXHIBIT 29

III.E.1 Transmission Facilities for West County Energy Center (WCEC) Unit 3

The work required to connect West County Energy Center (WCEC) Unit 3 in 2011 to the FPL grid is projected to be as follows:

I. Substation:

1. Build new collector yard containing two collector busses with four breakers to connect the three combustion turbines (CT), and one steam turbine (ST).
2. Build new Sugar 230 kV Substation on WCEC site.
3. Construct two string busses to connect the collector busses to Sugar 230kV Substation.
4. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
5. At Corbett Substation, relocate Germantown 230 kV line terminal from Corbett to Sugar Sub.
6. At Corbett Substation, relocate Broward/Yamato 230 kV line terminal from Corbett to Sugar Sub.
7. At Corbett Substation, install new Sugar 230 kV line terminal in Bay 2W.
8. At Corbett Substation, install one 5-ohm inductor on the 230 kV side of the 500/230 kV autotransformer.
9. Add relays and other protective equipment.

II. Transmission:

1. Relocate Germantown 230 kV line from Corbett to Sugar.
2. Relocate Broward/Yamato 230 kV line from Corbett to Sugar.
3. Construct one mile 230 kV 1190 MVA line from Sugar to Corbett.

EXHIBIT 29

III.E.2 Transmission Facilities for St. Lucie Units 1 & 2 Capacity Uprates

The work required to address the St. Lucie Units 1 & 2 uprates in 2011 for Unit 1, and in 2012 for Unit 2, in regard to the FPL grid is projected to be as follows:

I. Substation:

1. At Midway Substation, replace eleven 230 kV disconnect switches, and six wave traps. Also upgrade associated jumpers, bus work and equipment connections.
2. At St. Lucie Switchyard, replace eighteen 230 kV disconnect switches and six wave traps.
3. Uprate the Unit 1A and 1B main step-up transformers to 635 MVA.
4. Uprate the spare main step-up transformer to 635 MVA to replace Unit 2A main step-up transformer.
5. Replace the Unit 2B main step-up transformer with a new one rated at 635 MVA.
6. Add relays and other protective equipment.

II. Transmission:

1. Upgrade the three existing St. Lucie-Midway 230 kV lines with spacers between the conductors to achieve a normal (continuous) rating of 2790 Amperes.
2. Replace one existing overhead ground wire on each of the three existing St. Lucie Midway 230kV line with fiber optic overhead ground wire for protective relay communication.

EXHIBIT 29

III.E.3 Transmission Facilities for Turkey Point Units 3 & 4 Capacity Uprates

The work required to address the Turkey Point Units 3 & 4 uprates in 2012 in regard to the FPL grid is projected to be as follows:

I. Substation:

1. At Turkey Point Switchyard, install two 5-Ohm series phase inductors combined with external shunt capacitors on the southeast and southwest 230 kV operating busses.
2. At Turkey Point Switchyard, replace twelve 230 kV disconnect switches. Also upgrade associated jumpers, bus work and equipment connections.
3. Uprate the Unit 3 and Unit 4 main step-up transformers to 970 MVA.
4. Replace spare main step-up transformer with 1028 MVA transformer.
5. Add relays and other protective equipment.
6. Replace breaker failure panels at Davis Substation.
7. Replace breaker failure panels at Flagami Substation.

II. Transmission:

1. Upgrade the existing string busses for both Units 3 & 4 between the main step-up transformers and the switchyard with spacers between the conductors.

EXHIBIT 29

III.E.4 Transmission Facilities for Cape Canaveral Next Generation Clean Energy Center (Projected Modernization)

The work required to connect the projected Cape Canaveral Next Generation Clean Energy Center in 2013 to the FPL grid is forecasted to be as follows:

I. Substation:

1. Build new collector yard containing two collector busses with four breakers to connect the three combustion turbines (CT), and one steam turbine (ST).
2. Construct two string busses to connect the collector busses to Cape Canaveral 230kV Substation.
3. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
4. At Cape Canaveral Switchyard replace eight 230 kV disconnect switches. Also upgrade associated jumpers, bus work and equipment connections.
5. Expand switchyard relay vault and add relays and other protective equipment.

II. Transmission:

1. Relocate the Cape Canaveral-Grissom 115 kV line.

EXHIBIT 29

III.E.5 Transmission Facilities for Riviera Beach Next Generation Clean Energy Center (Projected Modernization)

The work required to connect the projected Riviera Beach Next Generation Clean Energy Center in 2014 to the FPL grid is forecasted to be as follows:

I. Substation:

1. Expand the Riviera 230 kV Switchyard five breakers to accommodate terminals for one combustion turbine (CT), and one steam turbine (ST).
2. Construct a new 138 kV Riviera Switchyard - five bays, 14 breakers with terminals to connect two CT units and seven 138 kV lines.
3. Add four main step-up transformers (3-370 MVA, 1- 580 MVA), one for each CT, and one for the ST.
4. Add relays and other protective equipment.
5. At Ranch Substation, add a new 230 kV bay 5 and upgrade bay 4 to 3000 Amperes.
6. Breaker replacements:
   Ranch Substation – Replace one 230 kV breaker
   Broward Substation – Replace one 230 kV breaker

II. Transmission:

1. Break the Indiantown-Riviera 230kV and extend each of the line segments south (approx. 4 miles) to connect to the Ranch 230 kV Substation forming Indiantown-Ranch and a Ranch-Riviera 230 kV circuits.
2. Remove Corbett-Ranch #2 230 kV line at Ranch and:
   a. extend to meet the Cedar-Lauderdale 230 kV line N/S corridor (approx. 10 miles).
3. Break Cedar -Corbett 230 kV (near Ranch Sub in Corbett-Jog section) and:
   a. Extend Cedar side to Riviera, (approx. 15 miles) creating new Cedar-Riviera 230 kV.
   b. Extend Corbett side to meet the Cedar-Lauderdale 230 kV N/S corridor (approx. 10 miles).
4. Break Cedar-Lauderdale 230 kV (near 230 corridor running N/S)
   a. Connect Cedar side to meet 3.b. to create a Cedar to Corbett 230 kV.
   b. Connect Lauderdale side to meet 2.a. to create a Corbett to Lauderdale 230 kV.
5. Upgrade the existing IBM-Yamato 138 kV line to 1200 Amperes.
6. New underground 138 kV tie line between new Riviera 138 kV Switchyard and 560 MVA, 230/138 kV autotransformer in the expanded Riviera 230 kV Substation.
7. Relocate six existing 138 kV lines from existing Ranch 138 kV Switchyard to new Riviera 138 kV Switchyard.

EXHIBIT 29

III.F. Renewable Resources

FPL has been the leading Florida utility in examining ways to utilize renewable energy technologies to meet its customers' current and future needs. FPL has been involved since 1976 in renewable energy research and development and in facilitating the implementation of various renewable energy technologies. For purposes of discussing FPL's renewable energy efforts in this document, those efforts will be placed into five categories.

1) Early Research & Development Efforts:

FPL assisted the Florida Solar Energy Center (FSEC) in the late 1970s in demonstrating the first residential solar photovoltaic (PV) system east of the Mississippi. This PV installation at FSEC's Brevard County location was in operation for over 15 years and provided valuable information about PV performance capabilities in Florida on both a daily and annual basis. FPL later installed a second PV system at the FPL Flagami substation in Miami. This 10-kilowatt (kW) system was placed into operation in 1984. (The system was removed in 1990 to make room for substation expansion once testing of this PV installation had been completed.)

For a number of years, FPL maintained a thin-film PV test facility located at the FPL Martin Plant Site. This FPL PV test facility was used to test new thin-film PV technologies and to identify design, equipment, or procedure changes necessary to accommodate direct current electricity from PV facilities into the FPL system. Although this testing has ended, the site is now the home for PV capacity which was installed as a result of FPL's recent Green Pricing effort (which is discussed below).

2) Demand Side & Customer Efforts:

In terms of utilizing renewable energy sources to meet its customers' needs, FPL initiated the first utility-sponsored conservation program in Florida designed to facilitate the implementation of solar technologies by its customers. FPL's Conservation Water Heating Program, first implemented in 1982, offered incentive payments to customers choosing solar water heaters. Before the program ended (due to the fact that it was no longer cost-effective), FPL paid incentives to approximately 48,000 customers who installed solar water heaters.

In the mid-1980s, FPL introduced another renewable energy program, FPL's Passive Home Program. This program was created in order to broadly disseminate information about passive solar building design techniques which are most applicable

EXHIBIT 29

in Florida's climate. As part of this program, three Florida architectural firms created complete construction blueprints for six passive home designs with the assistance of the FSEC and FPL. These designs and blueprints were available to customers at a low cost. During its existence, this program was popular and received a U.S. Department of Energy award for innovation. The program was eventually phased out due to a revision of the Florida Model Energy Building Code (Code). This revision was brought about in part by FPL's Passive Home Program. The revision incorporated into the Code one of the most significant passive design techniques highlighted in the program: radiant barrier insulation.

In early 1991, FPL received approval from the FPSC to conduct a research project to evaluate the feasibility of using small PV systems to directly power residential swimming pool pumps. This research project was completed with mixed results. Some of the performance problems identified in the test were deemed to be solvable, particularly when new pools are constructed. However, the high cost of PV, the significant percentage of sites with unacceptable shading, and various customer satisfaction issues remain as significant barriers to wide acceptance and use of this particular solar application.

FPL has since continued to analyze and promote the utilization of PV. These efforts have included a PV research, development, and education project, "green energy" research projects and pricing programs, and participation in the State of Florida's PV for Schools program. With resources from the FPL Group Foundation, FPL will contribute 30 kw of PV to schools and educational non-profits in its service area during 2010. This initiative also delivers teacher training and curriculum that is tied to the Sunshine Teacher Standards in Florida. Additionally, it provides teacher grants to promote and fund projects in the classrooms.

FPL has also been investigating fuel cell technologies through monitoring of industry trends, discussions with manufacturers, and direct field trials. From 2002 through the end of 2005, FPL conducted field trials and demonstration projects of Proton Exchange Membrane (PEM) fuel cells with the objectives of serving customer end-uses while evaluating the technical performance, reliability, economics, and relative readiness of the PEM technology. The demonstration projects were conducted in partnership with customers and included 5 locations. The research projects were useful to FPL in identifying specific issues that can occur in field applications and the current commercial viability of this technology. FPL will continue to monitor the

EXHIBIT 29

progress of these technologies and conduct additional field evaluations as significant developments in fuel cell technologies occur.

In addition, FPL assists customers who are interested in installing PV equipment at their facilities. Consistent with Florida Administrative Code Rule 25-6.065, Interconnection and Net Metering of Customer-Owned Renewable Generation, FPL works with customers to interconnect these customer-owned PV systems. Through December 2009, approximately 645 customer systems (predominantly residential) have been interconnected.

Finally, as part of its DSM goals decision, the FPSC imposed a requirement for Florida's investor-owned utilities to spend up to a set, not-to-exceed amount of money annually to facilitate demand side solar water heater and photovoltaic applications. FPL's not-to-exceed annual amount of money for these applications is approximately $15.5 million. At the time this Site Plan is being prepared, FPL is developing its plan for how these expenditures will be made and is scheduled to file its plan for FPSC approval on March 30, 2010. The FPSC is expected to approve FPL's plan in mid-2010. FPL expects to provide a description of its approved plan for these DSM-based solar expenditures in its 2011 Site Plan.

3) Supply Side Efforts – Power Purchases:

FPL has also facilitated renewable energy projects (facilities which burn bagasse, waste wood, municipal waste, etc.). Firm capacity and energy, and as-available energy, have been purchased by FPL from these types of facilities. (Please refer to Tables I.B.1, I.B.2, and Table I.C.1 in Chapter I).

Periodically, FPL invites renewables suppliers to provide proposals for renewable power and energy at or below avoided costs in response to FPL's Requests for Proposals (RFPs). FPL issued Renewable RFP's in 2007 and 2008 soliciting proposals to provide firm capacity and energy, and energy only, at or below avoided costs from renewable generators. FPL also promptly responds to inquiries for information from prospective renewable energy suppliers either by e-mail or phone.

With regard to existing contracts that have recently ended, FPL and the Solid Waste Authority of Palm Beach (SWA) agreed to extend their contract that expired March 31, 2010 for a 20 year term from April 1, 2012 through April 1, 2032. Also, the firm

EXHIBIT 29

capacity and energy contract with Broward South that expired August 2009 was not renewed, but Broward South continues as an as-available supplier of energy to FPL

4) Supply Side Efforts – FPL Facilities:

FPL is in the process of developing a wind generation project on South Hutchinson Island in St. Lucie County. This project is known as the St. Lucie Wind project and it consists of up to six wind turbine generators capable of generating up to approximately 13.8 MW. In 2007, FPL began the St. Lucie County land use approval process, and soon after applied for the necessary federal and state permitting. However, a decision by the state and federal agencies on the St. Lucie Wind project's permitting will not be finalized until the local land use approval process is completed. The in-service date will depend on the approval and permitting process.

With regard to solar projects, FPL has completed construction of the nation's largest photovoltaic (PV) power generation facility in the country, the 25 MW DeSoto Next Generation Solar Energy Center. In addition, two solar projects that will add 85 MW of solar capacity are projected to be completed in 2010. These three projects are in response to the Florida Legislature's House Bill 7135 which was signed into law by Governor Crist in June 2008. House Bill 7135 (hereafter referred to as the 2008 Energy Bill), was enacted to enable the development of clean, zero greenhouse gas emitting renewable generation in the State of Florida. Specifically, the 2008 Energy Bill authorized cost recovery for the first 110 MW of eligible renewable projects that had the proper land, zoning and transmission rights in place. FPL's three solar projects met the specified criteria, and were granted approval for cost recovery in 2008. Each of the three solar projects is discussed below.

a. The Martin Next Generation Solar Energy Center:

This project will provide 75 MW of solar thermal capacity in an innovative way that directly displaces fossil fuel usage on the FPL system. This project will involve the installation of solar thermal technology that will be integrated into the existing steam cycle for the Martin Unit 8 natural gas-fired CC plant. This project will be the first "hybrid" solar plant in the world, the second largest solar facility in the world, and the largest solar plant of any kind in the U.S. outside of California. Construction began in December 2008 and is expected to be completed by the end of 2010.

EXHIBIT 29

b. The DeSoto Next Generation Solar Energy Center:

This facility has been constructed and began commercial operation in October 2009. It currently is providing up to 25 MW of PV non-firm capacity and energy, making it the largest PV facility in the U.S. The facility utilizes a tracking array that is designed to follow the sun as it traverses through the sky.

c. The Space Coast Next Generation Solar Energy Center:

Located at the Kennedy Space Center, this project is part of an innovative public/private partnership with NASA. When completed, it will provide up to 10 MW of PV non-firm capacity and energy. Construction began in June 2009 and is expected to be completed in 2010.

Each of these facilities is a significant and innovative renewable generating plant in its own right. Collectively, these Next Generation Solar Energy Centers are expected to produce a total of approximately 213,000 megawatt-hours (MWh) of electricity each year, and at peak production provide enough energy to serve the requirements of more than 15,000 homes.

For resource planning purposes, FPL projects that the energy delivered from these renewable facilities will be “as available”, non-firm energy. This is due to several factors. First, the Martin solar thermal facility is designed as a “fuel-substitute” facility, not as a facility that will result in additional capacity and energy being generated. The solar thermal facility will displace the use of fossil fuel on the FPL system when the solar thermal facility is operating. Second, in regard to the two PV facilities, the intermittent nature of the solar resource makes it difficult to accurately determine what contribution the PV facilities at these specific locations can consistently make at FPL’s late Summer afternoon and early Winter morning peak load hours. Once site-specific operating data has been gathered for an appropriate amount of time, FPL will then re-evaluate the actual output from each PV facility to determine what portion, if any, of its output can be projected as firm capacity at the projected peak hours in FPL’s resource planning work.

In addition to these three approved projects, FPL is currently in the process of identifying other potential solar sites in the state in the event that a future Renewable Portfolio Standard (RPS), Clean Energy Portfolio Standard (CPS), or other enabling legislation is enacted by the Florida legislature. FPL is evaluating existing FPL

EXHIBIT 29

generation sites along with potential greenfield sites within FPL's service territory. These potential FPL and greenfield sites are discussed further in Chapter IV.

5) **Ongoing Research & Development Efforts:**

FPL has developed alliances with several Florida universities to promote development of emerging technologies. For example, an alliance has been established with the newly formed Center for Ocean Energy Technology at Florida Atlantic University (FAU), which will focus on the commercialization of ocean current, ocean thermal (i.e., energy conversion as well as cold water air conditioning) and hydrogen technologies. FPL has been taking the lead in assisting FAU with the discussions being held with the U.S. Department of the Interior's Minerals Management Service Department (MMS). MMS is working to establish the permitting process for ocean energy development on the outer continental shelf.

FPL has also developed an alliance with the University of Florida to support its studies of biomass renewable potential and wind studies in the state. In addition, FPL has partnered with the Florida Institute of Technology on fuel cell technology and with the Florida State Universities Center for Applied Power System in regard to grid integration of ocean energy and other renewables.

FPL is also developing a "living lab" to demonstrate FPL's solar energy commitment to employees and visitors at its Juno Beach facility. FPL will evaluate multiple solar technologies and applications to develop a renewable business model resulting in the most cost-effective and reliable source(s) of solar energy to FPL customers.

FPL has also been in discussions with several private companies on multiple emerging technology initiatives including ocean current, ocean thermal, hydrogen, fuel cell technology, biomass, biofuels, and energy storage.

III.G FPL's Fuel Mix and Fuel Price Forecasts

1. FPL's Fuel Mix

Until the mid-1980s, FPL relied primarily on a combination of fuel oil, natural gas, and nuclear energy to generate electricity with significant reliance on oil–fired generation. In the early 1980s, FPL began to purchase "coal-by-wire." In 1987, coal was first added to the fuel mix through FPL's partial ownership and additional purchases from

EXHIBIT 29

the St. Johns River Power Park (SJRPP). This allowed FPL to meet its customers' energy needs with a more diversified mix of energy sources. Additional coal resources were added with the partial acquisition (76%) of Scherer Unit 4 which began serving FPL's customers in 1991. Starting in 1997, petroleum coke was added to the fuel mix as a blend stock with coal at SJRPP.

The trend since the early 1990s has been a steady increase in the amount of natural gas that is used by FPL to provide electricity due, in part, to the introduction of highly efficient and cost-effective CC generating units and the ready availability of natural gas. This planning document reflects an evolution in that trend in recognition that, although efficient gas-fired generation continues to provide significant benefits to FPL's customers, adding natural gas-fired additions exclusively would, in the long term, create an unbalanced generation portfolio. In 2009, FPL placed into commercial operation two new gas-fired CC units at the West County Energy Center (WCEC) site. A third new CC unit is projected to be added to the WCEC site in 2011. In addition, FPL is currently projecting to modernize its existing Cape Canaveral and Riviera plant sites by removing the existing steam generating units and replacing them with two highly efficient new CC units, one at each site. These new CC units will provide highly efficient generation that will dramatically improve FPL's overall system generation efficiency.

In addition, FPL is increasing its utilization of nuclear energy through capacity uprates of its four existing nuclear units. These uprates will add a total of approximately 400 MW of nuclear generation capacity by 2012. (FPL is also pursuing plans to obtain permits to build two new nuclear units at its existing Turkey Point site that, in total, would add approximately 2,200 MW of new nuclear generating capacity. FPL currently assumes, for resource planning purposes, that the in-service dates for the new nuclear units are outside of the 2010-2019 reporting time frame of this document. At the time this document is being prepared, FPL is evaluating what the revised in-service dates for Turkey Point Units 6 & 7 should be for planning purposes. FPL will address those revised in-service dates for planning purposes in its May 3, 2010 nuclear cost recovery filing to the FPSC.)

In regard to utilizing renewable energy, FPL has committed to add 110 MW of solar generating capacity by 2010 through a 75 MW solar thermal facility at FPL's existing Martin site, a 25 MW PV facility in DeSoto County, and a 10 MW PV facility in

EXHIBIT 29

Brevard County. The 25 MW PV facility was placed into commercial operation in 2009. The other two solar facilities are projected to be completed in 2010.

FPL's future resource planning work will continue to focus on identifying and evaluating alternatives that would most cost-effectively maintain and/or enhance FPL's long-term fuel diversity. These fuel diverse alternatives may include: the purchase of power from renewable energy facilities, addition of FPL-owned renewable energy facilities, obtaining access to diversified sources of natural gas such as liquefied natural gas (LNG) and natural gas from the Mid-Continent unconventional reserves, preserving FPL's ability to utilize fuel oil at its existing units, and increased utilization of nuclear energy. (New advanced technology coal generating units are not currently considered as viable options in Florida in the ten-year reporting period of this document due to concerns over greenhouse gas emissions.) The evaluation of the feasibility and cost-effectiveness of these, and other possible alternatives, will be an ongoing part of future planning cycles.

FPL's current use of various fuels to supply energy to customers, plus a projection of this "fuel mix" through 2019 based on the resource plan presented in this document, is presented in Schedules 5, 6.1, and 6.2 later in this chapter.

2. <u>FPL's Fuel Mix</u>

Fossil fuel price forecasts, and the resulting projected price differentials between fuels, are major drivers used in evaluating alternatives for meeting future generating capacity needs. FPL's forecasts are generally consistent with other published contemporary forecasts.

Future oil and natural gas prices, and to a lesser extent, coal and petroleum coke prices, are inherently uncertain due to a significant number of unpredictable and uncontrollable drivers that influence the short-and long-term price of oil, natural gas, coal, and petroleum coke. These drivers include:

a. Current and projected worldwide demand for crude oil and petroleum products;

b. Current and projected worldwide refinery capacity/production;

c. Expected worldwide economic growth, in particular in China, and other Pacific Rim countries;

EXHIBIT 29

d. Organization of Petroleum Exporting Countries (OPEC) production, the availability of spare OPEC production capacity and the assumed growth in spare OPEC production capacity;

e. Non-OPEC production and expected growth in non-OPEC production;

f. The geopolitics of the Middle East, West Africa, the Former Soviet Union, Nigeria, Venezuela, etc., as well as, the uncertainty and impact upon worldwide energy consumption related to U. S. and worldwide environmental legislation, politics, etc.;

g. Current and projected North American natural gas demand;

h. Current and projected U.S., Canadian, and Mexican natural gas production;

i. The worldwide supply and demand for LNG; and

j. The growth in solid fuel generation on a U. S. and worldwide basis.

The inherent uncertainty and unpredictability in these factors today and tomorrow clearly underscores the need to develop a set of plausible oil, natural gas, and solid fuel (coal and petroleum coke) price scenarios that will bound a reasonable set of long-term price outcomes. In this light, FPL developed and utilized Low, Medium, and High price forecasts for fossil fuels in some of its 2009 resource planning work, particularly in regard to the nuclear cost recovery filings.

FPL’s Medium price forecast methodology is consistent for oil and natural gas. For oil and natural gas commodity prices, FPL’s Medium price forecast applies the following methodology:

a. For 2010 through 2012, the methodology used the January 26, 2010 forward curve for New York Harbor 1% sulfur heavy oil, U. S. Gulf Coast 1% sulfur heavy oil, ultra low sulfur diesel, and Henry Hub natural gas commodity prices;

b. For the next two years (2013 and 2014), FPL used a 50/50 blend of the January 26, 2010 forward curve and the most current projections at the time from The PIRA Energy Group;

c. For the 2015 through 2025 period, FPL used the annual projections from The PIRA Energy Group, and;

d. For the period beyond 2025, FPL used the real rate of escalation provided in the Energy Information Administration (EIA) *Annual Energy Outlook 2009* publication. FPL assumed a 2.5% annual rate of escalation to convert real prices to nominal prices prior to 2025, with no escalation from 2025 forward. In addition to the development of oil and natural gas commodity prices, nominal price forecasts also were prepared for oil and natural gas transportation costs. The addition of commodity and transportation forecasts resulted in delivered price forecasts.

FPL's Medium price forecast methodology is also consistent for coal and petroleum coke prices. Coal and petroleum coke prices were based upon the following approach:

a. The price forecasts for Central Appalachian coal (CAPP), Powder River Basin (PRB), South American coal, and petroleum coke were provided by JD Energy;

b. The marine transportation rates from the loading port for coal and petroleum coke to an import terminal were also provided by JD Energy;

c. The coal price forecast for SJRPP and Plant Scherer assume the continuation of the existing mine-mouth and transportation contracts until expiration, along with the purchase of spot coal, to meet generation requirements.

The development of FPL's Low and High price forecasts for oil, natural gas, coal, and petroleum coke prices were based on the historical volatility of the 12-month forward price, one year ahead. FPL developed these forecasts to account for the uncertainty which exists within each commodity as well as across commodities. These forecasts reflect a range of reasonable forecast outcomes.

3. Nuclear Fuel Cost Forecast

This section reviews the various steps needed to fabricate nuclear fuel for delivery to the nuclear power plants, the method used to forecast the price for each step, and other comments regarding FPL's nuclear fuel cost forecast.

a) Steps Required for Nuclear Fuel to be delivered to FPL's Plants

Four separate steps are required before nuclear fuel can be used in a commercial nuclear power reactor. These steps are summarized below.

EXHIBIT 29

(1) Mining: Uranium is produced in many countries such as Canada, Australia, Kazakhstan, and the United States. During the first step, uranium is mined from the ground using techniques such as open pit mining, underground mining, in-situ leaching operations, or production as a by-product from other mining operations, such as gold, copper, or phosphate rocks. The product from this first step is the raw uranium delivered as an oxide, U3O8 (sometimes referred to as yellowcake).

(2) Conversion: During the second step, the U3O8 is chemically converted into UF6 which, when heated, changes into a gaseous state. This second step further removes any chemical impurities and serves as preparation for the third step, which requires uranium to be in a gaseous state.

(3) Enrichment: The third step is called enrichment. Natural uranium contains 0.711% of uranium at an atomic mass of 235 (U-235) and 99.289% of uranium at an atomic mass of 238 (U-238). FPL's nuclear reactors use uranium with a higher percentage of up to five percent (5%) of U-235 atoms. Because natural uranium does not contain a sufficient amount of U-235, the third step increases the percentage amount of U-235 from 0.711% to a level specified when designing the reactor core (typically in a range from approximately 3% to as high as 5%). The output of this enrichment process is enriched uranium in the form of UF6.

(4) Fabrication: During the last step, fuel fabrication, the enriched UF6 is changed to a UO2 powder, pressed into pellets, and fed into tubes, which are sealed and bundled together into fuel assemblies. These fuel assemblies are then delivered to the plant site for insertion in a reactor.

Like other utilities, FPL has purchased raw uranium and the other components of the nuclear fuel cycle separately from numerous suppliers from different countries.

b) Price Forecasts for Each Step

(1) Mining: There is some volatility in the current uranium market. Demand is rather stable and outputs from production facilities have been increasing steadily. The following are the current major contributors that led to less volatility in the prices for uranium:

EXHIBIT 29

- The recent financial crisis had caused significant sales of inventories and caused the market price to drop earlier than predicted. However, Hedge funds continue to purchase uranium, reducing its availability to end users.

- The large inventory from the U.S. Department of Energy (DOE) is being withheld from the market due to political pressure from suppliers concerned about further price drop already affected by the current financial downturn. However, some of it is made available as barter in exchange for clean-up costs for the Department of Energy enrichment facilities.

- The Russians have announced that they would not supply down-blended weapons material to the U.S. government after 2013 for sale in the U.S. market. However, there is not an agreement between the U.S. and Russian government for the sales of enriched uranium.

- The U.S. Department of Commerce (DOC) has imposed restrictions on the import of nuclear fuel from France and Russia.

FPL expects the market to be more consistent with market fundamentals. In 2008 and 2009, a number of actions resolved restrictions of imports of foreign uranium. Recent law enacted in 2008 resolved the import of Russian-enriched uranium, by allowing some imports of Russian-enriched uranium to about 20-25% of needs for currently operating units, but with no restriction on the first core for new units and no restrictions after 2020. As mentioned earlier, the economic recession has also had a major impact and eliminated a significant portion of speculative demands with uranium pricing returning to close to the fundamentals. FPL cannot discount the possibility of future periodic sharp increase in prices, but believes such occurrences will likely be temporary in nature.

FPL's nuclear fuel price forecasts are the result of FPL's analysis based on inputs from various nuclear fuel market expert reports and studies.

(2) <u>Conversion:</u> FPL's price forecast considers the construction of new nuclear units. Just like for raw uranium, an increase in demand for conversion services would result from this need. Insufficient planned production is currently forecasted after 2013 to meet the higher demand scenario. As with additional

EXHIBIT 29

raw uranium production, supply will expand beyond current level once more firm commitments are made including commitments to building new nuclear units.

(3) **Enrichment:** With no new production capacity, the current tight market supply for economically produced enrichment services will continue until 2013. The current expensive diffusion plant can make up any gaps in supply of enrichment services. In addition, there are a number of new facilities coming on-line through 2013, using more efficient and proven processes such as the use of centrifuges for enrichment of uranium. As with supply for the other steps of the nuclear fuel cycle, expansion of future capacity is feasible within the lead time for constructing new nuclear units and any other projected increase in demand. Meanwhile, world supply and demand will continue to be balanced such that FPL expects adequate supply of enrichment services. The tight supply/demand will most likely cause the price of enrichment services to continue to rise in the future.

(4) **Fabrication:** Because the nuclear fuel fabrication process is highly regulated by the Nuclear Regulatory Commission (NRC), not all production facilities can qualify as suppliers to nuclear reactors in the U.S. Although world supply and demand is expected to show significant excess capacity for the foreseeable future, the gap is not as wide for U.S. supply and demand. The supply for the U.S. market is expected to be sufficient to meet U.S. demand for the foreseeable future.

c) Other Comments Regarding FPL’s Nuclear Fuel Cost Forecast

The calculations for the nuclear fuel cost forecasts used in FPL’s 2009 resource planning work were performed consistent with the method then used for FPL’s Fuel Clause filings, including the assumption of a fuel lease and the assumption of refueling outages every 18 months. The costs for each step to fabricate the nuclear fuels were added to come up with the total costs of the fresh fuel to be loaded at each refueling (acquisition costs). The acquisition cost for each group of fresh fuel assemblies were then amortized over the energy produced by each group of fuel assemblies FPL also added 1 mill per kilowatt hour net to reflect payment to DOE for spent fuel disposal.[3]

---

[3] Consistent with the FPSC’s decision in FPL’s recent base rate case, FPL will no longer be leasing its nuclear fuel. This fact, and its implications on the projected costs of nuclear fuel, will be reflected in FPL’s 2010 and later resource planning work.

EXHIBIT 29

Schedule 5
Fuel Requirements [1/]

	Fuel Requirements	Units	Actual 2/		Forecasted									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(1)	Nuclear	Trillion BTU	261	250	267	249	260	304	309	305	305	309	305	304
(2)	Coal	1,000 TON	3,599	3,577	3,289	3,956	3,249	3,959	3,639	3,956	3,775	3,760	3,764	3,765
(3)	Residual (FO6)- Total	1,000 BBL	9,379	7,489	2,825	1,965	1,432	730	687	759	1,459	1,750	1,876	2,067
(4)	Steam	1,000 BBL	9,379	7,489	2,825	1,965	1,432	730	687	759	1,459	1,750	1,876	2,067
(5)	Distillate (FO2)- Total	1,000 BBL	38	47	62	101	32	0	0	28	74	70	84	99
(6)	Steam	1,000 BBL	11	0	0	0	0	0	0	0	0	0	0	0
(7)	CC	1,000 BBL	8	6	5	35	0	0	0	0	0	0	0	0
(8)	CT	1,000 BBL	20	40	57	66	32	0	0	28	74	70	84	99
(9)	Natural Gas -Total	1,000 MCF	449,819	481,426	452,751	490,961	499,105	477,157	515,407	520,939	568,505	576,404	595,266	609,770
(10)	Steam	1,000 MCF	143,581	81,260	21,279	28,814	20,688	10,791	10,341	10,823	21,205	22,879	27,979	34,253
(11)	CC	1,000 MCF	303,942	395,703	430,900	461,073	477,926	466,366	505,066	509,798	546,450	552,683	566,289	574,427
(12)	CT	1,000 MCF	2,296	4,462	573	1,075	492	0	0	318	850	842	999	1,089

1/ Reflects fuel requirements for FPL only.
2/ Source: A Schedules.

EXHIBIT 29

Schedule 6.1
Energy Sources

			Actual 1/		Forecasted									
	Energy Sources	**Units**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
(1)	Annual Energy Interchange 2/	GWH	10,141	9,508	8,429	6,092	5,757	5,587	5,696	5,689	606	0	0	0
(2)	Nuclear	GWH	24,024	22,893	23,912	22,346	23,358	27,275	27,751	27,353	27,355	27,751	27,353	27,276
(3)	Coal	GWH	6,423	6,362	6,274	7,418	6,223	7,446	6,894	7,438	7,118	7,088	7,099	7,100
(4)	Residual(FO6) -Total	GWH	5,702	4,560	1,871	1,304	952	487	458	505	971	1,164	1,248	1,373
(5)	Steam	GWH	5,702	4,560	1,871	1,304	952	487	458	505	971	1,164	1,248	1,373
(6)	Distillate(FO2) -Total	GWH	17	21	23	52	9	0	0	8	23	22	27	33
(7)	Steam	GWH	6	3	0	0	0	0	0	0	0	0	0	0
(8)	CC	GWH	3	3	4	30	0	0	0	0	0	0	0	0
(9)	CT	GWH	9	15	19	22	9	0	0	8	23	22	27	33
(10)	Natural Gas -Total	GWH	58,820	62,728	64,256	69,523	71,420	69,174	75,234	76,103	82,375	83,391	85,796	87,531
(11)	Steam	GWH	7,257	8,705	2,105	2,844	2,043	1,070	1,025	1,071	2,093	2,260	2,762	3,376
(12)	CC	GWH	51,368	53,636	62,109	66,602	69,343	68,104	74,209	75,011	80,224	81,074	82,967	84,086
(13)	CT	GWH	195	387	42	76	34	0	0	22	58	57	67	70
(14)	Other 3/	GWH	5,877	5,231	5,122	4,901	5,799	5,931	6,438	7,645	7,224	7,821	8,142	8,400
	Net Energy For Load 4/	GWH	111,004	111,304	109,886	111,634	113,516	115,899	122,471	124,742	125,672	127,236	129,665	131,712

1/ Source: A Schedules

2/ The projected figures are based on estimated energy purchases from SJRPP and the Southern Companies.

3/ Represents a forecast of energy expected to be purchased from Qualifying Facilities, Independent Power Producers, net of Economy and other Power Sales.

4/ Net Energy For Load values for the years 2010 - 2019 are also shown in Schedule 2.3.

EXHIBIT 29

Schedule 6.2
Energy Sources % by Fuel Type

	Energy Source	Units	Actual [1/] 2008	2009	Forecasted 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(1)	Annual Energy Interchange 2/	%	9.1	8.5	7.7	5.5	5.1	4.8	4.7	4.6	0.5	0.0	0.0	0.0
(2)	Nuclear	%	21.6	20.6	21.8	20.0	20.6	23.5	22.7	21.9	21.8	21.8	21.1	20.7
(3)	Coal	%	5.8	5.7	5.7	6.6	5.5	6.4	5.6	6.0	5.7	5.6	5.5	5.4
(4)	Residual (FO6) -Total	%	5.1	4.1	1.7	1.2	0.8	0.4	0.4	0.4	0.8	0.9	1.0	1.0
(5)	Steam	%	5.1	4.1	1.7	1.2	0.8	0.4	0.4	0.4	0.8	0.9	1.0	1.0
(6)	Distillate (FO2) -Total	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(7)	Steam	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(8)	CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(9)	CT	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(10)	Natural Gas -Total	%	53.0	56.4	58.5	62.3	62.9	59.7	61.4	61.0	65.5	65.5	66.2	66.5
(11)	Steam	%	6.5	7.8	1.9	2.5	1.8	0.9	0.8	0.9	1.7	1.8	2.1	2.6
(12)	CC	%	46.3	48.2	56.5	59.7	61.1	58.8	60.6	60.1	63.8	63.7	64.0	63.8
(13)	CT	%	0.2	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
(14)	Other 3/	%	5.3	4.7	4.7	4.4	5.1	5.1	5.3	6.1	5.7	6.1	6.3	6.4
			100	100	100	100	100	100	100	100	100	100	100	100

1/ Source: A Schedules.

2/ The projected figures are based on estimated energy purchases from SJRPP and the Southern Companies.

3/ Represents a forecast of energy expected to be purchased from Qualifying Facilities, Independent Power Producers, net of Economy and other Power Sales.

EXHIBIT 29

Schedule 7.1
Forecast of Capacity, Demand, and Scheduled Maintenance At Time Of Summer Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
August of Year	Firm Installed 1/ Capacity MW	Firm Capacity Import MW	Firm Capacity Export MW	Firm QF MW	Total Firm Capacity Available 2/ MW	Total Peak 3/ Demand MW	DSM 4/ MW	Firm Summer Peak Demand MW	Reserve Margin Before Maintenance 5/ MW	% of Peak	Scheduled Maintenance MW	Reserve Margin After Maintenance 6/ MW	% of Peak
2010	22,394	1,460	0	640	24,494	21,922	2,118	19,804	4,689	23.7	0	4,689	23.7
2011	22,442	1,460	0	595	24,497	21,788	2,249	19,539	4,958	25.4	0	4,958	25.4
2012	22,740	1,305	0	650	24,695	22,139	2,408	19,731	4,963	25.2	0	4,963	25.2
2013	24,054	1,305	0	650	26,009	22,332	2,583	19,749	6,259	31.7	0	6,259	31.7
2014	25,266	1,305	0	650	27,221	23,575	2,765	20,810	6,410	30.8	0	6,410	30.8
2015	25,266	1,305	0	650	27,221	23,924	2,941	20,983	6,238	29.7	0	6,238	29.7
2016	25,266	0	0	650	25,916	24,344	3,103	21,242	4,674	22.0	0	4,674	22.0
2017	25,266	0	0	650	25,916	24,774	3,248	21,526	4,390	20.4	0	4,390	20.4
2018	25,658	0	0	650	26,308	25,328	3,381	21,947	4,360	19.9	0	4,360	19.9
2019	26,045	0	0	650	26,695	25,785	3,502	22,282	4,412	19.8	0	4,412	19.8

1/ Capacity additions and changes projected to be in-service by June 1st are generally considered to be available to meet Summer peak loads w are forecasted to occur during August of the year indicated. All values are Summer net MW.

2/ Total Capacity Available = Col.(2) + Col.(3) - Col.(4) + Col.(5).

3/ These forecasted values reflect the 2010 load forecast without incremental DSM or cumulative load management.

4/ The DSM MW shown represent cumulative load management capability plus incremental conservation from 1/2010-on intended for use with the 2010 load forecast. They are not included in total additional resources but reduce the peak load upon which Reserve Margin calculations are based.

5/ Margin (%) Before Maintenance = Col.(10) / Col.(9)

6/ Margin (%) After Maintenance = Col.(13) / Col.(9)

EXHIBIT 29

Schedule 7.2
Forecast of Capacity , Demand, and Scheduled Maintenance At Time of Winter Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Firm Installed [1/] Capability	Firm Capacity Import	Firm Capacity Export	Firm QF	Total Firm Capacity Available [2/]	Total Peak [3/] Demand	DSM [4/]	Firm Winter Peak Demand	Reserve Margin Before Maintenance [5/]		Scheduled Maintenance	Reserve Margin After Maintenance [6/]	
January of Year	MW	MW	MW	MW	MW	MW	MW	MW	MW	% of Peak	MW	MW	% of Peak
2010	24,638	1,481	0	690	26,809	20,550	1,816	18,734	8,074	43.1	0	8,074	43.1
2011	23,448	1,485	0	595	25,528	20,647	1,859	18,788	6,740	35.9	0	6,740	35.9
2012	24,106	1,485	0	595	26,186	20,861	1,912	18,949	7,237	38.2	0	7,237	38.2
2013	24,402	1,305	0	650	26,357	21,138	1,974	19,164	7,193	37.5	0	7,193	37.5
2014	25,757	1,305	0	650	27,712	22,152	2,044	20,108	7,604	37.8	0	7,604	37.8
2015	27,101	1,305	0	650	29,056	22,745	2,118	20,627	8,428	40.9	0	8,428	40.9
2016	27,101	375	0	650	28,126	23,118	2,189	20,929	7,196	34.4	0	7,196	34.4
2017	27,101	0	0	650	27,751	23,488	2,255	21,233	6,518	30.7	0	6,518	30.7
2018	27,101	0	0	650	27,751	23,889	2,316	21,573	6,178	28.6	0	6,178	28.6
2019	27,495	0	0	650	28,145	24,293	2,372	21,921	6,224	28.4	0	6,224	28.4

1/ Capacity additions and changes projected to be in-service by January 1st are considered to be available to meet Winter peak loads which are forecast to occur during January of the "second" year indicated. All values are Winter net MW.

2/ Total Capacity Available = Col.(2) + Col.(3) - Col.(4) + Col.(5).

3/ These forecasted values reflect the 2010 load forecast without incremental DSM or cumulative load management.

4/ The DSM MW shown represent cumulative load management capability plus incremental conservation from 1/2010-on intended for use with the 2010 load forecast. They are not included in total additional resources but reduce the peak load upon which Reserve Margin calculations are based.

5/ Margin (%) Before Maintenance = Col.(10) / Col.(9)

6/ Margin (%) After Maintenance = Col.(13) / Col.(9)

EXHIBIT 29

Schedule 8
Planned And Prospective Generating Facility Additions And Changes

Plant Name	(2) Unit No.	(3) Location	(4) Unit Type	(5) Fuel Pri.	(5) Fuel Alt.	(7) Fuel Transport Pri.	(8) Fuel Transport Alt.	(9) Const. Start Mo./Yr.	(10) Comm. In-Service Mo./Yr.	(11) Expected Retirement Mo./Yr.	(12) Gen. Max. Nameplate KW	(13) Firm Net Capability Winter MW	(14) Firm Net Capability Summer MW	(15) Status
ADDITIONS/ CHANGES														
2010														
Cape Canaveral	1	Brevard County	ST	FO6	NG	WA	PL	Unknown	Unknown	Unknown	402,050	(398)	(396)	
Cape Canaveral	2	Brevard County	ST	FO6	NG	WA	PL	Unknown	Unknown	Unknown	402,050	(398)	(396)	
Riviera	3	City of Riviera Beach	ST	FO6	NG	WA	PL	Unknown	Unknown	Unknown	310,420	(280)	(277)	
Riviera	4	City of Riviera Beach	ST	FO6	NG	WA	PL	Unknown	Unknown	Unknown	310,420	(291)	(288)	
Lauderdale	4	Broward County	CC	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	526,250	2	---	OT
Lauderdale	5	Broward County	CC	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	526,250	2	---	OT
Lauderdale	1-12	Broward County	GT	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	410,734	29	---	OT
Lauderdale	12-24	Broward County	GT	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	410,734	29	---	OT
Manatee	3	Manatee County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	1,224,510	(2)	6	OT
Ft. Myers	2	Lee County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	1,775,390	(3)	---	OT
Ft. Myers	3A & B	Lee County	CT	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	376,380	(2)	3	OT
Ft. Myers	1-12	Lee County	GT	FO2	No	PL	No	Jan-10	Jun-10	Unknown	744,120	49	---	OT
Martin	3	Martin County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	612,000	---	3	OT
Martin	4	Martin County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	612,000	---	3	OT
Martin	8	Martin County	CC	NG	No	PL	No	Jan-10	Jun-10	Unknown	1,224,510	---	10	OT
Martin Next Generation Solar Energy Center		Martin County	PV						Dec-10			See Note 3		
Port Everglades	1-12	City of Hollywood	GT	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	410,734	29		OT
Putnam	1	Putnam County	CC	NG	FO2	PL	WA	Jan-10	Jun-10	Unknown	290,004	12	---	OT
Putnam	2	Putnam County	CC	NG	FO2	PL	WA	Jan-10	Jun-10	Unknown	290,004	12	---	OT
Scherer	4	Monroe, GA	BIT	SUB	No	RR	No	Jan-10	Jun-10	Unknown	680,368	(8)	(8)	OT
SJRPP	1	Duval County	BIT	BIT	Pet	RR	WA	Jan-10	Jun-10	Unknown	135,918	(1)	(1)	OT
SJRPP	2	Duval County	BIT	BIT	Pet	RR	WA	Jan-10	Jun-10	Unknown	135,918	(1)	(1)	OT
Space Coast Next Generating Solar Energy Center (PV)	1	Brevard County	PV						Jun-10		10,000	See Note 4		P
Turkey Point	5	Miami-Dade County	CC	NG	FO2	PL	PL	Jan-10	Jun-10	Unknown	1,224,510	2	---	OT
2010 Changes/Additions w/o Inactive Reserve Total:												**(1,218)**	**(1,342)**	
Cutler	5	Miami Dade County	ST	NG	No	PL	No	---	---	---	75,000	(69)	(68)	OT
Cutler	6	Miami Dade County	ST	NG	No	PL	No	---	---	---	161,500	(138)	(137)	OT
Port Everglades	1	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	225,250	(214)	(213)	OT
Port Everglades	2	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	225,250	(214)	(213)	OT
Sanford	3	Volusia County	ST	FO6	NG	WA	PL	---	---	---	156,250	(140)	(138)	OT
2010 Changes/Additions with Inactive Reserve Total:												**(1,993)**	**(2,111)**	
2011														
West County Energy Center	3	Palm Beach County	CC	NG	FO2	PL	PL	Jan-09	Jun-11	Unknown	1,366,800	---	1219	T
2011 Changes/Additions w/o Inactive Reserve Total:												**0**	**1,219**	
Port Everglades	3	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	402,050	---	(387)	OT
Port Everglades	4	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	402,050	---	(392)	OT
Turkey Point	2	Miami Dade County	ST	FO6	NG	WA	PL	---	---	---	402,050	(394)	(392)	
2011 Changes/Additions with Inactive Reserve Total:												**(394)**	**48**	
2012														
Scherer	4	Monroe, GA	BIT	SUB	No	RR	No	Jan-12	Jun-12	Unknown	680,368	3	3	OT
St. Lucie (Uprates)	1	St. Lucie County	NP	UR	No	TK	No	See Note 5	Dec-11	Unknown	850,000	103	103	T
St. Lucie (Uprates)	2	St. Lucie County	NP	UR	No	TK	No	See Note 5	Jun-12	Unknown	723,775	---	88	T
Turkey Point (Uprates)	3	Miami Dade County	NP	UR	No	TK	No	See Note 5	May-12	Unknown	759,900	---	104	T
West County Energy Center	3	Palm Beach County	CC	NG	FO2	PL	PL	Jan-09	Jun-11	Unknown	1,366,800	1,335	---	T
2012 Changes/Additions w/o Inactive Reserve Total:												**1,441**	**298**	
Port Everglades	3	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	402,050	(389)	---	OT
Port Everglades	4	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	402,050	(394)	---	OT
2012 Changes/Additions with Inactive Reserve Total:												**658**	**298**	

Note 1: The Winter Total MW value consists of all generation additions and changes achieved by January. The Summer Total MW value consists of all generation additions and changes achieved by June. All MW additions/changes occuring later in the year will be picked up for reporting/planning purposes in the following year.

Note 2: Changes shown may include different ratings than shown in Schedule 1 due solely to ambient temperature consistent with those in FPL 's peak load forecast to maintain consistency in reserve margin calculations.

Note 3: The Martin solar thermal facility is designed to provide steam for FPL's existing Martin Unit 8 combined cycle unit, thus reducing FPL's use of natural gas. No additional capacity (MW) will result from the operation of the solar thermal facility.

Note 4: The Photovoltaic MWs are not included in the total at this time because these facilities are assumed to provide non-firm energy only.

Note 5: The nuclear uprates will be performed during the scheduled refueling outages for each unit.

Note 6: Certain existing FPL units that have been placed temporarily on Inactive Reserve status are assumed, for planning purposes, to return to active reserve starting in 2018.

EXHIBIT 29

Schedule 8
Planned And Prospective Generating Facility Additions And Changes

	(2)	(3)	(4)	(5)	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Transport		Const.	Comm.	Expected	Gen. Max.	Firm Net Capability		
Plant Name	Unit No.	Location	Unit Type	Pri.	Alt.	Pri.	Alt.	Start Mo./Yr.	In-Service Mo./Yr.	Retirement Mo./Yr.	Nameplate KW	Winter MW	Summer MW	Status
ADDITIONS/ CHANGES														
2013														
Cape Canaveral Next Generation Clean Energy Center	1	Brevard County	CC	NG	FO2	PL	PL	Jun-11	Jun-13	Unknown	1,296,750	---	1,210	T
St. Lucie (Uprates)	2	St. Lucie County	NP	UR	No	TK	No	See Note 3	Jun-12	Unknown	723,775	88	---	T
Turkey Point (Uprates)	3	Miami Dade County	NP	UR	No	TK	No	See Note 3	May-12	Unknown	759,900	104	---	T
Turkey Point (Uprates)	4	Miami Dade County	NP	UR	No	TK	No	See Note 3	Dec-12	Unknown	759,900	104	104	T
								2013 Changes/Additions w/o Inactive Reserve Total:				296	1,314	
												---	---	
								2013 Changes/Additions with Inactive Reserve Total:				**296**	**1,314**	
2014														
Cape Canaveral Next Generation Clean Energy Center	1	Brevard County	CC	NG	FO2	PL	PL	Jun-11	Jun-13	Unknown	1,296,750	1,355	---	T
Riviera Beach Next Generation Clean Energy Center	1	City of Riviera Beach	CC	NG	FO2	PL	PL	Jun-12	Jun-14	Unknown	1,296,750	---	1,212	T
								2014 Changes/Additions w/o Inactive Reserve Total:				**1,355**	**1,212**	
												---	---	
								2014 Changes/Additions with Inactive Reserve Total:				**1,355**	**1,212**	
2015														
Riviera Beach Next Generation Clean Energy Center	1	City of Riviera Beach	CC	NG	FO2	PL	PL	Jun-12	Jun-14	Unknown	1,296,750	1,344	---	T
								2015 Changes/Additions w/o Inactive Reserve Total:				**1,344**	**0**	
												---	---	
								2015 Changes/Additions with Inactive Reserve Total:				**1,344**	**0**	
2016														
												---	---	
								2016 Changes/Additions w/o Inactive Reserve Total:				**0**	**0**	
												---	---	
								2016 Changes/Additions with Inactive Reserve Total:				**0**	**0**	
2017														
												---	---	
								2017 Changes/Additions w/o Inactive Reserve Total:				**0**	**0**	
												---	---	
								2017 Changes/Additions w/o Inactive Reserve Total:				**0**	**0**	
2018														
												---	---	
								2018 Changes/Additions w/o Inactive Reserve Total:				**0**	**0**	
Turkey Point	2	Miami Dade County	ST	FO6	NG	WA	PL	---	---	---	402,050	---	392	OT
								2018 Changes/Additions with Inactive Reserve Total:				**0**	**392**	
2019														
												---	---	
								2019 Changes/Additions w/o Inactive Reserve Total:				**0**	**0**	
Turkey Point	2	Miami Dade County	ST	FO6	NG	WA	PL	---	---	---	402,050	394	---	OT
Port Everglades	3	City of Hollywood	ST	FO6	NG	WA	PL	---	---	---	402,050	---	387	OT
								2019 Changes/Additions with Inactive Reserve Total:				**394**	**387**	

Note 1: The Winter Total MW value consists of all generation additions and changes achieved by January. The Summer Total MW value consists of all generation additions and changes achieved by June. All MW additions/changes occuring later in the year will be picked up for reporting/planning purposes in the following year.

Note 2: Changes shown may include different ratings than shown in Schedule 1 due solely to ambient temperature consistent with those in FPL 's peak load forecast to maintain consistency in reserve margin calculations.

Note 3: The nuclear uprates will be performed during the scheduled refueling outages for each unit.

Note 4: Certain existing FPL units that have been placed temporarily on Inactive Reserve status are assumed, for planning purposes,to return to active reserve starting in 2018.

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Space Coast Next Generation Energy Center

(2) **Capacity**
a. Summer 10 MW
b. Winter 10 MW

(3) **Technology Type:** Photovoltaic

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2009
b. Commercial In-service date: 2010

(5) **Fuel**
a. Primary Fuel Solar
b. Alternate Fuel N/A

(6) **Air Pollution and Control Strategy:** N/A

(7) **Cooling Method:** N/A

(8) **Total Site Area:** 60 Acres

(9) **Construction Status:** U (Under Construction)

(10) **Certification Status:** Permitted (Individual Permits)

(11) **Status with Federal Agencies:** Permitted

(12) **Projected Unit Performance Data:**
Planned Outage Factor (POF): N/A
Forced Outage Factor (FOF): N/A
Equivalent Availability Factor (EAF): 0.98
Resulting Capacity Factor (%): Approx. 21.3% (First Full Year of Operation)
Average Net Operating Heat Rate (ANOHR): N/A Btu/kWh
Base Operation 75F,100%

(13) **Projected Unit Financial Data *,****
Book Life (Years): 25 years
Total Installed Cost (2010 $/kW): 7,890
Direct Construction Cost ($/kW): -
CWIP Amount ($/kW): 427.7
Escalation ($/kW): -
Fixed O&M ($/kW -Yr.): (2010 $kW-Yr) 54
Variable O&M ($/MWH): (2010 $/MWH) 0
K Factor: 1.2100

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes transmission interconnection.

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** West County Energy Center Combined Cycle Unit 3

(2) **Capacity**
a. Summer 1,219 MW
b. Winter 1,335 MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2009
b. Commercial In-service date: 2011

(5) **Fuel**
a. Primary Fuel Natural Gas
b. Alternate Fuel Distillate

(6) **Air Pollution and Control Strategy:** Natural Gas, Dry Low No$_x$ Combustors, SCR
0.0015% S. Distillate, & Water Injection on Distillate

(7) **Cooling Method:** Cooling Tower

(8) **Total Site Area:** 220 Acres

(9) **Construction Status:** U (Under construction, less than or equal to 50% Complete)

(10) **Certification Status:** Permitted

(11) **Status with Federal Agencies:** Permitted

(12) **Projected Unit Performance Data:**
Planned Outage Factor (POF): 2.1%
Forced Outage Factor (FOF): 1.1%
Equivalent Availability Factor (EAF): 96.8% (Base & Duct Firing Operation)
Resulting Capacity Factor (%): Approx. 93% (First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR): 6,582 Btu/kWh (Base Operation)
Base Operation 75F,100%

(13) **Projected Unit Financial Data **,*****
Book Life (Years): 25 years
Total Installed Cost (2011 $/kW): 709
Direct Construction Cost ($/kW):
AFUDC Amount ($/kW): 71
Escalation ($/kW):
Fixed O&M ($/kW -Yr.): (2011 $kW-Yr) 11.63
Variable O&M ($/MWH): (2011 $/MWH) 0.480
K Factor: 1.4697

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement, but not firm gas transportation costs.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** St. Lucie 1 Nuclear (Uprate)

(2) **Capacity**

a. Summer	103	MW (Incremental)
b. Winter	103	MW (Incremental)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**

a. Field construction start-date:	During scheduled refueling outage
b. Commercial In-service date:	2011

(5) **Fuel**

a. Primary Fuel	Uranium
b. Alternate Fuel	---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	No change from existing unit
Forced Outage Factor (FOF):	No change from existing unit
Equivalent Availability Factor (EAF):	No change from existing unit
Resulting Capacity Factor (%):	No change from existing unit
Average Net Operating Heat Rate (ANOHR):	No change from existing unit
Base Operation 75F,100%	No change from existing unit

(13) **Projected Unit Financial Data ***

Book Life (Years):	25	years (Matches the current operating license period.)
Total Installed Cost ($/kW): **	TBD	(See Note (1) for explanation.)
Direct Construction Cost:	TBD	(See Note (1) for explanation.)
AFUDC Amount ($/kW):		(See Note (2) for explanation.)
Escalation ($/kW):		(See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.):	There is no additional O&M impact from this project.	
Variable O&M ($/MWH):	There is no additional O&M impact from this project.	
K Factor:		(See Note (2) for explanation.)

NOTE:

(1) The projected capital cost values for the capacity uprates at each of FPL's existing nuclear units is currently being reviewed in on-going analyses as this document is being prepared. The capital cost projections that will result from these analyses are expected to be presented in FPL's May 2010 Nuclear Cost recovery filing.

(2) Not applicable due to early recovery of capital carrying costs.

(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.
** $/incremental kW

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Turkey Point 3 Nuclear (Uprate)

(2) **Capacity**

a. Summer 104 MW (Incremental)
b. Winter 104 MW (Incremental)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**

a. Field construction start-date: During scheduled refueling outage
b. Commercial In-service date: 2012

(5) **Fuel**

a. Primary Fuel Uranium
b. Alternate Fuel ---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	No change from existing unit
Forced Outage Factor (FOF):	No change from existing unit
Equivalent Availability Factor (EAF):	No change from existing unit
Resulting Capacity Factor (%):	No change from existing unit
Average Net Operating Heat Rate (ANOHR):	No change from existing unit
Base Operation 75F,100%	No change from existing unit

(13) **Projected Unit Financial Data ***

Book Life (Years):	20	years (Matches the current operating license period.)
Total Installed Cost ($/kW): **	TBD	(See Note (1) for explanation.)
Direct Construction Cost ($/kW):	TBD	(See Note (1) for explanation.)
AFUDC Amount ($/kW):		(See Note (2) for explanation.)
Escalation ($/kW):		(See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.):	There is no additional O&M impact from this project.	
Variable O&M ($/MWH):	There is no additional O&M impact from this project.	
K Factor:		(See Note (2) for explanation.)

NOTE:

(1) The projected capital cost values for the capacity uprates at each of FPL's existing nuclear units is currently being reviewed in on-going analyses as this document is being prepared. The capital cost projections that will result from these analyses are expected to be presented in FPL's May 2010 Nuclear Cost recovery filing.
(2) Not applicable due to early recovery of capital carrying costs.
(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.
** $/incremental kW

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** St. Lucie 2 Nuclear (Uprate)

(2) **Capacity**
a. Summer 103 MW (Total Incremental), 88 MW (incremental FPL's ownership share)
b. Winter 104 MW (Total Incremental), 88 MW (incremental FPL's ownership share)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**
a. Field construction start-date: During scheduled refueling outage
b. Commercial In-service date: 2012

(5) **Fuel**
a. Primary Fuel Uranium
b. Alternate Fuel ---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**
Planned Outage Factor (POF): No change from existing unit
Forced Outage Factor (FOF): No change from existing unit
Equivalent Availability Factor (EAF): No change from existing unit
Resulting Capacity Factor (%): No change from existing unit
Average Net Operating Heat Rate (ANOHR): No change from existing unit
Base Operation 75F,100% No change from existing unit

(13) **Projected Unit Financial Data *,****
Book Life (Years): 31 years (Matches the current operating license period.)
Total Installed Cost ($/kW): ** TBD (See Note (1) for explanation.)
Direct Construction Cost ($/kW): TBD (See Note (1) for explanation.)
AFUDC Amount ($/kW): (See Note (2) for explanation.)
Escalation ($/kW): (See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.): There is no additional O&M impact from this project.
Variable O&M ($/MWH): There is no additional O&M impact from this project.
K Factor: (See Note (2) for explanation.)

NOTE:
(1) The projected capital cost values for the capacity uprates at each of FPL's existing nuclear units is currently being reviewed in on-going analyses as this document is being prepared. The capital cost projections that will result from these analyses are expected to be presented in FPL's May 2010 Nuclear Cost recovery filing.
nuclear units.
(2) Not applicable due to early recovery of capital carrying costs.
(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.
** $/incremental kW

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Turkey Point 4 Nuclear (Uprate)

(2) **Capacity**
a. Summer 104 MW (Incremental)
b. Winter 104 MW (Incremental)

(3) **Technology Type:** Nuclear

(4) **Anticipated Construction Timing**
a. Field construction start-date: During scheduled refueling outage
b. Commercial In-service date: 2012

(5) **Fuel**
a. Primary Fuel Uranium
b. Alternate Fuel ---

(6) **Air Pollution and Control Strategy:** No change from existing unit

(7) **Cooling Method:** No change from existing unit

(8) **Total Site Area:** No change from existing unit

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** T (Regulatory approval received, but not under construction)

(11) **Status with Federal Agencies:** T (Regulatory approval received, but not under construction)

(12) **Projected Unit Performance Data:**
Planned Outage Factor (POF): No change from existing unit
Forced Outage Factor (FOF): No change from existing unit
Equivalent Availability Factor (EAF): No change from existing unit
Resulting Capacity Factor (%): No change from existing unit
Average Net Operating Heat Rate (ANOHR): No change from existing unit
Base Operation 75F,100% No change from existing unit

(13) **Projected Unit Financial Data *,****
Book Life (Years): 22 years (Matches the current operating license period.)
Total Installed Cost ($/kW): ** TBD (See Note (1) for explanation.)
Direct Construction Cost ($/kW): TBD (See Note (1) for explanation.)
AFUDC Amount ($/kW): (See Note (2) for explanation.)
Escalation ($/kW): (See Note (3) for explanation.)
Fixed O&M ($/kW -Yr.): There is no additional O&M impact from this project.
Variable O&M ($/MWH): There is no additional O&M impact from this project.
K Factor: (See Note (2) for explanation.)

NOTE:
(1) The projected capital cost values for the capacity uprates at each of FPL's existing nuclear units is currently being reviewed in on-going analyses as this document is being prepared. The capital cost projections that will result from these analyses are expected to be presented in FPL's May 2010 Nuclear Cost recovery filing.
(2) Not applicable due to early recovery of capital carrying costs.
(3) These costs are included in the Total Installed Cost value.

* $/kW values are based on incremental Summer capacity.
** $/incremental kW

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Cape Canaveral Next Generation Clean Energy Center

(2) **Capacity**

a. Summer	1,210	MW
b. Winter	1,355	MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**

a. Field construction start-date:	2011
b. Commercial In-service date:	2013

(5) **Fuel**

a. Primary Fuel	Natural Gas
b. Alternate Fuel	Ultra-low sulfur distillate

(6) **Air Pollution and Control Strategy:** Dry Low No$_x$ Burners, SCR, Natural Gas, 0.0015% S. Distillate and Water Injection on Distillate

(7) **Cooling Method:** Once-through cooling water

(8) **Total Site Area:** 43 Acres

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** Permitted

(11) **Status with Federal Agencies:** Permitted

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	2.4%	
Forced Outage Factor (FOF):	1.1%	
Equivalent Availability Factor (EAF):	96.5%	
Resulting Capacity Factor (%):	Approx. 90 %	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR): Base Operation 75F,100%	6,484	Btu/kWh

(13) **Projected Unit Financial Data *,****

Book Life (Years):	30	years
Total Installed Cost (2013 $/kW):	921	
Direct Construction Cost ($/kW):		
AFUDC Amount ($/kW):	98	
Escalation ($/kW):		
Fixed O&M ($/kW-Yr): (2013 $)	13.29	
Variable O&M ($/MWH): (2013 $)	0.16	
K Factor:	1.484	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

NOTE: Total installed cost includes gas expansion, transmission interconnection and integration, escalation, and AFUDC.

EXHIBIT 29

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Riviera Beach Next Generation Clean Energy Center

(2) **Capacity**

a. Summer	1,212	MW
b. Winter	1,344	MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**

a. Field construction start-date:	2012
b. Commercial In-service date:	2014

(5) **Fuel**

a. Primary Fuel	Natural Gas
b. Alternate Fuel	Ultra-low sulfur distillate

(6) **Air Pollution and Control Strategy:** Dry Low No_x Burners, SCR, Natural Gas, 0.0015% S. Distillate and Water Injection on Distillate

(7) **Cooling Method:** Once-through cooling water

(8) **Total Site Area:** 33 Acres

(9) **Construction Status:** T (Regulatory approval received, but not under construction)

(10) **Certification Status:** Permitted

(11) **Status with Federal Agencies:** Permitted

(12) **Projected Unit Performance Data:**

Planned Outage Factor (POF):	2.4%	
Forced Outage Factor (FOF):	1.1%	
Equivalent Availability Factor (EAF):	96.5%	
Resulting Capacity Factor (%):	Approx. 90%	(First Full Year Base Operation)
Average Net Operating Heat Rate (ANOHR):	6,480	Btu/kWh
Base Operation 75F,100%		

(13) **Projected Unit Financial Data *,**,*****

Book Life (Years):	30	years
Total Installed Cost (2014 $/kW):	1,053	
Direct Construction Cost ($/kW):		
AFUDC Amount ($/kW):	121	
Escalation ($/kW):		
Fixed O&M ($/kW-Yr): (2014 $)	13.67	
Variable O&M ($/MWH): (2014 $)	0.13	
K Factor:	1.509	

* $/kW values are based on Summer capacity.
** Fixed O&M cost includes capital replacement.

EXHIBIT 29

Schedule 10

Status Report and Specifications of Proposed Transmission Lines

Space Center Next Generation Solar Energy Center (PV)

The new Space Center Next Generation Solar Energy Center (PV) does not require any “new” transmission lines.

EXHIBIT 29

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

West County Energy Center Unit 3

(1)	Point of Origin and Termination:	New Sugar Substation – Corbett Substation
(2)	Number of Lines:	1
(3)	Right-of-way	FPL - Owned
(4)	Line Length:	1 mile
(5)	Voltage:	230 kV
(6)	Anticipated Construction Timing:	Start date: May 2009 End date: November 2010
(7)	Anticipated Capital Investment: (Trans. and Sub.)	$11,300,000
(8)	Substations:	New Sugar Substation and Corbett Substation
(9)	Participation with Other Utilities:	None

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

St. Lucie 1 Nuclear (Uprate)

The St. Lucie 1 Nuclear (Uprate) does not require any “new” transmission lines.

EXHIBIT 29

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point 3 Nuclear (Uprate)

The Turkey Point 3 Nuclear (Uprate) does not require any “new” transmission lines.

EXHIBIT 29

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

St. Lucie 2 Nuclear (Uprate)

The St. Lucie 2 Nuclear (Uprate) does not require any “new” transmission lines.

EXHIBIT 29

Schedule 10
Status Report and Specifications of Proposed Transmission Lines

Turkey Point 4 Nuclear (Uprate)

The Turkey Point 4 Nuclear (Uprate) does not require any “new” transmission lines.

Schedule 10

Status Report and Specifications of Proposed Transmission Lines

Cape Canaveral Next Generation Clean Energy Center (Projected Modernization)

The Cape Canaveral Next Generation Clean Energy Center, that would be the result of the projected modernization of the exiting Cape Canaveral power plant site, does not require any “new” transmission lines.

EXHIBIT 29

Schedule 10

Status Report and Specifications of Proposed Transmission Lines

Riviera Beach Next Generation Clean Energy Center (Projected Modernization)

The Riviera Beach Energy Center Modernization, that would be the result of the projected modernization of the existing Riviera Beach power plant site, does not require any “new” transmission lines. Several lines will be extended and reconfigured to accommodate the increased capacity.

EXHIBIT 29

Schedule 11.1

Existing FIRM and NON-FIRM Capacity and Energy by Primary Fuel Type
Actuals for the Year 2009

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Net (MW) Capability				**NEL**	**Fuel Mix**
	Generation by Primary Fuel	**Summer (MW)**	**Summer (%)**	**Winter (MW)**	**Winter (%)**	**GWh** [(2)]	**%**
(1)	Coal	900	3.3%	902	3.2%	6,362	5.7%
(2)	Nuclear	2,939	10.9%	3,013	10.6%	22,893	20.6%
(3)	Residual	6,764	25.0%	6,818	23.9%	4,560	4.1%
(4)	Distillate	1,908	7.1%	2,160	7.6%	21	0.0%
(5)	Natural Gas	11,993	44.4%	12,942	45.3%	62,728	56.4%
(6)	***FPL Existing Units Total*** [(1)] ***:***	***24,504***	***90.7%***	***25,835***	***90.5%***	***96,565***	***86.8%***
(7)	Renewables (Purchases)- Firm	111.0	0.4%	162.0	0.6%	1,036	0.9%
(8)	Renewables (Purchases)- Non-Firm	Not Applicable		Not Applicable		416	0.4%
(9)	***Renewable Total:***	***111.0***	***0.4%***	***162.0***	***0.6%***	***1,452***	***1.30%***
(10)	***Purchases Other :***	***2,404.0***	**8.9%**	***2,542.0***	**8.9%**	***13,288***	**11.9%**
(11)	***Total :***	***27,019.4***	***100.0%***	***28,539.0***	***100.0%***	***111,304***	***100.0%***

Note:

(1) FPL Existing Units Total should match Total System found on Schedule 1 for summer and winter.

(2) Net Energy for Load GWH should match Schedule 6.1 the actual value.

EXHIBIT 29

Schedule 11.2

Existing NON-FIRM Self-Service Renewable Generation Facilities
Actuals for the Year 2009

(1) Type of Facility	(2) Installed Capacity DC (MW)	(3) Renewable Projected Annual Output (MWh)	(4) Annual Energy Purchased from FPL (MWh)	(5) Annual Energy Sold to FPL (MWh)	(6) = (3+4) - (5) Projected Annual Energy Used by Customer (MWh)
Customer-Owned PV (0 kW to 10 kW)	2.525	2,095	42,634.0	30.0	44,698.9
Customer-Owned PV (> 10 kW to 100 kW)	1.085	865	12,938	54.0	13,749.1
Customer-Owned PV (> 100 kW - 2 MW)	2.846	379	29,739	0.0	30,118.5
Total	6.456	3,339.1	85,311.3	84.0	88,566.5

Notes:

(1) There were approximately 645 customer-owned operating PV facilities interconnected with FPL during 2009.
(2) The Installed Capacity value is the sum of the nameplate ratings (DC MW) for all of the customer-owned PV facilities connected as of Dec. 31,2009.
(3) The Projected Annual Output value is based on NREL's PV Watts program and the Installed Capacity value in column (2), adjusted for the date when each facility was installed and assuming each facility operated as planned.
(3) The Annual Energy Purchased from FPL is an actual value from FPL's metered data for 2009.
(4) The Annual Energy Sold to FPL is an actual value from FPL's metered data for 2009.
(5) The Projected Annual Energy Used by Customers is a projected value that equals:
(Renewable Projected Annual output + Annual Energy Purchased) minus the Annual Energy Sold to FPL.

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

CHAPTER IV

Environmental and Land Use Information

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

IV. Environmental and Land Use Information

IV.A Protection of the Environment

FPL operates in a sensitive, temperate/sub-tropical environment containing a number of distinct ecosystems with many endangered or threatened plant and animal species. FPL competes for air, land, and water resources that are necessary to meet the demand for generation, transmission, and distribution of electricity. At the same time, residents and tourists want unspoiled natural amenities, and the general public has an expectation that large corporations such as FPL will conduct their business in an environmentally responsible manner.

FPL has been recognized for many years as one of the leaders among electric utilities for its commitment to the environment. For example, FPL has one of the lowest CO_2 emission rates in the nation. The environmental leadership of FPL and its parent company, FPL Group, has been heralded by many outside organizations as demonstrated by a few recent examples. In 2009, FPL Group was ranked first among electric and gas utilities in FORTUNE® magazine's, "America's Most Admired Companies" edition. This is the third consecutive year that FPL Group scored number one in each of the eight attributes considered: innovation, people management, use of corporate assets, social responsibility, quality of management, financial soundness, long-term investments, and quality of products and services. According to *Fortune*, America's Most Admired Companies is "the definitive report card on corporate reputations".

FPL Group was named, for the fifth time, one of the Global 100 Most Sustainable Corporations in the World by Corporate Knights, Inc., a Canadian media company. Some 1,800 companies from a wide range of sectors were evaluated regarding effective management of environmental, social, and governance risks and opportunities. FPL Group was one of only three United States utility companies, or utility parent companies, to make the list of 100.

FPL Group's commitment to acknowledging the risks of climate change and effectively reducing its greenhouse gas emissions was again recognized when the company was named to the Carbon Disclosure Leadership Index for 2009. FPL Group was one of only three U.S. companies to be so named. The Carbon Disclosure Leadership Index is produced annually by the Carbon Disclosure Project (CDP), a not-for-profit organization that reports on the business risks and opportunities of climate change for investors. CDP

EXHIBIT 29

represents 475 institutional investors with $55 trillion in assets under management. Compiled by PricewaterhouseCoopers on behalf of CDP, the Carbon Disclosure Leadership Index highlights companies within the S&P 500 Index that excel in the area of climate change awareness and action.

FPL Group was named to the 2009 Dow Jones Sustainability Index (DJSI) of the leading companies in North America for corporate sustainability. The DJSI North America selects the top 20 percent of companies in sustainability performance from the 600 largest companies in North America. According to Dow Jones, corporate sustainability leaders achieve long-term shareholder value by “gearing their strategies and management to harness the market’s potential for sustainability products and services while successfully reducing and avoiding sustainability costs and risks.”

The 11th Annual Sustainable Florida Best Practice Awards were announced on June 9, 2009 in Orlando, Florida. FPL was named a finalist in the large business category for its “initiative and leadership in the voluntary development of three state-of-the-art clean, renewable, emissions-free solar energy facilities.” The awards are presented by the Council for Sustainable Florida, the premier statewide organization committed to balancing the economic interests of the state with the need to be socially and environmentally responsible. The Sustainable Florida Award recognizes organizations for protecting and preserving Florida’s environment for the future while building markets for Florida’s business.

In 2009, FPL received the Business of the Year Award from Martin County for efforts related to the construction of three solar energy facilities in Florida, including one in Martin County.

In recognition of the company’s leadership role in using low-carbon vehicles, FPL earned the 2008 National Biodiesel Board’s Eye on Innovation award for the early and substantive use of biodiesel, the 2008 National Association of Fleet Administrator’s Green Fleet Award, and the 2007 Council for Sustainable Florida Large Business Best Practice Award.

In May 2007, FPL Group was included on the KLD Global Climate 100SM Index for the third time since the Global Climate 100 was launched in 2005. The Global Climate 100 is designed to promote investment in public companies whose activities demonstrate the greatest potential for reducing the social and economic consequences of climate change.

EXHIBIT 29

The Global Climate 100 Index includes a mix of 100 global companies that demonstrate leadership in providing near-term solutions to climate change through renewable energy, alternative fuels, clean technology, and efficiency.

In 2006, FPL and the Palm Beach County-based Arthur R. Marshall Foundation joined as "partners for the environment." FPL's support included a $25,000 donation to the non-profit organization for educational and restoration programs, including the planting of native Florida wetland trees. In 2007, FPL volunteers returned to the site of the tree plantings to help take care of the growing saplings.

FPL has also been the recipient of earlier environmental awards and recognition. In 2001, FPL was awarded Edison Electric Institute's National Land Management Award for its stewardship of 25,000 acres surrounding its Turkey Point Plant. In 2001, FPL was awarded the 2001 Waste Reduction and Pollution Prevention Award from the Solid Waste Association of North America. FPL received the 2001 Program Champion Award from the Environmental Protection Agency's Wastewise Program. The Florida Department of Environmental Protection named FPL a "Partner for Ecosystem Protection" in 2001 for its emission-reducing "repowering" projects at its Fort Myers and Sanford Plants. FPL won the Council for Sustainable Florida's award in 2002 for its sea turtle conservation and education programs at its St. Lucie Plant. Finally, FPL has been recognized by numerous federal and state agencies for its innovative endangered species protection programs which include such species as manatees, crocodiles, and sea turtles.

As mentioned above, FPL Group has taken a leadership role to address climate change and the call for action for a national climate change policy. The decision to step into the forefront of this issue goes hand-in-hand with FPL Group's longtime commitment to managing operations with sensitivity to the environment.

IV.B FPL's Environmental Statement

To reaffirm its commitment to conduct business in an environmentally responsible manner, FPL developed an Environmental Commitment in 1992 to clearly define its position. This statement reflects how FPL incorporates environmental values into all aspects of its activities and serves as a framework for new environmental initiatives throughout the company. FPL's Environmental Statement is:

EXHIBIT 29

It is the Company's intent to continue to conduct its business in an environmentally responsible manner. Accordingly, Florida Power & Light Company will:

- Comply with the spirit and intent, as well as the letter of, environmental laws, regulations, and standards.
- Incorporate environmental protection and stewardship as an integral part of the design, construction, operation, and maintenance of our facilities.
- Encourage the wise use of energy to minimize the impact on the environment.
- Communicate effectively on environmental issues.
- Conduct periodic self-evaluations, report performance, and take appropriate actions.

IV.C Environmental Management

In order to implement the Environmental Statement, FPL established an environmental management system to direct and control the fulfillment of the organization's environmental responsibilities. A key component of the system is an Environmental Assurance Program that is discussed below. Other components include: executive management support and commitment, a dedicated environmental corporate governance program, written environmental policies and procedures, delineation of organizational responsibilities and individual accountabilities, allocation of appropriate resources for environmental compliance management (which includes reporting and corrective action when non-compliance occurs), environmental incident and/or emergency response, environmental risk assessment/management, environmental regulatory development and tracking, and environmental management information systems.

IV.D Environmental Assurance Program

FPL's Environmental Assurance Program consists of activities which are designed to evaluate environmental performance, verify compliance with corporate policy as well as legal and regulatory requirements, and communicate results to corporate management. The principal mechanism for pursuing environmental assurance is the environmental audit. An environmental audit may be defined as a management tool comprising a systematic, documented, periodic, and objective evaluation of the performance of the organization and of the specific management systems and equipment designed to protect the environment. The environmental audit's primary objectives are to facilitate

EXHIBIT 29

management control of environmental practices and assess compliance with existing environmental regulatory requirements and FPL policies.

IV.E Environmental Communication and Facilitation

FPL is involved in many efforts to enhance environmental protection through the facilitation of environmental awareness and in public education. Some of FPL's 2009 environmental outreach activities are noted in Table IV.E.1. In 2009 and 2010, FPL launched web cams at three facilities in order to increase public awareness of ongoing solar projects and the warm water refuge for manatees provided by power plants. The "solar cams" provide the public with a glimpse of the PV installation at the Space Coast Next Generation Solar Energy Center and the solar thermal installation at the Martin Next Generation Solar Energy Center. Additionally, the "manatee cam" provides the public a glimpse of hundreds of manatees that gather in the warm waters near the FPL Riviera Plant each Winter during the cold weather. In the first two months the manatee cam has been operational, the cam has received over 78,000 page views on-line. These web cam addresses, respectively, are:

http://www.fpl.com/environment/solar/spacecoast_cam.shtml),
(http://www.fpl.com/environment/solar/martin_cam.shtml),
http://www.fpl.com/environment/plant/riviera_cam.shtml).

In 2009 FPL also initiated efforts to recommence tours of the Barley Barber Swamp at the Martin Power Plant. Public tours are expected to begin by the end of 2010.

Table IV.E.1: 2009 FPL Environmental Outreach Activities

Activity	**# of Participants (Approx.)**
Visitors to FPL's Energy Encounter at St. Lucie	20,000
Visitors to Manatee Park	180,000
Number of visits to FPL's Environmental Website	103,000
Number of pieces of Environmental literature distributed	>60,000
Solar Schools Program (# of schools participating)	13

EXHIBIT 29

IV.F Preferred and Potential Sites

Based upon its projection of future resource needs, FPL has identified seven Preferred Sites and ten Potential Sites for future generation additions. Preferred Sites are those locations where FPL has conducted significant reviews and has either taken action, or is currently committed to take action, to site new generation capacity. Potential Sites are those sites that have attributes that support the siting of generation and are under consideration as a location for future generation. Some of these sites are currently in use as existing generation sites and some are not. The identification of a Potential Site does not indicate that FPL has made a definitive decision to pursue generation (or generation expansion in the case of an existing generation site) at that location, nor does this designation indicate that the size or technology of a generator has been determined. The Preferred Sites and Potential Sites are discussed in separate sections below.

As has been described in previous FPL Site Plans, FPL also considers a number of other sites as possible sites for future generation additions. These include the remainder of FPL's existing generation sites and other Greenfield sites.

IV.F.1 Preferred Sites

FPL identifies seven Preferred Sites in this Site Plan: the West County Energy Center (WCEC) adjacent to the existing Corbett FPL substation, the existing St. Lucie plant site, the existing Turkey Point plant site, the existing Cape Canaveral plant site, the existing Riviera plant site, and two locations for new solar power generation: Brevard County and the existing Martin plant site.

The West County Energy Center site is the location for one CC capacity addition FPL will make in 2011. The St. Lucie site is the location for nuclear capacity uprates that FPL will make in 2011 and 2012. The St. Lucie site is also the location for a proposed wind generation addition. The Turkey Point site is the location for nuclear capacity uprates that FPL will make in 2011 and 2012. (Turkey Point is also the site for two new nuclear units, Turkey Point Units 6 & 7, for which FPL is pursuing licensing approvals. Current projections for these new, nuclear units' in-service dates are beyond the 2010-2019 reporting time frame of this document.). The Cape Canaveral and Riviera sites are the locations for potential modernizations of existing power plant sites that are projected in this document. And, as previously mentioned, the other two sites, Brevard County and Martin County, are the sites for new solar energy facilities.

EXHIBIT 29

The seven Preferred Sites are discussed below.

Preferred Site # 1: West County Energy Center, Palm Beach County

FPL has identified the property adjacent to the existing Corbett Substation property in unincorporated western Palm Beach County as a Preferred Site for the addition of new generating capacity. The site was selected for the addition of another CC natural gas unit (Unit 3) with ultra-low sulfur light fuel oil (distillate) as a backup fuel. WCEC Units 1 & 2 were constructed on this site and went into commercial operations on August 27, 2009, and November 3, 2009, respectively. WCEC Unit 3, which began construction in March 2009, was approved by both the FPSC and the Secretary of the Florida Department of Environmental Protection (FDEP) and is anticipated to go into commercial operation in June of 2011. Unit 3 will be identical to Units 1 & 2 in regard to technology and capacity.

The existing site is accessible to both natural gas and electrical transmission through existing structures or through additional lateral connections. The facility will use natural gas as the primary fuel and state-of-the-art combustion controls.

a. U.S. Geological Survey (USGS) Map

A USGS map of the West County Energy Center (WCEC) plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the WCEC generating facilities at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The site was undeveloped until February 2007 when construction of WCEC Units 1 & 2 was initiated. The site was previously dedicated to industrial (mining) and agricultural use. The site had been excavated, back-filled, and totally re-graded to an elevation of approximately 10 feet above the surrounding land surface. Prior to the initiation of power plant construction, no structures were present on the site and vegetation was virtually non-existent. Units 1 & 2 are completed and are now in commercial operation.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The plant site had been significantly altered by the construction and operation of a limestone mine where vegetation had been cleared and removed. The surrounding land use is predominantly sugar cane, agriculture, and limestone mining. FPL's existing Corbett substation is located north of the site. The Arthur R. Marshall Loxahatchee National Wildlife Refuge is located to the south of the site.

2. Listed Species

Construction and operation of Unit 3 at the site will not affect any rare, endangered, or threatened species. Wildlife utilization of the property is minimal as a result of the prior mining activities. Common wading birds can be observed on areas adjacent to, and occasionally within, the property. The property is adjacent to areas that have been identified as potential habitats for wood stork.

3. Natural Resources of Regional Significance Status

The construction and operation of another gas-fired CC generating facility at this location is not expected to have any adverse impacts on parks, recreation areas, or environmentally sensitive lands including the Arthur R. Marshall Loxahatchee National Wildlife Refuge. Construction will not result in any onsite wetland impacts under federal, state, or local agency permitting criteria.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design of Unit 3 comprises the following: one 1,219 MW (Summer capacity) unit consisting of: three combustion turbines (CT), three heat recovery steam generators (HRSG), and a new steam turbine. Natural gas delivered via pipeline is the primary fuel type for this facility with ultra-low sulfur light fuel oil (distillate) serving as a backup fuel.

EXHIBIT 29

g. Local Government Future Land Use Designations

Local government future land use designation for the project site is “Rural Residential” according to the Palm Beach County Future Land Use Map. Designations for the area under the Palm Beach County Unified Land Development Code classified the project site and surrounding area as Special Agricultural District. The site has been granted conditional use for electrical power facilities under a General Industrial zoning district.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site due to consideration of various factors including system load and economics. Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues.

i. Water Resources

WCEC Units 1 & 2 are currently operating using water from the Floridan Aquifer for cooling, service, and process water. Potable water is purchased from the Palm Beach County water municipality.

The primary water source for the entire site will be reclaimed (reuse) water that will come from Palm Beach County Water Utilities Department once Unit 3 is complete. FPL has obtained the necessary approvals to also supply WCEC Units 1 & 2 using reclaimed water once WCEC Unit 3 is operational. Reclaimed water will be used for cooling, service, and process water. Backup water sources include utilizing the Floridan Aquifer allocation permitted for WCEC Units 1, 2, & 3.

j. Geological Features of Site and Adjacent Areas

The site is underlain by approximately 13,000 feet of sedimentary rock strata. The basement complex in this area consists of Paleozoic igneous and metamorphic rocks. Little information is known about these rocks due to their great depth.

Overlying the basement complex to the ground surface are sedimentary rocks and deposits that are primarily marine in origin. Below a depth of about 400 feet these rocks are predominantly limestone and dolomite. Above 400 feet the deposits are largely composed of sand, silt, clay, and phosphate grains. The deepest formation in Palm Beach County on which significant published data are available is the Eocene Age Avon Park. Limited information is available from wells penetrating the underlying

EXHIBIT 29

Oldsmar formation. The published information on the sediments comprising the formations below the Avon Park Limestone is based on projections from deep wells in Okeechobee, St. Lucie, and Palm Beach counties.

Testing during construction of Exploratory Well 2 (EW-2) demonstrated the presence of a highly permeable zone (Boulder Zone) below a depth of 2,790 feet below pad level (bpl) overlain by a thick confining interval from approximately 2,000 to 2,790 feet bpl. The base of the Underground Source of Drinking Water (USDW) was identified between the depths of 1,932 and 1,959 feet bpl through interpretation of packer tests, water quality data, and geophysical logs. Injection testing has confirmed that the hydrogeology of the EW-2 site is favorable for disposal of fluids via a deep injection well system.

k. Projected Water Quantities for Various Uses

The estimated quantity of water required for industrial processing and cooling for all 3 units is approximately 29 million gallons per day (mgd). Cooling water for the three generating units would be cycled through cooling towers. Water quantities needed for other uses such as potable water are estimated to be approximately 35,000 gallons per day (gpd) for the entire WCEC site.

l. Water Supply Sources by Type

WCEC Units 1 & 2 will use available ground water as the source of cooling water until Unit 3 comes on line. Cooling towers will act as a heat sink for the facility auxiliary cooling system. Such needs for cooling and process water will comply with the existing SFWMD regulations for consumptive water use.

WCEC Unit 3, and eventually Units 1 & 2, will use reclaimed water as the primary source of cooling water for the cooling tower. The cooling tower will also act as a heat sink for the facility auxiliary cooling system. Such needs for cooling and process water will comply with the existing SFWMD regulations for consumptive water use. In addition, reclaimed water used at WCEC must meet all relevant requirements of Chapter 62-610, F.A.C., Part III, for use in cooling towers.

m. Water Conservation Strategies Under Consideration

The use of reclaimed water is a water conservation strategy because it is a beneficial use of wastewater. Impacts on the surficial aquifer would be minimized and used only for potable water, if necessary. Water from the Floridan Aquifer will be used for

EXHIBIT 29

cooling purposes as a backup water source and cooling towers will be utilized. In addition, captured stormwater may be reused in the cooling tower whenever feasible. Stormwater captured in the stormwater ponds will also recharge the surficial aquifer.

n. Water Discharges and Pollution Control

Heat will be dissipated in the cooling towers. Blowdown water from the cooling towers, along with other wastestreams, will be injected into the boulder zone of the Floridan Aquifer. Non-point source discharges are not an issue since there will be none at this facility. Storm water runoff will be collected and used to recharge the surficial aquifer via a storm water management system. Design elements will be included to capture suspended sediments. In addition, captured stormwater may be reused in the cooling towers, whenever feasible. The facility will employ a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The site is serviced by a new natural gas transmission pipeline that is capable of providing a sufficient quantity of gas to the entire site. Ultra-low sulfur light fuel oil (distillate) will be received by truck and stored in above-ground storage tanks to serve as backup fuel for the WCEC generating units.

p. Air Emissions and Control Systems

The use of natural gas and ultra-low sulfur light fuel oil (distillate) and combustion controls will minimize air emissions from these units and ensure compliance with applicable emission limiting standards. Using these fuels minimizes emissions of sulfur dioxide (SO_2), particulate matter, and other fuel-bound contaminants. Combustion controls similarly minimize the formation of nitrogen oxides (NO_x) and the combustor design will limit the formation of carbon monoxide and volatile organic compounds. When firing natural gas, NO_x emissions will be controlled using dry-low NO_x combustion technology and selective catalytic reduction (SCR). Water injection and SCR will be used to reduce NO_x emissions during operations when using ultra-low sulfur light fuel oil (distillate) as backup fuel. These design alternatives constitute the Best Available Control Technology for air emissions, and minimize such emissions while balancing economic, environmental, and energy impacts. Taken together, the design of the WCEC generating units incorporate features that will make them among the most efficient and cleanest power plants in the State of Florida.

q. Noise Emissions and Control Systems

Noise expected to be caused by construction at the site is expected to be below current noise levels for the residents nearest the site. Noise from the operation of the new unit will be within allowable levels.

r. Status of Applications

In regard to WCEC Unit 3, a Site Certification Application (SCA) was filed in December 2007 and received Site Certification by the Secretary of the FDEP, in lieu of the Governor and Cabinet, in November 2008. A Prevention of Significant Deterioration (PSD) air permit was filed in December 2007. The permit was issued by FDEP in July 2008. FPL initiated construction in March 2009 and anticipates an in-service date of mid-2011. WCEC Unit 3 will utilize the underground injection control (UIC) system permitted for the entire site.

Preferred Site # 2: St. Lucie Plant, St. Lucie County

FPL's St. Lucie Plant is located in St. Lucie County on Hutchinson Island on an FPL-owned 1,130-acre site. The plant site is bordered by the Atlantic Ocean to the east and the Indian River Lagoon to the west. Located on the site are two nuclear-powered generating units, St. Lucie Units 1 & 2, which have been in operation since 1976 and 1983, respectively. The St. Lucie site has been selected as a Preferred Site for the addition of two types of new generating capacity.

The first type of generating capacity addition is an increase in the capacity of the two existing nuclear generating units that is used to serve FPL's customers of approximately 103 MW for St. Lucie Unit 1 and 88 MW for St. Lucie Unit 2. This difference is due to FPL's 100% ownership share of St. Lucie 1 and its 85% ownership share of St. Lucie Unit 2. This work will involve changes to several existing main components within the existing facilities to increase their capability to produce steam for the generation of electricity. No new facilities are required as part of this capacity "uprate." This capacity uprate, along with a similar capacity uprate of FPL's existing Turkey Point nuclear units, was approved by the FPSC in January 2008. The capacity uprates at St. Lucie for the two nuclear units sited there are projected to be in-service in late 2011 and 2012.

EXHIBIT 29

The second type of generating capacity addition is the proposed installation of FPL wind generation turbines at the plant site. In 2007, FPL began the St. Lucie County land use approval process, and soon after applied for the necessary federal and state permitting. However, a decision by the state and federal agencies on the St. Lucie Wind project's permitting won't be finalized until the local land use approval process is completed. The in-service date will depend on the approval and permitting process. Six wind turbines are being proposed that, in total, would have a maximum output of approximately 13.8 MW.

a. U.S. Geological Survey (USGS) Map

A USGS map of the FPL St. Lucie Nuclear site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the proposed generating facilities at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

St. Lucie Units 1 & 2 are pressurized water reactors, each having two steam generators. The prominent structures, enclosed facilities, and equipment associated with St. Lucie Units 1 & 2 include the containment building, the turbine generator building, the auxiliary building, and the fuel handling building.

Prominent features beyond the power block area include the intake and discharge canals, switchyard, spent-fuel storage facilities, technical and administrative support facilities, and public education facilities (the Energy Encounter and the College of Turtle Knowledge). Significant features surrounding the St. Lucie Units 1 & 2 are predominately undeveloped land and water bodies including; Big Mud Creek, the Atlantic Ocean, Herman's Bay, and Indian River Lagoon.

In regard to the nuclear capacity uprates, the only changes will be modifications to the existing power generation facilities within the power block area, modifications to the switchyard facilities, and modifications to the transmission lines from St. Lucie to Midway substation. None of the other existing facilities at the plant will change as a result of the uprates. No changes to the nuclear power generation facilities are projected as a result of the proposed wind turbine additions.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

FPL's St. Lucie Plant is located in St. Lucie County on Hutchinson Island on an FPL-owned 1,130-acre site. The St. Lucie Plant includes the reactor buildings, turbine buildings, access/security building, auxiliary building, maintenance facilities, and miscellaneous warehouses and other buildings associated with the operation of Units 1 & 2. The site includes adjacent undeveloped mangrove areas. As a result of the approved capacity uprates, the site characteristics will not change.

The proposed wind turbines would also be located on the FPL-owned site. Impacts to the site characteristics are projected to be minimal from the proposed wind turbines.

2. Listed Species

Some listed species known to occur in the area of the plant location are Atlantic sturgeon, smalltooth sawfish, loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas)*, leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbriccata*), gopher tortoise (*Gopherus polyphemus*), kemp's ridley sea turtle (*Lepidochelys kempi*)**,** wood stork (*Mycteria americana*), black skimmer (*Rynchops niger*), and least tern (*Sterna antillarum*).

In regard to the nuclear capacity uprates, neither the development work, nor the continued operation of the two nuclear units after the uprate work has been completed, are expected to adversely affect any rare, endangered, or threatened species. No changes in wildlife populations at the adjacent undeveloped areas are anticipated, including listed species. Noise and lighting impacts will not change and it is expected that wildlife will continue to use the undeveloped areas within the St. Lucie Plant boundary.

In regard to the wind turbines, some changes to the adjacent undeveloped areas are anticipated. Noise and lighting impacts will not change and the wind turbines

EXHIBIT 29

are not anticipated to deter the continued use by wildlife of the undeveloped areas within the St. Lucie Plant boundary or any adjacent areas.

3. Natural Resources of Regional Significance Status

Significant features surrounding the St. Lucie Units 1 & 2 are predominately undeveloped land and water bodies including; Big Mud Creek, the Atlantic Ocean, Herman's Bay, and Indian River Lagoon.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The source of cooling water for the St. Lucie Plant is the Atlantic Ocean. It is a once-through system. The effects of the discharge of cooling water via these discharge structures were evaluated and mixing zones were established to allow compliance with thermal water quality standards as a part of the Plant's NPDES (Permit No. FL0002208). These mixing zones include the volume of water beyond the discharge structures, at the edge of which the water temperature is no greater than 17°F above the ambient temperature of the intake water.

In regard to the nuclear capacity uprates, the once-through system will continue to be used for the nuclear units. In regard to the wind turbines, no water will be required.

g. Local Government Future Land Use Designations

St. Lucie Units 1 & 2 are located in unincorporated St. Lucie County, Florida. The County has adopted a comprehensive plan, which is updated on a periodic basis. The County Comprehensive Plan incorporates a map that depicts the future land use categories of all property falling within the unincorporated portions of the County. The St. Lucie Plant has a Future Land Use category of Transportation/Utilities (T/U) according to the St. Lucie County Future Land Use Map. The T/U category is described in the St. Lucie County Comprehensive Plan Future Land Use Element Future Land Use.

In regard to the wind turbines, FPL has submitted an application to St. Lucie County to rezone the land that would serve as the footprint of the turbines to the T/U category.

EXHIBIT 29

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the nuclear capacity uprates because it is an existing nuclear plant site and, therefore, offers the opportunity for increased nuclear capacity. The site has been selected as a Preferred Site for the wind turbines because of the available wind resource at that location.

i. Water Resources

The source of cooling water for the St. Lucie Plant is the Atlantic Ocean. The once-through system flow will not change as a result of the nuclear uprates. No water will be required to operate the wind turbines. Due to the existing nature of the St. Lucie Plant, surrounding surface waters will not be adversely affected by either of the generation capacity additions. Stormwater will be handled by the existing facilities and no new areas will be impacted. Wetlands, groundwater, and nearby surface waters will not be impacted.

j. Geological Features of Site and Adjacent Areas

Beneath the land surface, there is a peat layer 4 to 6 feet thick. Below this layer is the Anastasia Formation, a sedimentary rock formation composed of clay lenses, sandy limestone, and silty fine to medium sand with fragmented shells. This highly permeable stratum extends 35 to 90 feet below mean sea level (msl). Underlying this stratum there is a semi-permeable zone, The Hawthorn Formation, consisting of slightly clayey and very fine silt which extends 600 feet below msl.

The original surficial deposits at the St. Lucie Plant were excavated to a depth of 60 feet and backfilled with Category I or II fill. The fill is underlain by the Anastasia formation, a sequence of partially cemented sand and sandy limestone, which extend to an average depth of about 145 feet. The Anastasia is underlain to a depth of about 600 to 700 feet by the partially cemented and indurated sands, clays, and sandy limestones of The Hawthorn Formation. Underlying these surface strata are about 13,000 feet of Jurassic through Tertiary Formations, primarily carbonate rocks. These formations have a relatively gentle slope to the southeast.

k. Projected Water Quantities for Various Uses

In regard to the nuclear capacity uprates, no change is expected in the quantity or characteristics of industrial wastewaters generated by the facility. Therefore, no change in that compliance achievement status is expected. The capacity uprates will not cause any changes in hydrologic or water quality conditions due to diversion,

EXHIBIT 29

interception, or additions to surface water flow. The St. Lucie Plant does not directly withdraw groundwater under its current operations and it will not withdraw groundwater after the capacity uprates work is completed. The use of water supplied by the City of Fort Pierce, which does withdraw groundwater, will remain unchanged and there will be no changes to the groundwater discharges. There will be no quality, quantity, or hydrological changes, either by withdrawal or discharge to a drinking water source. Therefore, there will be no impacts on drinking water.

The wind turbines will not require water for operations and will not cause any changes in the hydrologic or water quality conditions due to diversion, interception, or additions to surface water flow.

l. Water Supply Sources by Type

The source of cooling water for the St. Lucie Plant is the Atlantic Ocean. General plant service water, fire protection water, process water, and potable water are obtained from City of Fort Pierce. Process water uses include demineralizer regeneration, steam cycle makeup, and general service water use for washdowns.

The existing St. Lucie Plant water use is projected to be unchanged as a result of the nuclear capacity uprates. The wind turbines will not require water for operations.

m. Water Conservation Strategies Under Consideration

The existing water resources will not change as a result of the nuclear capacity uprates. The wind turbines will not require water for operations.

n. Water Discharges and Pollution Control

St. Lucie Units 1 & 2 use once-through cooling water from the Atlantic Ocean to remove heat from the main (turbine) condensers via the Circulating Water System (CWS), and to remove heat from other auxiliary equipment via the Auxiliary Equipment Cooling Water System (AECWS). The great majority of this cooling water is used for the CWS.

Under emergency conditions, water can be withdrawn from Big Mud Creek via the Emergency Intake Canal through two 54-inch pipe assemblies in the barrier wall that separates the Creek from the Canal. FPL does not use this intake during normal operations, but does test this system quarterly.

The facility employs a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to control the inadvertent release of pollutants. The wind turbines will not require water for operations. Consequently, there will be no water discharge as a result of these turbines.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

St. Lucie Units 1 & 2 are licensed for uranium-dioxide fuel that is slightly enriched uranium-235. The uranium-dioxide fuel is in the form of pellets contained in Zircaloy tubes with welded end plugs to confine radionuclides. The tubes are fabricated into assemblies designed for loading into the reactor core. Each reactor core includes 217 fuel assemblies.

FPL currently replaces approximately one-third of the fuel assemblies in each reactor at intervals of approximately 18 months. FPL operates the reactors such that the average fuel usage by the reactors is approximately 47,000 megawatt-days per metric ton uranium. In regard to the nuclear capacity uprates, more nuclear fuel will be used due to the increased capacity of each generating unit. No changes in the fuel-handling facilities are required. The addition of the wind turbines will have no fuel-related impact; i.e., no impacts from fuel delivery, storage, waste, or pollution control. Used fuel assemblies are stored in the onsite Nuclear Regulatory Commission (NRC) approved spent fuel storage facilities. Following completion of the uprates, approximately 11 percent more nuclear fuel will be used to increase the capacity of each unit. No changes in the fuel-handling facilities are required.

Diesel fuel is used in a number of emergency generators that include four main plant generators, two building generators, and various general purpose diesel engines. The main plant emergency generators will not be changed as a result of either of the two types of generation capacity additions. These emergency generators are for standby use only and are tested to assure reliability and for maintenance. Diesel fuel is delivered to the St. Lucie Plant by truck as needed, and stored in tanks with secondary containment.

p. Air Emissions and Control Systems

The St. Lucie Plant is classified as a minor source of air pollution, since FDEP has issued a Federally Enforceable State Operating Permit (FESOP) to keep emissions less than 100 tons per year for any air pollutant regulated under the Clean Air Act.

EXHIBIT 29

The applicable units at the St. Lucie Plant consist of eight large main plant diesel engines, two smaller diesel engines, and various general-purpose diesel engines. The air emissions from these engines are limited by the use of 0.05-percent sulfur diesel fuel and good combustion practices. Best Available Control Technology (BACT) is not applicable to these existing emission units.

Nitrogen oxide (NO_x) emissions from the operation of the diesel engines comprise the limiting pollutant for these diesel units at the St Lucie Plant. The FDEP FESOP limits NO_x emissions to 99.4 tons, which includes fuel use limits on the large main plant emergency diesel engines of 97,000 gallons in any 12-month consecutive period and the smaller building and general purpose diesel engines of 190,000 gallons in any 12-month consecutive period. Also, the Plant may choose to combine the diesel units' fuel-tracking, which then limits the NO_x totals for a 12-month consecutive period to a maximum of 80 tons. There will be no change in the operation or emissions of the diesel engines resulting from either the nuclear capacity uprates or the wind turbines.

In addition, neither of these types of generation capacity additions will result in an increase of carbon dioxide (CO_2) or other greenhouse gas emissions. In fact, both of these increases in generation capacity are projected to result in decreased FPL system-wide emissions of $CO_{2.}$

q. Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by construction activities at the site was conducted for both types of generation capacity additions. Predicted noise levels are not expected to result in adverse noise impacts in the vicinity of the site during construction or operation of either generating capacity additions.

r. Status of Applications

In regard to the nuclear capacity uprates, a Site Certification Application (SCA) under the Florida Electrical Power Plant Siting Act was filed in December 2007 and a final order issued in September 2008. The FPSC voted to approve the need for the St. Lucie (and Turkey Point) nuclear capacity uprates and the final order approving the need for these capacity additions was issued in January 2008. In regard to the wind turbines, a Site Certification Application is not required. Individual permit applications were submitted for an Environmental Resource Permit (ERP) and the Army Corps of

EXHIBIT 29

Engineers Permits in May 2008 and the Coastal Construction Control Line in July 2008. In September of 2007, FPL submitted an application to St. Lucie County for a Conditional Use, Rezoning, and Height Amendment. The local approvals process is ongoing. However, the state and federal permitting process is on hold awaiting completion of local permitting.

Preferred Site # 3: Turkey Point Plant, Miami-Dade County

The Turkey Point Plant site is located on the west side of Biscayne Bay, 25 miles south of Miami. The site is directly on the shoreline of Biscayne Bay and is geographically located approximately 9 miles east of Florida City on Palm Drive. Public access to the plant site is limited due to the nuclear units located there. The land surrounding the site is owned by FPL and acts as a buffer zone. The site is comprised of two nuclear units (Units 3 & 4), two natural gas/oil conventional boiler units (Units 1 & 2), one CC natural gas unit (Unit 5), nine small diesel generators, the cooling canals, an FPL-maintained natural wildlife area, and wetlands that have been set aside as the Everglades Mitigation Bank (EMB).

Turkey Point Units 3 & 4 have been in operation since 1972 and 1973, respectively. The Turkey Point site has been selected as a Preferred Site for the increase in the capacity of its two existing nuclear generating units by approximately 103 MW each. This work will involve changes to several existing main components within the existing facilities to increase their capability to produce steam for the generation of electricity. No new or expanded facilities are required as part of this capacity “uprate.” This capacity uprate, along with a similar capacity uprate of FPL’s existing St. Lucie nuclear units, was approved by the FPSC in January 2008. The capacity uprates at Turkey Point are projected to be in-service in 2012.

As previously mentioned, FPL is pursuing licensing for two new nuclear units at the Turkey Point site. Each of these two units would provide 1,100 MW of capacity. Current projections for the in-service dates of these two units, Turkey Point Units 6 & 7, are beyond the 2010-2019 reporting time frame of this document. At the time this document is being prepared, FPL is evaluating what the revised in-service dates for Turkey Point 6& 7 should be for planning purposes. FPL will address those revised in-service dates for planning purposes in its May 3, 2010 cost recovery filing to the FPSC.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Turkey Point plant site is found at the end of this chapter.

EXHIBIT 29

b. Proposed Facilities Layout

A map of the general layout of the Turkey Point Units 3 and 4 generating facility at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The five existing power generation units and support facilities occupy approximately 150 acres of the 11,000-acre Turkey Point Plant site. Support facilities include service buildings, an administration building, fuel oil tanks, water treatment facilities, circulating water intake and outfall structures, wastewater treatment basins, and a system substation. The cooling canal system occupies approximately 5,900 acres. The two 400-megawatt (MW) (nominal) fossil fuel-fired steam electric generation units at the Turkey Point Plant have been in service since 1967 (Unit 1) and 1968 (Unit 2). These units currently burn residual fuel oil and/or natural gas with a maximum equivalent sulfur content of 1 percent. The two 700-MW (nominal) nuclear units have been in service since 1972 (Unit 3) and 1973 (Unit 4). Turkey Point Units 3 and 4 are pressurized water reactor (PWR) units. Turkey Point Unit 5 is a nominal 1,150-MW CC unit that began operation in 2007. Significant features in the vicinity of the site include Biscayne National Park, the Miami-Dade County Homestead Bayfront Park, and the Everglades National Park.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The prominent structures and enclosed facilities and equipment associated with Units 3 & 4 include: the containment building, which contains the nuclear steam supply system, including the reactor, steam generators, reactor coolant pumps, and related equipment; the turbine generator building, where the turbine generator and associated main condensers are located; the auxiliary building, which contains waste management facilities, engineered safety components, and other facilities; and the fuel handling building, where the spent fuel storage pool and storage facilities for new fuel are located. Prominent features beyond the power block area include the intake system, cooling canal system, switchyard, spent fuel storage facilities, and technical and administrative support facilities.

EXHIBIT 29

2. Listed Species

The construction during the uprating of the units, and operation of the units after the capacity uprating is completed, are not expected to adversely affect any rare, endangered, or threatened species. Listed species known to occur at the site and in the nearby Biscayne National Park that could potentially utilize the site include the peregrine falcon *(Falco peregrinus)*, wood stork *(Mycteria americana)*, American crocodile *(Crocodylus acutus)*, mangrove rivulus *(Rivulus marmoratus)*, roseate spoonbill (*Ajaja ajaja)*, limpkin *(Aramus guarauna),* little blue heron *(Egretta caerulea),* snowy egret *(Egretta thula),* American oystercatcher *(Haematopus palliates),* least tern *(Sterna antillarum)*, the white ibis *(Eudocimus albus)*, and bald eagle *(Haliaeetus leucocephalus)*. No bald eagle nests are known to exist in the vicinity of the site. The federally listed, threatened American Crocodile thrives at the Turkey Point site, primarily in and around the southern end of the cooling canals which lie south of the project area. The entire site is considered crocodile habitat due to the mobility of the species and use of the site for foraging, traversing, and basking. FPL manages a program for the conservation and enhancement of the American crocodile and is attributed with survival improvement and the downlisting of the American Crocodile from endangered to threatened.

3. Natural Resources of Regional Significance Status

Significant features in the vicinity on the site include Biscayne National Park, the Miami-Dade County Homestead Bayfront Park, and the Everglades National Park. The portion of Biscayne Bay adjacent to the site is included within the Biscayne National Park. Biscayne National Park contains 180,000 acres, approximately 95 percent of which is open water interspersed with more than 40 keys. The Biscayne National Park headquarters is located approximately 2 miles north of the Turkey Point plant and is adjacent to the Miami-Dade County Homestead Bayfront Park which contains a marina and day-use recreational facilities.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

EXHIBIT 29

Turkey Point Units 3 & 4 uses cooling water from a closed-cycle cooling canal system to remove heat from the main (turbine) condensers, and to remove heat from other auxiliary equipment. The existing cooling canals will accommodate the increase in heat load that is associated with the increased capacity from the uprates. The maximum predicted increase in water temperature entering the cooling canal system from the units resulting from the uprates is predicted to be about 2.5°F, from 106.1°F to 108.6°F. The associated maximum increase in water temperature returning to the units is about 0.9°F, from 91.9°F to 92.8°F.

g. Local Government future Land Use Designations

Local government future land use plan designates most of the site as IU-3 “Industrial, Unlimited Manufacturing District.” There are also areas designated GU – “Interim District.” Designations for the surrounding area are primarily GU – “Interim District.”

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the nuclear capacity uprates because it is an existing nuclear plant site and, therefore, offers the opportunity for increased nuclear capacity.

i. Water Resources

Unique to the Turkey Point plant site is the self-contained cooling canal system that supplies water to condense steam used by the plant's turbine generators. The canal system consists of 36 interconnected canals. The cooling canals occupy an area approximately two miles wide by five miles long (5,900 acres), approximately four feet deep. The system performs the same function as a giant radiator. The water is circulated through the canals in a two-day journey, ending at the plant's intake pumps.

j. Geological Features of Site and Adjacent Areas

The Turkey Point Plant lies upon the Floridian Plateau, a partly-submerged peninsula of the continental shelf. The peninsula is underlain by approximately 4,000 to 15,000 feet of sedimentary rocks consisting of limestone and associated formations that range in age from Paleozoic to Recent. Little is known about the basement complex of Paleozoic igneous and metamorphic rocks due to their great depth.

Generally in Miami-Dade County, the surficial aquifer (Biscayne Aquifer) consists of a wedge-shaped system of porous clastic and carbonate sedimentary materials, primarily limestone and sand deposits of the Miocene to late Quaternary age. The Biscayne Aquifer is thickest along the eastern coast and varies in thickness from 80 to 200 feet thick. The surficial aquifer is typically composed of Pamlico Sand, Miami Limestone (Oolite), the Fort Thompson and Anastasia Formations (lateral equivalents), Caloosahatchee Marl, and the Tamiami formation. The lower confining layers below the surficial aquifer range in thickness from 350 to 600 feet and are composed of the Hawthorn Group. Beneath the Hawthorn Group, the Floridan Aquifer System ranges from 2,800 to 3,400 feet thick and consists of Suwannee Limestone, Avon Park Limestone, and the Oldsmar Formations.

k. Projected Water Quantities for Various Uses

The addition of nuclear generating capacity as a result of the uprates will not cause any changes in the quantity or characteristics of industrial wastewaters generated by the facility; therefore, no change in that compliance achievement status is expected. The uprates will not cause any changes in hydrologic or water quality conditions due to diversion, interception, or additions to surface water flow. The Turkey Point Plant does not directly withdraw groundwater under its current operations and it will not do so after the capacity uprates. Locally, groundwater is present beneath the site in the surficial or Biscayne Aquifer and in deeper aquifer zones that are part of the Floridan Aquifer System. There will be no effects on those deeper aquifer zones from the capacity uprates.

l. Water Supply Sources and Type

The source of cooling water for Turkey Point Units 3 & 4 is the cooling canal system. There will be no increase in the amount of water withdrawn as a result of the capacity uprates. General plant service water, fire protection water, process water, and potable water are obtained from Miami-Dade County. Process water uses include demineralizer regeneration, steam cycle makeup, and general service water use for washdowns. The water use for the facility will not change as a result of the capacity uprates.

m. Water Conservation Strategies

The existing water resources will not change as a result of the uprates.

n. Water Discharges and Pollution Control

Heated water discharges are dissipated using the existing closed cooling water system and the cooling canal system.

EXHIBIT 29

The facility employs a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

Turkey Point Units 3 & 4 utilize uranium-dioxide fuel that is slightly enriched uranium-235. The uranium-dioxide fuel is in the form of pellets contained in Zircaloy tubes with welded end plugs to confine radionuclides. The tubes are fabricated into assemblies designed for loading into the reactor core. Used fuel assemblies are stored in the onsite NRC-approved spent fuel storage facilities.

FPL currently replaces approximately one-third of the fuel assemblies in each reactor at refueling intervals of approximately 18 months. FPL operates the reactors such that the average fuel usage by the reactors is approximately 45,000 megawatt-days per metric ton of uranium. Following completion of the uprates, more nuclear fuel will be used to increase the capacity of each unit. No changes in the fuel handling facilities are required. Following completion of the uprates, approximately 11 percent more nuclear fuel will be used to increase the capacity of each unit. No changes in the fuel-handling facilities are required.

Diesel fuel is used in a number of emergency generators that include four main emergency generators, five smaller emergency generators and various general purpose diesel engines. The emergency generators will not be changed as a result of the capacity uprates. These emergency generators are for stand-by use only and only operated for testing purposes to assure reliability and for maintenance. Diesel fuel for the emergency generators is delivered to the Turkey Point Plant by truck as needed, and stored in tanks with secondary containment.

p. Air Emissions and Control Systems

The normal operation of Turkey Point Units 3 & 4 does not create fossil fuel-related air emissions. However, there are 9 emergency generators associated with Units 3 & 4. Four of these nine emergency generators are main plant emergency generators which are rated at 2.5 MW each. The remaining five are smaller emergency generators which are associated with the security system. In addition, various general purpose diesels are used as needed for Units 3 & 4.

EXHIBIT 29

Turkey Point Plant Units 3 & 4's associated emergency generators and diesel engines, together with Units 1, 2, & 5, are classified as a major source of air pollution. FDEP has issued a separate Title V Air Operating Permit for the Turkey Point Nuclear Plant (Permit Number 0250003-004-AV). There are no operating limits for the emergency generators or diesel engines. Emergency diesel generators are limited to ultra-low sulfur distillate (0.0015% sulfur). NOx emissions are regulated under Reasonably Available Control Technology (RACT) requirements in Rule 62-296.570(4)(b)7 F.A.C., which limit NO_x emissions to 4.75 lb/MMBtu. The use of 0.05 percent sulfur diesel fuel and good combustion practices serve to keep NO_x emissions under this limit.

q. Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by activities associated with the uprates was conducted. Predicted noise levels are not expected to result in adverse noise impacts in the vicinity of the site.

r. Status of Applications

A Site Certification Application (SCA) under the Florida Electrical Power Plant Siting Act was filed in January 2008 and a final order was issued in October 2008. The FPSC voted to approve the need for the Turkey Point (and St. Lucie) uprates and the final order approving the need for this additional nuclear capacity was issued in January 2008.

Preferred Site # 4: Cape Canaveral Plant, Brevard County

This site is located on the existing FPL Cape Canaveral Plant property in unincorporated Brevard County. The site is bound to the east by the Indian River Lagoon and on the west by a four lane highway (US. 1). The city of Port St. Johns is located less than a mile away. A rail line is located near the plant.

The existing 788 MW (summer) of generating capacity at FPL's Cape Canaveral site occupies a portion of the 43 acres that are wholly owned by FPL. The generating capacity is made up of steam units (Units 1 & 2).

The Cape Canaveral Plant site has been listed as a Potential Site in previous FPL Site Plans for both CC and simple cycle generation options. FPL is proposing, for resource planning purposes, to modernize the existing Cape Canaveral Plant, to be renamed the

EXHIBIT 29

Cape Canaveral Next Generation Clean Energy Center (CCEC), by replacing the existing generating units with a modern, highly efficient, lower-emission next-generation clean energy center using the latest CC technology. The existing two (2) steam units will first be dismantled and removed from the site and will be replaced by a single new CC unit.

a. Geological Survey (USGS) Map

A USGS map of the Cape Canaveral Plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the CCEC generating facilities at the site is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The existing land uses on the site are primarily dedicated to electrical generation; i.e., FPL's existing Cape Canaveral Units 1 & 2. The existing land uses that are adjacent to the site consist of single- and multi-family residences to the south and southwest, commercial property to the northwest, utility systems to the west, and a private medical/office facility to the north.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The natural environment surrounding the site includes the Indian River Lagoon to the east and upland scrub, pine and hardwoods to the north and south. Vegetation with the approximately 45-acre offsite construction laydown and parking area (located west of U.S. Highway 1) consists of open land, upland scrub, pine, hardwoods along with exotic plant species.

2. Listed Species

No adverse impacts to federally or state-listed terrestrial plants and animals are expected in association with construction at the Site, due to the existing developed nature of the Site and lack of suitable onsite habitat for listed species. Federal- or state-listed terrestrial plants and animals inhabiting the offsite construction laydown and parking area are limited to the state-listed gopher tortoise and the state- and federally-listed scrub jay. The warm water discharges from the plant attract manatees, an endangered species. FPL is working closely with state and federal wildlife agencies to ensure protection of the manatees during the modernization process and upon operation of the new plant. FPL will be complying with several manatee related conditions of certification to ensure the protection of the manatees during this time.

3. Natural Resources of Regional Significance Status

The construction and operation of a natural gas-fired CC generating facility at this location is consistent with the existing use at the site and is not expected to have any adverse impacts on parks, recreation areas, or environmentally sensitive lands.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design option is to replace the existing steam generating units (Units 1 & 2) with one new 1,219 MW (approximate) CC unit consisting of three new combustion turbines (CT), three new heat recovery steam generators (HRSG), and a new steam turbine. The new CC unit would be in-service in mid-2013. Natural gas delivered via pipeline is the primary fuel type for this unit with ultra-low sulfur light oil serving as a backup fuel.

g. Local Government Future Land Use Designations

Local government future land use designation for the site is “Public Utilities” and the area has been rezoned to GML-U. Designations for the surrounding area are primarily “Community Commercial” and “Residential”. The Indian River Lagoon is to the east of the site.

h. Site Selection Criteria Process

The Cape Canaveral Plant has been selected as a preferred site for a site modernization due to consideration of various factors including system load and economics. Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues. However, there are environmental benefits of replacing the existing steam units with a new CC unit including a significant reduction in system air emissions and improved aesthetics at the site.

i. Water Resources

Condenser cooling for the steam cycle portion of the new plant and auxiliary cooling will come from the existing cooling water intake system. Process, potable, and irrigation water for the new plant will come from the existing City of Cocoa's potable water supply.

j. Geological Features of Site and Adjacent Areas

FPL's Cape Canaveral Plant is located on the Atlantic Coastal Ridge and is at an approximate elevation of 12 feet above mean sea level (msl). The land consists primarily of fine to medium sand that parallels the coast. There is a lack of shell as it was deposited during a time of transgression. The base of the sedimentary rocks is made up of a thick, primarily carbonate sequence deposited during the Jurassic age through the Pleistocene age. Starting in the Miocene age and continuing through the Holocene age, siliciclastic sedimentation became more predominant. The basement rocks in this area consist of low-grade metamorphic and igneous intrusives, which occur several thousand feet below land surface and are Precambrian, Paleozoic, and Mesozoic in age.

k. Projected Water Quantities for Various Uses

The estimated quantity of water required for processing is approximately 0.232 million gallons per day (mgd) for uses such as process water and service water. Approximately 619 million gallons per day (mgd) of cooling water would be cycled through the once-through cooling water system. Potable water demand is expected to average .001 mgd.

l. Water Supply Sources by Type

The new plant will continue to use the Indian River Lagoon water as the source of once-through cooling water. Such needs for cooling water will comply with the existing St. John's River Water Management District (SJRWMD) Consumptive Use Permit (CUP). Process, potable, and irrigation water for the new plant will come from the existing City of Cocoa's potable water supply.

m. Water Conservation Strategies Under Consideration

No additional water sources will be required as a result of the modernization project.

EXHIBIT 29

n. Water Discharges and Pollution Control

The modernized site will utilize portions of the existing once-through cooling water systems for heat dissipation. The heat recovery steam generator blowdown will be mixed with the cooling water flow before discharge. Reverse osmosis (R/O) reject will be mixed with the plant's once-through cooling water system. Stormwater runoff will be collected and routed to stormwater ponds. The facility will employ a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

Natural gas for the new unit would be transported to the site via a pipeline. New on-site gas compressors may be installed to raise the gas pressure of the existing pipeline for the new unit. Ultra-low sulfur light fuel oil would be received by truck or barge from Port Canaveral and stored in an existing above-ground storage tank.

p. Air Emissions and Control Systems

The emission rates of CCEC would decrease by almost 100-fold from the existing Cape Canaveral Plant, resulting in substantial annual emissions reductions and increased air quality benefits. The use of natural gas and ultra-low sulfur light fuel oil and combustion controls would minimize air emissions from the unit and ensure compliance with applicable emission limiting standards. Using these fuels minimizes emissions of sulfur dioxide (SO_2), particulate matter, and other fuel-bound contaminates. Combustion controls similarly minimize the formation of nitrogen oxides (NO_x) and the combustor design will limit the formation of carbon monoxide and volatile organic compounds. When firing natural gas, NO_x emissions will be controlled using dry-low NO_x combustion technology and selective catalytic reduction (SCR). Water injection and SCR will be used to reduce NO_x emissions during operations when using ultra-low sulfur light fuel oil as backup fuel. These design alternatives are equivalent to the Best Available Control Technology for air emissions, and minimize such emissions while balancing economic, environmental, and energy impacts. Taken together, the design of the new CCEC plant will incorporate features that would make it among the most efficient and cleanest power plants in the State of Florida.

q. Noise Emissions and Control Systems

Noise from the operation of the new unit will be within allowable levels.

EXHIBIT 29

r. Status of Applications

The FPSC voted to approve the need for the modernization project and the need order was issued in September 2008. The project received final state certification on October 9, 2009, through the issuance of a final order signed by the Secretary of the DEP.

Preferred Site # 5: Riviera Plant, Palm Beach County

This site is located on the existing FPL Riviera Plant property primarily within Riviera Beach, Palm Beach County (with a small portion of the Site in West Palm Beach). The site is bound to the east by the Lake Worth Lagoon (Intracoastal Waterway) and on the west by a four lane highway (US. 1). The site has barge access via the Port of Palm Beach. A rail line is located near the plant.

The current site generating capacity is made up of two (2) operational 300 MW (approximate) steam generating units (Units 3 & 4). Units 1 & 2 have been retired and dismantled and are no longer on the plant site.

The Riviera Plant site has been listed as a Potential Site in previous FPL Site Plans for both CC and simple cycle generation options. FPL is proposing, for resource planning purposes, to modernize the existing Riviera Plant, to be renamed the Riviera Beach Next Generation Clean Energy Center (RBEC), by replacing the existing generating units with a modern, highly efficient, lower-emission next-generation clean energy center using the latest CC technology. The existing two steam units will first be removed from the site and will be replaced by a single new CC unit.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Riviera site is found at the end of this chapter.

b. Proposed Facilities Layout

A general layout of the RBEC generating facilities is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

EXHIBIT 29

d. Existing Land Uses of Site and Adjacent Areas

The existing Riviera Plant currently consists of two 300 MW (approximate) units with conventional dual-fuel fired steam boilers and steam turbine units. The plant site includes minimal vegetation and a landscape buffer area south of the power plant. Adjacent land uses include port facilities and associated industrial activities, as well as light commercial and residential development.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The majority of the site is comprised of facilities related to electric power generation for the existing Riviera Plant. The site is located on the Intracoastal waterway which provides warm water refugia for manatees during cold winter days.

2. Listed Species

No adverse impacts to federally or state-listed terrestrial plants and animals are expected in association with construction at the Site, due to the existing developed nature of the Site and lack of suitable onsite habitat for listed species. The warm water discharges from the plant attract manatees, an endangered species. FPL is working closely with state and federal wildlife agencies to ensure protection of the manatees during the modernization process and upon operation of the new plant. FPL will be complying with several manatee related conditions of certification to ensure the protection of the manatees during this time.

3. Natural Resources of Regional Significance Status

The construction and operation of a natural gas-fired CC generating facility at this location is consistent with the existing use at the site and is not expected to have any adverse impacts on parks, recreation areas, or environmentally sensitive lands.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design option is to replace the existing units (Units 3 & 4) with one new 1,219 MW (approximate) unit consisting of three new combustion turbines (CT), three new

EXHIBIT 29

heat recovery steam generators (HRSG), and a new steam turbine. The new CC unit would be in service in mid-2014. Natural gas delivered via pipeline is the primary fuel type for the unit with ultra-low sulfur light oil serving as a backup fuel.

g. Local Government Future Land Use Designations

Local government future land use designation for the site is “Utility”. The Port of Palm Beach is to the north of the site. Designation to the west of the site is “Commercial”. To the south of the site is “Residential” and is in the City of West Palm Beach.

h. Site Selection Criteria Process

The Riviera plant has been selected as a Preferred Site to consideration of various factors including system load and economics. Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues. However, there are environmental benefits of replacing the existing steam units with a new CC unit including a significant reduction in system air emissions and improved aesthetics at the site.

i. Water Resources

Water from the Lake Worth Lagoon (Intracoastal waterway) is currently used for once-through cooling water. The new plant will utilize portions of the existing once through cooling water intake and discharge structures. Water for cooling pump seals and irrigation will come from three onsite surficial aquifer wells. Process and potable water for the converted plant will come from the existing City of Riviera Beach potable water supply.

j. Geological Features of Site and Adjacent Areas

FPL’s Riviera Plant site is underlain by the surficial aquifer system. The Surficial aquifer system in eastern Palm Beach County is primarily composed of sand, sandstone, shell, silt, calcareous clay (marl), and limestone deposited during the Pleistocene and Pliocene Epochs. The sediments forming the aquifer system are the Pamlico Sand, Fort Thompson Formation (Pleistocene) and the Caloosahatchee Marl (Pleistocene and Pliocene). Permeable sediments in the upper part of the Tamiami Formation (Pliocene) are also part of the aquifer system. The sediments in the eastern portion of the county are appreciably more permeable than in the west due to better sorting and less silt and clay content.

EXHIBIT 29

The surficial aquifer is underlain by at least 600 feet the Hawthorn formation (confining unit). The Floridan Aquifer System underlies the Hawthorn formation.

k. Projected Water Quantities for Various Uses

The estimated quantity of water required for processing is approximately 0.232 million gallons per day (mgd) for uses such as process water and service water. Approximately 600 mgd of cooling water would be cycled through the once-through cooling water system. Potable water demand is expected to average .001 mgd.

l. Water Supply Sources by Type

The new plant will continue to use the Lake Worth Lagoon water as the source of once-through cooling water. Water for cooling pump seals and irrigation will come from on-site surficial aquifer wells currently permitted by SFWMD. Process and potable water for the new plant will come from the existing City of Riviera Beach's potable water supply.

m. Water Conservation Strategies Under Consideration

No additional water sources will be required as a result of the modernization project.

n. Water Discharges and Pollution Control

The new plant will utilize portions of the existing once-through cooling water system for heat dissipation. The heat recovery steam generator blowdown will be mixed with the cooling water flow before discharge. Reverse osmosis (R/O) reject will be mixed with the plant's once-through cooling water system prior to discharge. Stormwater runoff will be collected and routed to stormwater ponds. The facility will employ a Best Management Practices (BMP) plan and Spill Prevention, Control, and Countermeasure (SPCC) plan to prevent and control the inadvertent release of pollutants.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

Natural gas for the new unit would be transported to the site via a pipeline. New gas compressors may be installed to raise the gas pressure of the existing pipeline to the appropriate level for the converted unit. Ultra-low sulfur light fuel oil would be received by truck, pipeline or barge and stored in a new above-ground storage tank.

EXHIBIT 29

p. Air Emissions and Control Systems

The regulated air emissions at the new plant would be more than 90 percent lower than the existing Riviera Plant's emissions are, resulting in significant annual emissions reductions and air quality benefits. The use of natural gas and ultra-low sulfur light fuel oil and combustion controls would minimize air emissions from the unit and ensure compliance with applicable emission limiting standards. Using these fuels minimizes emissions of sulfur dioxide (SO_2), particulate matter, and other fuel-bound contaminates. Combustion controls similarly minimize the formation of nitrogen oxides (NO_x) and the combustor design will limit the formation of carbon monoxide and volatile organic compounds. When firing natural gas, NO_x emissions will be controlled using dry-low NO_x combustion technology and selective catalytic reduction (SCR). Water injection and SCR will be used to reduce NO_x emissions during operations when using ultra-low sulfur light fuel oil as backup fuel. These design alternatives are equivalent to the Best Available Control Technology for air emissions, and minimize such emissions while balancing economic, environmental, and energy impacts. Taken together, the design of RBEC would incorporate features that will make it among the most efficient and cleanest power plants in the State of Florida.

q. Noise Emissions and Control Systems

Noise expected to be caused by unit construction at the site is expected to be below current noise levels for the residents nearest the site.

r. Status of Applications

The FPSC voted to approve the need for the modernization project and the need order was issued in September 2008. The project received final state certification on November 24, 2009, through the issuance of a final order signed by the Secretary of the DEP.

Preferred Site #6: Space Coast Next Generation Solar Energy Center, Brevard County

The Space Coast site is located at Section 13, Township 23 South, and Range 36 East, North of North Courtenay Parkway. FPL is leasing approximately 60 acres from Kennedy Space Center in Brevard County. This Space Coast site has been selected as a Preferred Site for the addition of a 10 MW PV generation facility. The Space Coast Next Generation Solar Energy Center is expected to be in operation by the end of 2010. This

Site has the potential to expand by another 10 MW. Also, FPL is evaluating the potential for expansion beyond the existing site.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Space Coast Next Generation Solar Energy Center plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the Space Coast Next Generation Solar Energy Center generating facility is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

The site is inactive. The site was previously dedicated to agricultural use as citrus groves. There are no structures on the site and the majority of the vegetation is citrus grove.

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The surrounding land use is predominantly agriculture. FPL was able to design the PV facility to avoid most of the impacts to natural wetlands.

2. Listed Species

Wildlife resources at the site were evaluated in February 2008 through pedestrian surveys. There were no listed species observed.

3. Natural Resources of Regional Significance Status

The construction and operation of a PV generating facility at this location is not expected to have any adverse impacts on parks or recreation areas. Construction will result in minimal wetland impacts under federal, state, or local agency permitting criteria.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The design consists of 10 MW of PV technology. No mitigating options are deemed necessary at the site.

g. Local Government future Land Use Designations

Future land use designation for the site is Spaceport Management as designated by the Brevard County Future Land Use Map.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site for the installation of a PV technology due to consideration of various factors including its suitability for a PV facility of this magnitude and the cooperation of the Kennedy Space Center.

i. Water Resource

No water will be required at the PV facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficient rainfall. Any such water would be brought to the site by truck.

j. Geological Features of the Site and Adjacent Areas

The surface and near-surface deposits of east-central Florida range from surficial unconsolidated sands to well indurated limestones and dolomites at depth. In ascending order the four main geologic units present in east-central Florida are: (i) Eocene limestones; (ii) Lower and Middle Miocene compact silt and clays; (iii) Upper Miocene and Pliocene silty and clayey sands; and (iv) Pleistocene and Recent age sands with interbedded shell layers.

k. Projected Water Quantities for Various Uses

The projected water use for the PV facility is expected to be minimal with water being used occasionally only to clean the PV panels.

l. Water Supply Sources and Type

At this time, it is expected that natural rainfall will be sufficient to keep the solar panels clean. In the event that additional water is required, a small amount of water may be occasionally trucked in to clean the PV panels.

EXHIBIT 29

m. Water Conservation Strategies

FPL constructed this PV facility knowing it would not use water for operation and would only need a minimal amount for cleaning the PV panels.

n. Water Discharges and Pollution Control

There will not be any water discharges or pollution as a result of this facility

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The facility will use the sun for fuel. Therefore, there will not be any fuel delivery, storage, waste, or pollution at this site.

p. Air Emissions and Control Systems

No air emissions will be emitted from this facility.

q. Noise Emissions and Control Systems

Noise expected during construction is expected to be below noise levels allowed by Brevard County. No noise will be emitted from this facility during operation.

r. Status of Applications

FPL received an Environmental Resource Permit (ERP) from the St. Johns Water Management District in April 2009 and a U.S. Army Corps of Engineers permit in December 2008 for the 10 MW site. .

Preferred Site #7: Martin Next Generation Solar Energy Center, Martin County

The Martin Next Generation Solar Energy Center (MSEC) is located on the existing FPL Martin Plant site in unincorporated Martin County, Florida. The Martin Plant site is located in southwestern Martin County about 40 miles northwest of West Palm Beach and about 1.3 miles east of Lake Okeechobee (Figure 2.1-1). The Martin Plant site is bounded by State Road (SR) 710 and a CSX Railroad line (east and north), a Florida East Coast Railway line and SFWMD L-65 Canal (west), and the St. Lucie Waterway (south).The MSEC Project will be constructed in an approximately 600-acre area (Project Area) within FPL's existing 11,300-acre Martin Plant site. The land surrounding the site is owned by FPL and acts as a buffer zone.

The site has been selected as a Preferred Site for the addition of approximately 75 MW of solar thermal generation. The facility will produce steam that will replace steam that would otherwise have been produced by burning natural gas in one of the existing CC units at the site, Martin Unit 8. The Martin Next Generation Solar Energy Center is expected to be in operation by the end of 2010.

There also is potential for an additional 75 MW of photovoltaic or solar thermal on the Martin Plant Property in the future. Adjacent farmlands are also being considered for additional photovoltaic facilities.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Martin Next Generation Solar Energy Center plant site is found at the end of this chapter.

b. Proposed Facilities Layout

A map of the general layout of the Martin Next Generation Solar Energy Center generating facility is found at the end of this chapter.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found at the end of this chapter.

d. Existing Land Uses of Site and Adjacent Areas

Total acreage for the existing Martin Plant site is approximately 11,300 acres, which represents land owned by FPL. The Martin Plant site consists of a 6,800-acre cooling pond (6,500 acres of water surface and 300 acres of embankment) and approximately 400 acres for existing Units 1 through 4, Unit 8, and associated facilities. Units 1 & 2 are nominal 800-MW steam electric generating units that use natural gas and low-sulfur residual oil. Units 3 & 4 are nominal 500-MW natural gas-fired CC units. Unit 8 is a natural gas fired 4-on-1 CC unit with a nominal capacity of 1,100 MW that began operation in 2005. Light oil is used as backup in Unit 8. The other onsite facilities include water and wastewater treatment facilities, residual and light fuel oil storage, switchyards and transmission lines, offices, warehouses, maintenance buildings, and other miscellaneous uses.

Adjacent areas include agricultural uses such as croplands, pastures, and groves account for much of the land use and cover within 5 miles of the Martin Plant site. Three types of wetlands, forested freshwater, non-forested freshwater, and mixed forested and forested freshwater also account for a great deal of nearby land use.

EXHIBIT 29

e. General Environment Features On and In the Site Vicinity

1. Natural Environment

The portions of the Martin Plant site that will be affected by the construction of the MSEC are about 550 acres that will be utilized for solar arrays and construction facilities. The solar arrays will be located east of the existing Unit 8. Activities associated with construction will occupy about 100 acres. This will include construction laydown, parking, and trailers. These areas will be cleared of any vegetation. The area for the heat exchangers will be near Unit 8 and this area has been previously impacted by the construction of Units 3, 4, and 8.

2. Listed Species

Threatened and endangered species within the project area are limited to avian species and gopher tortoise. No listed species of plants were identified within the MSEC project area. Due to the presence of large areas of similar habitat both within the Northwest Mitigation Area and areas north of the existing transmission line right-of-way (ROW) adjacent to the project area, and the highly mobile nature of protected avian species, no significant adverse impacts to federally or state listed animals are expected. Creation of wood stork foraging ponds and sandhill crane habitat within the Northwest Mitigation Area provides suitable habitat to offset the loss of shallow hydroperiod wetlands within the project area.

Gopher tortoises are classified as threatened by the Florida Fish and Wildlife Conservation Commission (FFWCC), but are not listed federally by the U.S. Fish and Wildlife Service (USFWS). Gopher tortoise burrows were observed in the palmetto prairie and woodland pasture. Other listed species are known to utilize gopher tortoise burrows (commensal species), including the Eastern indigo snake (*Drymarchon corais couperi*; federally and state threatened), gopher frog (*Rana capito*; state species of special concern), and Florida mouse (*Podomys floridanus*; state species of special concern). A permit was obtained to relocate the gopher tortoises and any commensal species. Construction and operation at the site is not expected to affect any rare, endangered, or threatened species.

3. Natural Resources of Regional Significance Status

The construction and operation of a solar thermal facility at this location is not expected to have any adverse impacts on parks or recreation areas.

EXHIBIT 29

Construction will result in minimal wetland impacts under federal, state, or local agency permitting criteria.

4. Other Significant Features

The Florida Department of State, Division of Historical Resources, has determined that no significant archaeological or historical sites are recorded or are likely to be present within the project area. As a result no construction impacts on historic properties listed or eligible for listing in the National Register of Historic Places, or otherwise of historical or archaeological value, are anticipated.

f. Design Features and Mitigation Options

The design consists of approximately 75 MW of solar thermal technology. FPL has already undertaken an extensive wetland mitigation program on a 1,130-acre parcel northwest of the existing Martin Plant generating units. That mitigation program was deemed successful by the SFWMD in 2001. All wetland impacts associated with the MSEC have been fully mitigated through this now-successful wetland and upland mitigation effort.

g. Local Government future Land Use Designations

The Martin Plant site that includes Units 1 & 2 was developed prior to the county's adoption of a future land use map. In 1982, at the time of the original land use plan map adoption, the portion of the Martin Plant site surrounding the existing units was designated Industrial. The Electric Utility Element of the Comprehensive Plan acknowledged FPL's then current plans to construct two integrated coal gasification combined cycle (IGCC) plants at the Martin Plant site and encouraged the facilities to be developed under the industrial planned unit development [PUD(i)] zoning designation. In September 1988, FPL requested a comprehensive plan land use amendment to industrial for the licensing of the Martin Coal Gasification/Combined Cycle (CG/CC) Project Area and a rezoning of that area to PUD(i). In August 1989, the Martin County Board of County Commissioners (BOCC) approved the comprehensive plan amendment and the rezoning request. In June 2008, with the BOCC approval of the rezoning, a PUD Zoning Agreement was executed between Martin County and FPL in which development standards and special conditions were addressed. Most of the special conditions were addressed during earlier phases of developing the Martin Plant site. An amendment of the PUD Zoning Agreement was requested by FPL to allow renewable energy facilities to be located within the PUD

EXHIBIT 29

area. Subsequent to the certification of the CG/CC project, which includes the area of the MSEC, Martin County has amended its future land use element and map to designate 7,300 acres in the Martin Plant site as Public Utilities – Major Public Power Generation Facilities.

h. Site Selection Criteria Process

The site has been selected as a Preferred Site due to consideration of various factors including available land area and proximity to an existing generating unit (Martin Unit 8) to which the steam generated by the solar thermal facility could be fed.

i. Water Resource

There will be no water used at the solar thermal facility except the small amount needed to occasionally clean the solar mirrors. The additional water needed for mirror cleaning is already within the previously approved allocation of water for the Martin Plant site.

j. Geological Features of the Site and Adjacent Areas

Borings drilled in the area just east of the existing Unit 8 show that the predominant soil type is sand from the ground surface [approximately 30 feet above mean sea level (ft-msl)] to −70 ft-msl (negative number denotes feet below sea level). The sands vary in color from light to dark gray and brown. Clayey sand and sandy clay seams from a few inches to several feet in thickness are generally found at 10 ft-msl. A thin layer of greenish-gray sandy clay was found in the borings at approximately −25 ft-msl. The Pamlico and Anastasia Formations extend from the ground surface (20 to 30 ft-msl) to an average of −3 ft-msl. These strata consist of fine sands and silty sands with shell fragments. Thin beds of limestone and cemented sand occur sporadically at depths ranging from 2 to 4.5 ft-msl in localized areas; this zone may represent the boundary between the Pamlico and Anastasia Formations. In areas where the cemented sands and limestone are absent, it is not possible to differentiate the two formations.

The underlying Caloosahatchee Group extends to an average −80 ft-msl. This formation can be subdivided into two units, namely an upper limestone interbedded with sand and shell present to an average −12 ft-msl, and a lower unit of silty sand with shell fragments and shell beds to −80 ft-msl. The Tamiami Formation underlies the Caloosahatchee from −105 ft-msl to −150 ft-msl. This formation consists of silty sand varying with depth to clayey sand from −72 ft-msl. The color of the formation also varies from gray in the sands to predominantly green in the clayey zone.

EXHIBIT 29

The top of the Hawthorn Group occurs at approximately −105 ft-msl to −150 ft-msl. These elevations are based on the logs of test wells and exploratory borings drilled in the area. The Hawthorn, approximately 550 ft thick, consists predominantly of greenish clay with subordinate amounts of shell, limestone, silt, and sand. Major limestone zones generally occur near the base of the formation. Due to very low vertical permeability, the Hawthorn acts as a confining bed overlying the Floridan Aquifer.

k. Projected Water Quantities for Various Uses

Washing mirrors requires about 50 gallons per 120 mirrors (i.e., a 50 meter section). Based on the amount of mirrors for the MSEC, about 75,000 gallons per washing will be required. This amount of water is estimated to be no more than about 2 million gallons per year for cleaning mirrors.

l. Water Supply Sources and Type

The plant water use for MSEC can be accommodated by the current authorization for water in the Conditions of Certification (PA89-27L). The amount of water required by the MSEC is estimated to not exceed about 2 million gallons per year for cleaning mirrors, or an annual average of about 5 gallons per minute (gpm). The usage will be intermittent, with maximum usage of about 75,000 gallons every 1 or 2 weeks during periods without rain and depending upon the reflectivity of the mirrors. The source of water for the MSEC is the existing demineralized water system.

m. Water Conservation Strategies

FPL plans to construct this solar thermal facility knowing it will use very little water for operation.

n. Water Discharges and Pollution Control

There will not be any water discharges or pollution as a result of this facility.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The facility will use the sun for fuel. Therefore, there will not be any fuel delivery, storage, waste, or pollution at the site from the operation of the solar thermal facility.

p. Air Emissions and Control Systems

There will be no SO_2, NO_x, or CO_2 emissions from the solar thermal facility and its operation will result in reductions of FPL system emissions for all three types of emissions.

EXHIBIT 29

There will be minor amounts of volatile organic compounds (VOCs) released from the expansion tanks as a result of decomposition products of heat transfer fluids (HTF). Based on reported values from FPL Energy SEGS facilities in California, the VOC emissions from the MSEC will be about 0.8 tons per year (TPY). This amount would classify these emissions as insignificant activities and the amount is well below the threshold requiring permitting under FDEP rules in 62-210.300, F.A.C. A generic exemption is that emissions of any regulated pollutant be less than 5 TPY. The 5 TPY applies to the “potential-to-emit” for the emission unit, which would be 8,760 hours/year unless restricted as an enforceable permit condition in a permit. The exemption covers the requirement to obtain construction permits required pursuant to Rule 62-210.300(1), F.A.C.

q. Noise Emissions and Control Systems

Noise during construction is expected to be below noise level allowed by Martin County. There will not be any noise from the solar thermal facility during operation.

r. Status of Applications

FPL submitted an application for a Site Certification Modification for the Martin Next Generation Solar Energy Center to the FDEP in May 2008. FPL received the site certification modification approval in August 2008.

IV.F.2 Potential Sites for Generating Options

Ten (10) sites are currently identified as Potential Sites for near-term future generation additions to meet FPL’s capacity and energy needs.[4]

These sites have been identified as Potential Sites due to considerations of location to FPL load centers, space, infrastructure, and/or accessibility to fuel and transmission facilities. These sites are suitable for different capacity levels and technologies.

Each of these Potential Sites offer a range of considerations relative to engineering and/or costs associated with the construction and operation of feasible technologies. In addition, each Potential Site has different characteristics that will require further definition

---

[4] As has been described in previous FPL Site Plans, FPL also considers a number of other sites as possible sites for future generation additions. These include the remainder of FPL’s existing generation sites and other greenfield sites. Greenfield sites that FPL currently does not own, or for which FPL has not currently secured the necessary rights to, are not specifically identified as Potential Sites in order to protect the economic interests of FPL and its customers.

EXHIBIT 29

and attention. Solely for the purpose of estimating water requirements for each site, it was assumed that either one dual-fuel (natural gas and light oil) simple cycle combustion turbine (CT) or a natural gas-fired CC unit would be constructed at the Potential Sites unless otherwise noted. A simple cycle CT would require approximately 50 gallons per minute (gpm) for both process and cooling water (assuming air cooling). A CC unit would require approximately 150 gpm for service and process water and approximately 14 million gallons per day (mgd) for cooling water depending upon the water source and associated water quality. If an existing power plant site is ultimately selected for converting an existing unit(s), the water requirements discussed above for a CC unit would be approximately correct for the converted unit. If a renewable energy generating technology, such as photovoltaic or solar thermal, is ultimately selected for one of these sites, the water requirements would be less than those for CT or CC facilities.

Permits are presently considered to be obtainable for each of these sites. No significant environmental constraints are currently known for any of these sites. The Potential Sites briefly discussed below are presented in alphabetical order. At this time, FPL considers each site to be equally viable.

Potential Site # 1: Babcock Ranch , Charlotte County

This site is located within the Babcock Ranch Community on the north side of Truckers Grade, approximately 10.5 miles north of the intersection of SR-80 and SR-31 and 1.1 miles east of SR-31. The project is bordered on the north by the Babcock Ranch Reserve owned by the State of Florida. The site is within the SFWMD and, therefore, the drainage would be in accordance with the SFWMD Basis of Review. Permitting of the surface water management system would be through the Florida Department of Environmental Protection (FDEP) - South District based on a pre-application meeting. This site is a possibility for an FPL photovoltaic (PV) facility.

a. U.S. Geological Survey (USGS) Map

A map of this site is found at the end of this chapter.

b. Land Uses

Existing Land Use on the site is agricultural. FPL would attempt to re-zone the property to PD-P1 which will allow for electrical generation.

c. Environmental Features

FPL anticipates mitigating for any panther and/or wetland impacts as a result of the project.

d. Water Quantities

Minimal amounts of water would be required for a PV facility.

e. Supply Sources

No water will be required at the PV facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficient rainfall. Any such water would be brought to the site by truck.

Potential Site # 2: DeSoto Solar Expansion, DeSoto County

The DeSoto site is located at 4051 Northeast Karson Street approximately 0.3 miles east of US 17 and immediately north of Bobay Road in Arcadia, Florida. The site is located in Sections 26, 27, & 35, Township 36 South, and Range 25 East. FPL owns an approximate 13,000 acre parcel in DeSoto County. FPL has designated approximately 1,523 acres for development of a photovoltaic (PV) facility. The land surrounding the site is owned by FPL and acts as a buffer zone.

The DeSoto site was previously selected as the site for the addition of a 25 MW PV facility, which is currently operational. There is also a potential to create an additional 275 MW PV generating facility which would be implemented in phases on the additional land.

a. U.S. Geological Survey (USGS) Map

A map of this site is found at the end of this chapter.

b. Land Uses

Existing Land Use on the site is agricultural.

c. Environmental Features

There are no significant environmental features on the site.

d. Water Quantities

Minimal amounts of water would be required for a PV facility.

EXHIBIT 29

e. Supply Sources

No water will be required at the PV facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficient rainfall. Any such water would be brought to the site by truck.

Potential Site # 3: Florida Heartland Solar, Glades County

This site is located within Glades County, Florida off of SR 78. This site is a possibility for an FPL PV facility.

a. U.S. Geological Survey (USGS) Map

A map of this site is found at the end of this chapter.

b. Land Uses

The existing land uses on the site is agriculture.

c. Environmental Features

FPL anticipates mitigating for any panther and/or wetland impacts as a result of the project.

d. Water Quantities

Minimal amounts of water would be required for a PV facility.

e. Supply Sources

No water will be required at the PV facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficient rainfall. Any such water would be brought to the site by truck.

Potential Site # 4: Fort Myers Plant, Lee County

FPL's existing 460-acre Fort Myers property is located just east of Interstate 75 in Lee County and is adjacent to the Caloosahatchee River. The existing facilities on the site include one 1,440 MW (approximate) CC unit, 12 gas turbines, each with an approximate capacity of 54 MW, and two combustion turbines, each with an approximate capacity of 160 MW.

a. U.S. Geological Survey (USGS) Map

A USGS map of the Fort Myers plant site is found at the end of this chapter.

b. Land Uses

The land on the site is currently dedicated to industrial use with surrounding grassy and landscaped areas. Much of the site has been used in recent years for direct plant construction activities. The adjacent land uses include light commercial and retail to the east of the property, plus some residential areas located toward the west.

c. Environmental Features

Mixed scrub with some hardwoods can be found to the east and further south. The Caloosahatchee River is designated as critical habitat for manatees.

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

e. Supply Sources

The available water source is the Caloosahatchee River and the available groundwater source is the sandstone aquifer. FPL is aware that the Caloosahatchee River provides habitat for a variety of listed species. Prior to definitive site selection, FPL will take into account impingement and entrainment impacts as well as potential water quality impacts as a result of any new generating unit addition.

Potential Site # 5: Hendry County

FPL is currently evaluating potential sites in Hendry County for a future photovoltaic facility for up to 100 MW. Sites currently under investigation are approximately 1500 acres. No specific locations have been selected at this time.

a. U.S. Geological Survey (USGS) Map

Not available because a specific site has not been selected at this time.

b. Land Uses

Hendry County is predominantly agricultural land use.

c. Environmental Features

Not available because a specific site has not been selected at this time.

d. Water Quantities

Minimal amounts of water would be required for a photovoltaic facility.

e. Supply Sources

No water will be required at the PV facility except the small amount that may be needed to occasionally clean the solar panels in the absence of sufficient rainfall. Any such water would be brought to the site by truck.

Potential Site # 6: Lauderdale Plant, Broward County

The Lauderdale site is located in Eastern Broward County approximately 5 miles inland from Dania Beach and less than 2 miles west of Ft. Lauderdale International Airport. The site is bounded on the south by Dania Cutoff Canal, on the east by S.W. 30th Avenue, and on the North by I-595.

The existing approximately 1,700 MW of generating capacity at FPL's Lauderdale site occupies a portion of the approximately 210 acres that are wholly owned by FPL. The generating capacity is made up of two CC units (Units 4 & 5), and 24 simple cycle gas turbine (GT) units.

a. U.S. Geological Survey (USGS) Map

A USGS map of the site is found at the end of this chapter.

b. Land Uses

The existing power plant facilities are located on approximately 130 acres. The existing site has been in use since the 1920s and is adjacent to a county resource recovery project.

c. Environmental Features

To the north of the power plant is an area of mixed uplands with a scattering of small wetlands. Manatees are known to inhabit the waters nearby the plant.

EXHIBIT 29

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

e. Supply Sources

Existing groundwater or the municipal water supply are potential water sources. FPL will also consider the potential for alternative water development options at this site.

Potential Site # 7: Manatee Plant, Manatee County

The existing FPL Manatee Plant 9,500-acre site is located in unincorporated north-central Manatee County. The existing power generating facilities are located in all or portions of Sections 18 and 19 of Township 33S, Range 20-E. The plant site lies approximately 5 miles east of Parrish, Florida. It is approximately 5 miles east of U.S. 301 and 9.5 miles east of Interstate Highway 75 (I-75). The existing plant is approximately 2.5 miles south of the Hillsborough-Manatee County line; a portion of the north property boundary of the plant site abuts the county line. State Road 62 (SR 62) is about 0.7 mile south of the plant, with the plant entrance road going north from that highway. This site is a possibility for an FPL PV or solar thermal facility.

a. U.S. Geological Survey (USGS) Map

A map of the site is found at the end of this chapter.

b. Land Uses

Existing Land use on the site is agricultural. FPL is attempting to rezone the property to PD-PI which will allow for electrical generation.

c. Environmental Features

FPL anticipates mitigating for any gopher tortoise and/or wetland impacts as a result of the project.

d. Water Quantities

Minimal amounts of water would be required for a solar thermal facility.

EXHIBIT 29

e. Supply Sources

The existing water supply could be used for the water required to clean the mirrors for a solar thermal facility.

Potential Site # 8: Northeast Okeechobee County

This site is located within Okeechobee County, Florida. The northeastern portion of Okeechobee County has been identified as an area with the potential to provide a project site that requires strategic consideration. Further assessments of NE Okeechobee County are anticipated to determine suitability of a specific site.

a. U.S. Geological Survey (USGS) Map

Not available because a specific site has not been selected at this time.

b. Land Uses

Northeast Okeechobee County is predominantly agricultural land use.

c. Environmental Features

Not available because a specific site has not been selected at this time.

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

e. Supply Sources

Existing groundwater is a potential water source.

Potential Site # 9: Southwest Indian River County

This site is located within Indian River County, Florida. The southwestern portion of Indian River County has been identified as an area with the potential to provide a project site that requires strategic consideration. Further assessments of SW Indian River County are anticipated to determine suitability of a specific site.

a. U.S. Geological Survey (USGS) Map

Not available because a specific site has not been selected at this time.

b. Land Uses

Southwestern Indian River County is predominantly agricultural land use.

c. Environmental Features

Not available because a specific site has not been selected at this time.

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

e. Supply Sources

Existing groundwater is a potential water source.

Potential Site # 10: West Broward, Broward County

FPL has identified the Andytown Substation property in western unincorporated Broward County as a potential site for the addition of new generating capacity and FPL refers to this potential site as the West Broward site. Current facilities on-site include an electric substation. The existing site is an area accessible to both natural gas and electrical transmission through existing structures or through additional lateral connections.

a. U.S. Geological Survey (USGS) Map

A USGS map of the site has been included at the end of this chapter.

b. Land Uses

The land uses for the site were designated as agricultural use.

c. Environmental Features

Extensive low-quality wetlands are present on the site. Construction and operation of a new facility on this site would not be expected to adversely affect any rare, endangered, or threatened species.

d. Water Quantities

As previously discussed, needed water quantities would be up to 150 gallons per minute (gpm) for both process and cooling water (assuming air cooling) and up to 14 million gallons per day (mgd) for cooling water.

EXHIBIT 29

e. Supply Sources

Groundwater from the shallow aquifer or a local source of reclaimed (reuse) water has been identified as potential water sources. The Floridan Aquifer has also been identified as a potential cooling water source. FPL will also consider the potential for alternative water development options at this site.

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

CHAPTER V

Other Planning Assumptions & Information

EXHIBIT 29

(This page is left intentionally blank.)

EXHIBIT 29

Introduction

The Florida Public Service Commission (FPSC), in Docket No. 960111-EU, specified certain information that was to be included in an electric utility's Ten Year Power Plant Site Plan filing. Among this specified information was a group of 12 items listed under a heading entitled "Other Planning Assumptions and Information". These 12 items basically concern specific aspects of a utility's resource planning work. The FPSC requested a discussion or a description of each of these items.

These 12 items are addressed individually below as separate "Discussion Items".

Discussion Item # 1: Describe how any transmission constraints were modeled and explain the impacts on the plan. Discuss any plans for alleviating any transmission constraints.

FPL's resource planning work considers two types of transmission limitations/constraints: external limitations and internal limitations. External limitations deal with FPL's ties to its neighboring systems. Internal limitations deal with the flow of electricity within the FPL system.

The external limitations are important since they affect the development of assumptions for the amount of external assistance that is available to the FPL system as well as the amount and price of economy energy purchases. Therefore, these external limitations are incorporated both in the reliability analysis and economic analysis aspects of resource planning. The amount of external assistance which is assumed to be available is based on the projected transfer capability to FPL from outside its system as well as historical levels of available assistance. In the loss of load probability (LOLP) portion of its reliability analyses, FPL models this amount of external assistance as an additional generator within FPL's system which provides capacity in all but the peak load months. The assumed amount and price of economy energy are based on historical values and projections from production costing models.

Internal transmission limitations are addressed by identifying potential geographic locations for potential new units that minimize adverse impacts to the flow of electricity within FPL's system. The internal transmission limitations are also addressed by developing the direct costs for siting new units at different locations and by evaluating the cost impacts created by the new unit/unit location combination on the operation of existing units in the FPL system.

EXHIBIT 29

Both of these site- and system-related transmission costs are developed for each different unit/unit location option or groups of options. In addition, transfer limits for capacity and energy that can be imported into the Southeastern region of FPL's system are also developed for use in FPL's production costing analyses. (A further discussion of the Southeastern Florida region and the need to maintain a regional balance between generation and transmission contributions is found in Chapter III.)

FPL's annual transmission planning work determines transmission additions needed to address limitations and to maintain/enhance system reliability. FPL's planned transmission facilities to interconnect and integrate FPL's resource plans and those that must be certified under the Transmission Line Siting Act are presented in Chapter III.

Discussion Item # 2: Discuss the extent to which the overall economics of the plan were analyzed. Discuss how the plan is determined to be cost-effective. Discuss any changes in the generation expansion plan as a result of sensitivity tests to the base case load forecast.

FPL typically performs economic analyses of competing resource plans using as an economic criterion FPL's levelized system average electric rates (i.e., a Rate Impact Measure or RIM approach). In addition, for analyses in which DSM levels are not changed, FPL uses the equivalent criterion of the cumulative present value of revenue requirements for the FPL system.[4]

The load forecast that is presented in FPL's 2010 Site Plan was developed in February 2010. FPL has not performed sensitivity analyses on forecasts that differ from this recently developed load forecast.

---

[4] FPL's basic approach in its resource planning work is to base decisions on a lowest electric rate basis. However, when DSM levels are considered a "given" in the analysis (i.e., when only new generating options are considered), the lowest rate basis and the lowest system revenue requirements basis are identical. In such cases FPL evaluates options on the simpler – to – calculate (but equivalent) lowest system revenue requirements basis.

EXHIBIT 29

Discussion Item # 3: Explain and discuss the assumptions used to derive the base case fuel forecast. Explain the extent to which the utility tested the sensitivity of the base case plan to high and low fuel price scenarios. If high and low fuel price sensitivities were performed, explain the changes made to the base case fuel price forecast to generate the sensitivities. If high and low fuel price scenarios were performed as part of the planning process, discuss the resulting changes, if any, in the generation expansion plan under the high and low fuel price scenario. If high and low fuel price sensitivities were not evaluated, describe how the base case plan is tested for sensitivity to varying fuel prices.

The basic assumptions FPL used in deriving its fuel price forecasts are discussed in Chapter III of this document. FPL used three fuel and four environmental compliance cost forecasts in the 2009 nuclear cost recovery filings. FPL utilized one of these fuel cost forecasts, and one of these environmental compliance cost forecasts in its DSM Goals analyses.

The resource plan presented in this Site Plan is based, in part, on those prior analyses. For that reason, this resource plan, with the recently developed February 2010 load forecast, has not been further tested for different fuel cost forecasts.

Discussion Item # 4: Describe how the sensitivity of the plan was tested with respect to holding the differential between oil/gas and coal constant over the planning horizon.

As described above in the answer to Discussion Item # 3, FPL used up to three fuel cost forecasts in its 2009 resource planning analyses. While these forecasts did not represent a constant cost differential between oil/gas and coal, a variety of fuel cost differentials were represented in these forecasts.

Discussion Item # 5: Describe how generating unit performance was modeled in the planning process.

The performance of existing generating units on FPL's system was modeled using current projections for scheduled outages, unplanned outages, capacity output ratings, and heat rate information. Schedule 1 in Chapter I, and Schedule 8 in Chapter III, present the current and projected capacity output ratings of FPL's existing units. The values used for outages and

EXHIBIT 29

heat rates are generally consistent with the values FPL has used in planning studies in recent years.

In regard to new unit performance, FPL utilized current projections for the capital costs, fixed and variable operating & maintenance costs, capital replacement costs, construction schedules, heat rates, and capacity ratings for all construction options in its resource planning work. A summary of this information for the new capacity options FPL projects to add over the planning horizon is presented on the Schedule 9 forms in Chapter III.

Discussion Item # 6: Describe and discuss the financial assumptions used in the planning process. Discuss how the sensitivity of the plan was tested with respect to varying financial assumptions.

In its 2009 resource planning work, FPL used the following financial assumptions: (i) a capital structure of 44.2% debt and 55.8% equity; (ii) a 7.03% cost of debt; (iii) a 12.5% return on equity; and (iv) an after-tax discount rate of 8.89%. In this work, FPL performed no sensitivity analyses that used varying financial assumptions.

In its new resource planning analysis work in 2010, financial assumptions such as these will change due to the outcome of FPL's recent base rate case.

Discussion Item # 7: Describe in detail the electric utility's Integrated Resource Planning process. Discuss whether the optimization was based on revenue requirements, rates, or total resource cost.

FPL's integrated resource planning (IRP) process is described in detail in Chapter III of this document.

The standard basis for comparing the economics of competing resource plans in FPL's basic IRP process is the impact of the plans on FPL's electricity rate levels with the intent of minimizing FPL's levelized system average rate (i.e., a Rate Impact Measure or RIM approach). As discussed in response to Discussion Item # 2, both the electricity rate perspective and the cumulative present value of system revenue requirement perspective are identical when DSM levels are unchanged between competing plans. Therefore, in planning work in which DSM levels were unchanged, the equivalent cumulative present value of revenue requirements perspective was utilized.

EXHIBIT 29

Discussion Item # 8: Define and discuss the electric utility's generation and transmission reliability criteria.

FPL uses two system reliability criteria in its resource planning work that addresses generation, purchase, and DSM options. One of these is a minimum 20% Summer and Winter reserve margin. The other reliability criterion is a maximum of 0.1 days per year loss-of-load-probability (LOLP). These reliability criteria are discussed in Chapter III of this document.

In regard to transmission reliability analysis work, FPL has adopted transmission planning criteria that are consistent with the planning criteria established by the Florida Reliability Coordinating Council (FRCC). The FRCC has adopted transmission planning criteria that are consistent with the Reliability Standards established by the North American Electric Reliability Council (NERC). The *NERC Reliability Standards* are available on the internet site (http://www.nerc.com/).

In addition, FPL has developed a *Facility Connection Requirements* (FCR) document as well as a *Facility Rating Methodology* document that are also available on the internet under the FPL OATT Documents directory at https://www.oatioasis.com/FPL/index.html.

Generally, FPL limits its transmission facilities to 100% of the applicable thermal rating. The normal and contingency voltage criteria for FPL stations are provided below:

	Normal/Contingency	
Voltage Level (kV)	**Vmin (p.u.)**	**Vmax (p.u.)**
69, 115, 138	0.95/0.95	1.05/1.07
230	0.95/0.95	1.06/1.07
500	0.95/0.95	1.07/1.09
Turkey Point (*)	1.01/1.01	1.06/1.06
St. Lucie (*)	1.00/1.00	1.06/1.06

(*) Voltage range criteria for FPL's Nuclear Power Plants

There may be isolated cases for which FPL may have determined that it is acceptable to deviate from the general criteria stated above. There are several factors that could influence this criteria, such as the overall number of potential customers that may be impacted, the probability of an outage actually occurring, or transmission system performance, as well as others.

EXHIBIT 29

Discussion Item # 9: Discuss how the electric utility verifies the durability of energy savings for its DSM programs.

The impact of FPL's DSM programs on demand and energy consumption is revised periodically. Engineering models, calibrated with field-metered data, are updated when significant efficiency changes occur in the marketplace. Participation trends are tracked for all of the FPL DSM programs in order to adjust impacts each year for changes in the mix of efficiency measures being installed by program participants.

Survey data is collected from non-participants in order to establish the baseline efficiency. Participant data is compared against non-participant data to establish the demand and energy saving benefits of the utility program versus what would be installed in the absence of the program. For these DSM measures which involve the utilization of load management, FPL conducts periodic tests of the load control equipment to ensure that it is functioning correctly.

Discussion Item # 10: Discuss how strategic concerns are incorporated in the planning process.

The Executive Summary chapter provides a discussion of two system concerns that are typically addressed in FPL's resource planning work: (1) maintaining/enhancing fuel diversity in the FPL system, and (2) maintaining a balance between load and generating capacity in Southeastern Florida. In addition, two other relatively recent items will also influence FPL's resource planning efforts. One of these items is the Executive Orders directive issued in 2007 by Governor Crist calling for reduction in greenhouse gas emissions and greater contribution from renewable energy sources. As previously discussed in both the Executive Summary chapter and Chapter III, FPL's resource planning has already taken positive steps in regard to both of these issues. The other item that could affect FPL's resource planning is the possibility of the establishment of a Florida standard for renewable energy, or clean energy, contributions to a utility system. A Renewable Portfolio Standard (RPS) proposal was prepared by the FPSC, and then sent to the Florida Legislature for consideration, with a possible change to a Clean Portfolio Standard (CPS), during the 2009 legislative session. However, no RPS or CPS legislation was enacted during the 2009 legislative session. RPS or CPS legislation, or other legislative initiatives regarding renewable or clean energy contributions, may occur in the future. If such legislation is enacted in 2010 or later years, FPL will then determine what steps need to be taken to address the legislation. Such steps

EXHIBIT 29

would then be discussed in FPL's Site Plan in the year following the enactment of such legislation.

In addition to these system concerns/issues, there are other strategic factors FPL typically considers when choosing between resource options. These include the following: (1) technology risk; (2) environmental risk, and (3) site feasibility. The consideration of these factors may include both economic and non-economic aspects.

Technology risk is an assessment of the relative maturity of competing technologies. For example, a prototype technology, which has not achieved general commercial acceptance, has a higher risk than a technology in wide use and, therefore, is less desirable.

Environmental risk is an assessment of the relative environmental acceptability of different generating technologies and their associated environmental impacts on the FPL system, including environmental compliance costs. Technologies regarded as more acceptable from an environmental perspective for a plan are those which minimize environmental impacts for the FPL system as a whole through highly efficient fuel use and state of the art controls.

Site feasibility assesses a wide range of economic, regulatory, and environmental factors related to successfully developing and operating the specified technology at the site in question. Projects that are more acceptable have sites with few barriers to successful development.

All of these factors play a part in FPL's planning and decisions, including its decisions to construct capacity or to purchase power.

Discussion Item # 11: Describe the procurement process the electric utility intends to utilize to acquire the additional supply-side resources identified in the electric utility's ten-year site plan.

As has been previously discussed in prior FPL Site Plans, elements of FPL's recent and future capacity additions include the construction of new generating capacity at the West County Energy Center (WCEC) site, WCEC Units 1, 2, & 3. These generation construction projects were selected after evaluating competing bids received in response to Requests for Proposals (RFP) issued by FPL. The FPSC subsequently approved FPL's decision to construct these new combined cycle (CC) units in Determination of Need dockets.

EXHIBIT 29

In regard to the Modernization projects at FPL's existing Cape Canaveral and Riviera plants, these projects were also evaluated using the competing bids received in response to the RFP issued for WCEC Unit 3. In addition, bids from competing vendors were also evaluated for FPL's new solar thermal and PV projects.

The nuclear capacity additions, both the nuclear uprates and the new nuclear units, do not lend themselves to an RFP approach involving bids from third parties who would build new nuclear generation capacity. In addition, nuclear capacity additions are exempted from the Commission's Bid Rule by section 403.519 (4) (c). For these nuclear projects, FPL's procurement activities were conducted to ensure the best combination of quality and cost for the delivered products.

Construction capacity addition decisions for non-nuclear generation for years beyond those presented in this document are expected to be conducted in a manner consistent with the Commission's Bid Rule.

Identification of self-build options, beyond those units already approved by the FPSC and Governor and Siting Board or units for which FPL may be then seeking approval, in future FPL Site Plans will not be an indication that FPL has pre-judged any capacity solicitation it may conduct. The identification of future generating units is required of FPL in its Site Plan filings and represents those alternatives that appear to be FPL's best, most cost-effective self-build options at the time. FPL reserves the right to refine its planning analyses and to identify other self-build options. Such refined analyses have the potential to yield a variety of self-build options, some of which might not require an RFP. If an RFP is issued for Supply options, FPL reserves the right to choose the best alternative for its customers, even if that option is not an FPL self-build option.

Discussion Item # 12: Provide the transmission construction and upgrade plans for electric utility system lines that must be certified under the Transmission Line Siting Act (403.52 – 403.536, F. S.) during the planning horizon. Also, provide the rationale for any new or upgraded line.

(1) FPL has identified the need for a new 230kV transmission line that required certification under the Transmission Line Siting Act which was issued in April 2006. The new line is to be completed in two phases connecting FPL's St. Johns Substation to FPL's Pringle Substation (also shown on Table III.E.1 in Chapter III). Phase 1 was completed in May 2009 and consisted of a new line connecting Pringle

EXHIBIT 29

to a new Pellicer Substation. Phase 2 is planned to connect St. Johns to Pellicer and is scheduled to be complete by December 2013. The construction of this line is necessary to serve existing and future customers in the Flagler and St. Johns areas in a reliable and effective manner.

(2) FPL has identified the need for a new 230kV transmission line (by December 2012) that required certification under the Transmission Line Siting Act which was issued on November 2008. The new line will connect FPL's Manatee Substation to FPL's proposed BobWhite Substation (also shown on Table III.E.1 in Chapter III). The construction of this line is necessary to serve existing and future customers in the Manatee and Sarasota areas in a reliable and effective manner.

EXHIBIT 29

(This page is intentionally left blank.)

EXHIBIT 30

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of

Florida Power & Light Company

Combined License Application for
Turkey Point Units 6 & 7

Docket No. 52-040 and 52-041

DECLARATION OF DR. MARK A. COOPER

I, Dr. Mark A. Cooper, do hereby declare as follows:

1. My name is Dr. Mark A. Cooper. I reside at 504 Highgate Terrace, Silver Spring, Maryland.

2. I have a Ph.D. from Yale University and have been providing economic and policy analysis for energy and telecom for almost thirty years. I have been the Director of Energy and the Director of Research at the Consumer Federation of America for 27 years, although the opinions I express in this testimony are my personal opinions and not those of the Consumer Federation. I am a Fellow at various universities on specific issues, including the Institute for Energy and the Environment at Vermont Law School. I have testified over 100 times before public utility commissions in 44 jurisdictions in the U.S. and Canada on energy and telecommunications issues and about twice as many times before federal agencies and Congress on a variety of issues, including energy and electricity.

3. I have provided expert testimony for the Southern Alliance for Clean Energy ("SACE") before the Florida Public Service Commission ("FL PSC") dealing with the early cost recovery for the proposed nuclear reactors at Turkey Point in 2009 and 2010 for the Nuclear Cost Recovery Clause ("NCRC") dockets. Copies of that testimony, to which I refer in this declaration, are provided as Attachments 1 and 2 respectively. A copy of my resume with energy related activities is included in my 2010 NCRC testimony.

4. I am familiar with the application of Florida Power & Light ("FPL") for a combined license (the "COL") for Units 6 & 7. I have reviewed excerpts of the Environmental Report (the "ER") prepared by FPL in the COL applications to the U.S. Nuclear Regulatory Commission (the "NRC").

5. I have been asked by SACE to review and give my opinion upon FPL's analysis in the ER regarding (1) the need for power and demand forecasts, and (2) Demand Side Management ("DSM") and renewable energy alternatives.

EXHIBIT 30

6. I conclude that the issues raised by contentions 8 and 9 regarding the need for power, demand forecasts, DSM, and renewable energy alternatives are consistent with the issues I raised in the FL PSC proceeding. Additionally, I conclude that (1) the energy forecasting in the ER suffers from the same inadequacies as FPL's forecasting in the FL PSC proceeding, (2) the electricity demand forecast information in the ER is flawed and outdated and (3) there are viable alternatives to nuclear power. Over two years ago the FL PSC approved the Certificate of Need for Units 6 & 7, relying on data that was from 2007 and earlier. The fundamental assumptions on which the FL PSC analysis was based have proven to be far off the mark. Additionally, the process for review at the FL PSC does not include a comprehensive analysis of the full range of alternatives available to the utility. The NRC should not rely on analysis that is out of date, incomplete or erroneous.

7. In support of contention 8.1, in my 2009 Testimony (included as attachment 1), I concluded that the projected load growth on which the Certificate of Need was based did not reflect the new realities that the Turkey Point reactors are likely to face (2009, pp. 8-9). In 2009 I estimated that the decline in load growth would push the need for Units 6 & 7 out by half a decade from the original date. In fact, FPL has moved their in-service date back, hoping demand will pick up (2010, pp. 4-5, 12-14).

Moreover, the analysis FPL placed before the Florida Commission rests on a fundamental contradiction that undermines the justification for the reactors. The assumption of the adoption of Federal environmental policies that put a price on carbon is critical to the FPL's need analysis, but the likelihood that such a policy would come with mandates for greater efficiency and renewables is nowhere reflected in the analysis submitted to the FL PSC. Modeling HR2454, the piece of legislation that has progressed the farthest in Washington, D.C., I estimate that the need for the proposed new reactors would be pushed out by as much as two decades (2009, 16-20; 2010, 17, 24-26).

I have also identified a number of other factors that lead me to conclude that the reactors are not viable in the long-term (2009, pp. 204; 2010, pp. 6-8). The most important of these include natural gas prices (2009, pp. 11-13; 2010, p. 20) and financial risks (2009, pp. 25-30; 2010, 35-41).

8. Regarding contention 8.2, in my 2009 and 2010 Testimony I note that the regulatory review process in Florida is not well integrated or comprehensive. A full range of alternatives is not reviewed and system wide need, resource flexibility and excess capacity are never considered (2009, pp. 33-36; 2010, pp. 35-38, 42).

9. Regarding contention 9, in my 2009 and 2010 Testimony I have noted that efficiency and renewables have not received adequate attention in the analysis of alternatives (2009, pp. 20-22; 2010, pp. 32-34).

10. I am providing this declaration in support of the Petition for Intervention.

I declare under penalty of perjury that the foregoing is true and correct.

EXHIBIT 30

Date: 8/17/10

DECLARANT: Mark Cooper

Executed in Accord with 10 CFR 2.304(d)

Dr. Mark A. Cooper
504 Highgate Terrace
Silver Spring, MD 20904
Phone: (301) 384-2204
Email: markcooper@aol.com

EXHIBIT 30

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Nuclear Plant Cost)
Recovery Clause) DOCKET NO. 090009-EI
) FILED: July 15, 2009
____________________________________)

DIRECT TESTIMONY OF DR. MARK COOPER

ON BEHALF OF
SOUTHERN ALLIANCE FOR CLEAN ENERGY (SACE)

E. LEON JACOBS, JR.
Florida Bar No. 0714682
WILLIAMS & JACOBS, LLC
1720 S. Gadsden Street MS 14
Suite 201
Tallahassee, FL 32301
Tel: (850) 222-1246
Fax: (850) 599-9079
Email: ljacobs50@comcast.net

GARY A. DAVIS
N.C. Bar No. 25976
JAMES S. WHITLOCK
N.C. Bar. No. 34304
GARY A. DAVIS & ASSOCIATES
PO Box 649
Hot Springs, NC 28779
Tel: (828) 622-0044
Fax: (828) 622-7610
Email:gadavis@enviroattorney.com
jwhitlock@enviroattorney.com
(Qualified Representative Requests Pending)

EXHIBIT 30

IN RE: NUCLEAR PLANT COST RECOVERY CLAUSE
BY THE SOUTHERN ALLIANCE FOR CLEAN ENERGY
FPSC DOCKET NO. 090009-EI
DIRECT TESTIMONY OF
DR. MARK COOPER

Introduction and Qualifications

Q. Please state you name and address.

A. My name is Dr. Mark Cooper. I reside at 504 Highgate Terrace, Silver Spring, Maryland.

Q. Briefly describe your qualifications

A. I have a Ph.D. from Yale University and have been providing economic and policy analysis for energy and telecom for almost thirty years. I have been the Director of Energy and the Director of Research at the Consumer Federation of America for 27 years, although the opinions I express in this testimony are my personal opinions and not those of the Consumer Federation. I am a Fellow at various universities on specific issues, including the Institute for Energy and the Environment at Vermont Law School. I have testified over 100 times before public utility commissions in 44 jurisdictions in the U.S. and Canada on energy and telecommunications issues and about twice as many times before federal agencies and Congress on a variety of issues, including energy and

EXHIBIT 30

electricity. A copy of my resume with energy related activities is attached as Appendix A.

Purpose and Summary of Testimony

Q. What is the Purpose of your testimony?

A. I have been asked by the Southern Alliance for Clean Energy ("SACE") to examine the long-term feasibility of Florida Power & Light's ("FPL") Turkey Point 6 & 7 Reactors ("Turkey Point") and Progress Energy Florida's ("PEF" or "Progress") Levy Nuclear Reactors ("Levy") (collectively "reactors" or "projects") as required by F.A.C. Rule 25-6.0423(5)(c)5.

Q. Please summarize your findings.

A. I have identified dramatically changed circumstances since affirmative determinations of need were made by this Commission for these reactors and present in my testimony evidence on the current marketplace, regulatory, technological, and financial risks of these reactors proposed for construction in Florida by Progress and FPL. These changed circumstances and resulting risks lead me to conclude that completion of the Turkey Point and Levy reactors is no longer feasible in the long term and that incurring additional costs on these reactors would not be prudent.

The decisions by Progress and FPL to build these nuclear reactors were based on four important assumptions that have been called into question in the time since the evidence was filed in their petitions for determination of need ("Need Docket").

(1) They assumed a high rate of demand growth.

EXHIBIT 30

(2) They downplayed the contribution that efficiency and renewables can make to meet the need for electricity.

(3) They assumed high prices for fossil fuels based on both commodity prices and the belief that public policy would put a high price on carbon.

(4) They used a low estimate of the cost of nuclear reactors.

The impact of the changed factors on these assumptions that have developed since the Need Docket can be summarized as follows:

Market Factors	
Declining Demand	Eliminates need for large quantity of new generation
Falling price of natural gas	Makes natural gas more attractive
Regulatory Factors	
Efficiency/renewable standards	Reduces need for non-renewable generation
Carbon cost reduction	Makes low carbon resources less attractive
Technological Factors	
Nuclear cost uncertainties	Raises prospects of cost overruns
Growing confidence in cost and availability of alternatives	Makes alternatives more attractive
Financial Factors	
Tight Financial markets	Makes finance more difficult
Increasing concerns on Wall Street about Nuclear reactors	Makes finance more expensive

EXHIBIT 30

Any of these changed factors alone could demonstrate that completion of these reactors is not feasible in the long term   Taken together, these factors thoroughly undermine the case that the companies have tried to make to demonstrate the long-term feasibility of these nuclear reactors at this time. The evidence presented by the companies to the Commission does not take these changed factors fully into account and does not reflect the highly uncertain future that nuclear reactors face.

If the Commission were to merely conclude that the changes in conditions make the future highly uncertain, that conclusion alone would argue strongly against continuing with these reactors. In an uncertain environment, the assets a prudent person acquires should be flexible, have short lead times, come in small increments and not involve the sinking of large capital costs. The characteristics of nuclear reactors are the antithesis of those best suited to an uncertain environment. They are large, "lumpy" investments that require extremely long lead times and sink massive amounts of capital. Therefore, it would be imprudent to allow the companies to incur any more expenses or recover those costs from ratepayers at this time because the companies have failed to demonstrate the long-term feasibility of completing the reactors.

There are other factors that will be documented by other witnesses that reinforce the conclusion that the reactors are no longer feasible in the long-term, including the failure of some of the projects to obtain regulatory approvals, which were being counted on to stay on schedule and uncertainties and delays in the Nuclear Regulatory Commission ("NRC") licensing process. While one can point to some positive developments in the policy space, such as the possibility of the creation by the U.S.

EXHIBIT 30

Congress of a Clean Energy Development Authority, these are vastly outweighed by the negative developments.

Q. How is your testimony organized?

A. First, I set forth how I approach the analysis of the long-term feasibility of these proposed nuclear reactors. Next, I define the conditions that have developed since the Need Dockets that have changed the terrain of nuclear reactors and describe in qualitative terms how these conditions impact the long-term feasibility of the nuclear reactors. Then I provide quantitative evidence to support my conclusions. The bulk of my analysis focuses on the FPL evidence because FPL has presented a recent recalculation of its need analysis. I also raise some concerns that the changes in the economic landscape highlight some aspects of the methodology that FPL has developed specifically to evaluate nuclear reactor economics that may be distorting the picture presented to the Commission.

In contrast, Progress has presented little tangible evidence that it is actually conducting any ongoing analysis, other than the statement of its witnesses that they are thinking about the relevant issues. However, all of the concerns raised about the proposed FPL reactors apply with even greater force to the Progress reactors. The case for building reactors was weaker in the case of Progress than FPL. Progress had higher reserve margins, a more diverse fuel mix, and higher costs for the Levy nuclear reactors, because it is a site that does not have an existing reactor. While all of the changes I have discussed in the case of FPL also affect Progress, Progress has suffered a unique setback, having been forced to shift its schedule by 20 months and renegotiate its EPC contract with the vendor.

EXHIBIT 30

Q. Are you sponsoring any exhibits to your testimony?

A. Yes, I am sponsoring the following exhibits:

MNC-1:Impact Of Declining Demand On Summer Peak Load
MNC-2: Natural Gas Wellhead, Henry Hub And Futures Prices
MNC-3: Projected Natural Gas Prices Compared To Nymex Futures Prices
MNC-4: Projections Of Carbon Compliance Costs
MNC-5: Estimates Of Potential Mid-Term Efficiency Savings: By State
MNC-6: Estimates Of Costs Of Alternatives To Meet Electricity Needs
MNC-7: Impact Of Climate Policy On Peak Load: FPL
MNC-8: Impact Of Climate Policy On Peak Load: Progress
MNC-9: Estimates Of Nuclear Reactor Overnight, Costs: 2001-2009
MNC-10: Nuclear Operators, Reactor Cancellations And Moody's Downgrades
MNC-11: Standard And Poor's Credit Profile Considerations
MNC-12**:** Diversity Of Resource Under Various Technology Scenarios
MNC-13: The $1/Kw Cost Factor
MNC-14: The Narrow Margin In FPL's Breakeven Analysis

ANALYZING THE RISK FACTORS

Approach

Q. How do you approach the analysis of the long-term feasibility of the nuclear reactors?

EXHIBIT 30

A. The rule adopted by the Commission requires an assessment of the long-term feasibility of the projects. I believe a thorough review of the projects is vital to protect the public interest. In a competitive marketplace firms must constantly review whether their investment decisions continue to be economically viable and justified in light of the changing market, technological, financial and regulatory conditions. For utility services that are offered under franchise monopoly conditions subject to regulatory oversight, the commission is charged with protecting the public from imprudent actions by the utility. It must ensure that utilities exercise the same vigilance with respect to the prudence of their actions as firms in a competitive market.

This regular review of the long-term feasibility of a project is particularly important in the case of nuclear reactors, which are, by their nature, extremely vulnerable to these four types of risk. As very large investments that take a long time to construct, and produce large quantities of electricity, they represent a huge quantity of inflexible, sunk costs. These investments are incapable of responding to change. They are inherently “go-no-go” decisions that should be made before costs are incurred. Because of their size and nature, the Commission needs to address the long-term feasibility of the projects before additional, substantial costs have been incurred.

The companies are well aware that this proceeding requires an affirmative showing of the long-term feasibility of completing these reactors. FPL has redone its breakeven analysis under new sets of assumptions. Progress states that it is considering a wide range of factors that affect the decision to proceed. However, Progress has presented no “detailed analysis” as required by Rule 25-6.0423(5)(c)5 demonstrating the long-term feasibility of completing the Levy project.

EXHIBIT 30

The factors that FPL has reanalyzed are appropriate for a decision on whether these projects should proceed, and these are the factors that the Commission should be looking at as the ultimate arbiter of prudence and long-term feasibility. Exercising this judgment before money is spent is infinitely preferable to arguing about it after the money has been spent. Both companies assert that, having reviewed recent changes in the factors that affect the decision to build these reactors, it is prudent to continue and that the completion of the reactors is feasible. However, the companies' review of the changes now faced by these reactors is cursory and insufficient to justify that conclusion.

.

MARKETPLACE CONDITIONS

Demand

Q. Have there been changes in the marketplace that affect the long-term feasibility of these nuclear reactors?

A. Yes. There has been a dramatic change in the marketplace since the companies prepared their need analyses in the respective need dockets. The nation has plunged into the worst recession since the Great Depression. Some even call it a depression. Moreover, there is a growing recognition that this change is not simply a severe dip in the business cycle, but rather a major shift in the economy. The spending binge on which the U.S. embarked for a decade, in which households and business became highly leveraged, is likely over. A massive amount of household wealth was destroyed when the housing market bubble burst. Retirement accounts have been devastated by the collapse of the stock market.

EXHIBIT 30

Ironically, the decade on which the projections were based in the need docket coincided almost exactly with the decade in which the housing and consumption bubbles were pumped up by excessive leverage. That level of growth was unsustainable. It is my opinion that the shift in consumption is permanent and signals slower growth in the future. However, even if this were just a severe downturn in the business cycle, it would affect the demand for electricity sufficiently to raise questions about the long-term feasibility of these new nuclear reactors.

FPL

Q. Is there evidence that load growth has changed in the FPL service territory?

A. Yes there is strong evidence of a dramatic reduction in consumption that should sharply reduce projected load growth. FPL provides sufficient detail to examine closely the problem of excess capacity created by the nuclear reactors, as shown in Exhibit MNC-1, page 1. The reduction in peak demand between the 2008 and 2009 feasibility analysis is striking. In 2017, which is a crucial year in the 2008 analysis because that was the year the reserve margin hit the limit of 20 percent, the 2009-projected peak is 11 percent lower than the peak projected in 2008. Under the 2009 projection, the FPL does not reach the 2017 peak projected in 2008 until 2022, five years later. By 2040, the projected peak is 20 percent lower.

Q. Is this dramatic shift in demand fully reflected in the 2009 Economic Analysis?

EXHIBIT 30

A. With a dramatic decline in demand, averaging between 10 and 11 percent in the decade between 2010 and 2020, all else equal, one would expect to see an equally dramatic increase in FPL's reserve margins. That is not the case. With a drop in the summer peak of more than 10 percent in 2017, FPL shows only a 1 percent increase in reserve margin. In order to achieve that level, it must use the flexibility of natural gas plants to react to the decline of projected peak demand. Comparing Schedule 8 in the 2008 and 2009 10-year plans, we can see natural gas plants moved back a year or two, reduction of inactive reserves and elimination of some additions altogether, while making room for the Turkey Point reactors. Thus in contrast to the ten year time horizon needed for nuclear reactors, the short time frame for deploying gas alternatives is much more flexible for dealing with the uncertainties in demand.

Progress Energy

Q. Is the Progress demand projection similar to that of FPL?

A. The demand reduction projected by Progress is substantial, but much lower than that projected by FPL, as shown in Exhibit MNC-1, page 2. From the peak in 2007 to the trough in 2010, Progress shows a 2.5 percent decline in peak, compared to FPL, which shows a 6.2 percent decline. FPL assumes a more vigorous growth of peak from 2010 forward, but the depth of the decline in the recession still leaves it with a projected peaks in 2017 that is almost 10 percent lower than in the 2008 10-yer plan. For Progress, the reduction in the projected peak for 2017 is only about 2.6 percent lower.

To put these declines in demand into perspective, I note that taken together, the reduction in projected peak summer demand between the 2008 and 2009 10-year plans is

EXHIBIT 30

almost 3500 MW, which exceeds the combined capacity of three of the four reactors. Since these utilities represent just under three quarters of the total statewide peak summer demand, and assuming the other utilities in the state have suffered similar reductions in demand, the lowering of the peak statewide in the past year would exceed the capacity of all four plants being considered in this docket.

There are two important implications from this change in demand. First, a lack of demand can undermine the long-term feasibility of the reactor. This played a critical role in the cancellation and abandonment of nuclear reactors in the 1970s and 1980s. Back then, it was oil price shocks and rate shock that undermined demand. Today it is the great recession and, as I describe below, climate policy, that can undermine demand, but the historical experience teaches us that inadequate demand can definitely render nuclear reactors infeasible in the long term. Second, hoping to sell pieces of the plant – either with off system sales at wholesale or equity stakes – in an attempt to salvage failing economics brought on by declining demand may not be feasible with a state-wide reduction in demand.

NATURAL GAS PRICES

Q. Are there other market changes that the Commission should consider?

A. Yes, the price of gas, which plays a central role in Florida, bears close scrutiny. Natural gas was the best alternative to nuclear in the economic analysis of the FPL Need Docket, and FPL has focused on gas in this proceeding. In that Need Docket analysis, the variable cost of gas accounts for 90 percent of the difference between the nuclear

EXHIBIT 30

scenario and the gas scenario, and the cost of natural gas is the single largest determinant of the variable cost by far.

In this proceeding, FPL concludes that the prospects for nuclear reactors have actually brightened because of rising fossil prices – both commodity prices and carbon compliance costs. “The primary reasons for the projected general increase in the economic advantage of the Turkey Point 6 & 7 project, compared to the 2007 Need Determination filing, are: (i) currently projected higher natural gas costs, particularly in the early years; and (ii) higher projected environmental compliance costs.” (Florida Power & Light Company, Docket No. 0900009-EI, Responses to Staff’s Second Set of Interrogatories, Interrogatory No. 45, page 1 of 1).

This conclusion does not comport with the emerging reality. As shown in Exhibit MNC-2, page 1, the price of natural gas has not only tumbled, but it has separated from the price of oil. There are a number of reasons that natural gas might not continue to track oil as closely in the future as it has in the past. It is much more of a regional market than oil. There is increasing optimism about natural gas resources. There are efficiency programs targeted at natural gas consumption in the climate change legislation moving through Congress, which may free up supply and put downward pressures on price. Finally, there is considerable evidence that a significant part of the volatility in the natural gas market over the past decade was caused by excessive speculation brought on by excessive deregulation. The rise in prices and volatility was coincident with the creation of what is known as the Enron loophole and the entry of index traders into the market. There are strong regulatory and legislative measures being put into place to

EXHIBIT 30

prevent excessive speculation from again afflicting energy markets. In short, the past decade should be the exception, rather than the rule in natural gas markets.

FPL

Q. Please provide empirical evidence to support your concerns about the natural gas projections employed by FPL.

A. The evidence relies on futures prices. As shown in Exhibit MNC-2, page 2, the Henry Hub futures price, which is the standard base for natural gas pricing, is a near perfect predictor of natural gas wellhead prices. As shown in Exhibit MNC-2, page 3, the Henry Hub price is a near perfect predictor of Florida prices for gas for electric utilities.

Exhibit MNC-3, page 1 shows that the dramatic change in natural gas prices is not reflected in the FPL's analysis. The price of natural gas shown in FPL's "Key Assumption" analysis, is a cross between the mid and the high estimates from the Need Docket. These very high price projections stand in sharp contrast to the prices that prevail in the natural gas futures market. Exhibit MNC-3-page 1 shows the August futures price for Nymex Henry Hub natural gas, in years matching those used in the need docket. On average, the natural gas price in the "Key Assumption" page is about 50 percent higher than the Nymex price.

Needless to say, overestimating the single most important factor in the economic analysis can have a huge impact on the economic calculation made by the company. The Nymex futures prices are a lot closer to the low gas cost scenario from the FPL 2007 Need Docket than they are to the "Key Assumptions" prices used by the company in this

EXHIBIT 30

feasibility assessment. In the Need Docket, two of the three nuclear cost scenarios had higher overnight costs than the break even capital cost point in the low gas case.

PROGRESS ENERGY

Q. Do Progress Energy's natural gas prices raise similar concerns?

A. Yes. The assumed natural gas prices used by Progress suggest a dramatic shift in the relationship between the price of natural gas for utilities in Florida and the futures price of gas, as shown in Exhibit MNC-3, page 2. For most of the past decade, the price of gas for electric utilities in Florida tracked the futures price closely, but in the past three years the gap between Florida utility gas prices and futures prices grew, then declined. Compared to Nymex futures prices, the natural gas prices used by Progress suggest a gap between Florida prices and futures prices of $2 to 3$ per mmbtu greater than the historical pattern. The differences represent 20 to 30 percent of the assumed price.

Q. Did the low gas cost scenario also have low environmental costs?

A. Yes it did and I will examine the issue of compliance cost in the analysis of regulatory conditions.

REGULATORY CONDITIONS

Q. Should regulatory conditions enter into the Commission's evaluation of the long-term feasibility of these reactors?

A. Yes. The companies' Need Docket analyses were driven by assumptions about federal regulatory policy. The companies have put a high price on carbon in their

EXHIBIT 30

economic analyses. Without the high price on carbon, the economics of nuclear reactors would look very different. To my knowledge, the state of Florida has not put a price on carbon, nor is it contemplating doing so. Thus, the companies have decided to pursue these projects and the Commission has allowed cost recovery based, in part, on assumptions about federal climate change policy.

Q. Are you suggesting that the Commission should not take future climate change policy into account when considering the long-term feasibility of these reactors?

A. Quite the contrary. I believe the Commission should take federal policy into account when considering the long-term feasibility of these reactors, since that is a major source of regulatory risk to state decisions. However, I believe the Commission must take the **entirety** of federal policy into account. The prospect of federal climate change legislation is growing. The idea of putting a price on carbon is only a part of the legislation that is moving through the Congress. H.R. 2454, the American Clean Energy and Security Act, the first piece of climate change policy legislation to pass a house of Congress, does not simply put a price on carbon directly. Rather, it establishes an elaborate scheme of allowances to emit carbon, which will indirectly set a price on carbon. Moreover, policies other than putting a price on carbon, particularly policies to promote efficiency and renewables, play a large role as well.

Q. Please describe the full suite of federal policies that affect the long-term feasibility of these nuclear reactors.

EXHIBIT 30

A. On the supply-side, the legislation has a renewable energy standard that would require utilities to meet an increasing part of their load with renewables. Within a decade, they would be required to get 20 percent of their generation from renewables, with as much as 8 percent of that total coming from efficiency. At the same time, the legislation includes a number of provisions that have sharply lowered projections of the cost of carbon credits, such as efficiency and renewable mandates, subsidies for carbon control technologies and domestic and international offsets. All of these lower the demand for allowances and therefore the price. This means that the assumed compliance costs of fossil fuels are lower than projected by the companies in prior proceedings and this proceeding.

On the demand side, there is a substantial mandate for energy efficiency. This is embodied, in part, in the ability to meet 40 percent of the renewable resource standard with efficiency and, in part, in dramatic improvements in building codes and appliance standards. Mandates to improve the energy efficiency of new buildings by 30 percent in the near term and 50 percent in the longer term will have a substantial impact on energy demand over the life of the reactors being considered in this proceeding. Funds from certain allowances are set-aside to improved efficiency, particularly for natural gas. Similarly, the American Recovery and Reinvestment Act of 2009 includes a huge increase in funding to improve the energy efficiency of existing buildings. As the efficiency of buildings and appliances improves, the demand for electricity and natural gas declines.

These regulatory factors – increased renewables, lower demand through efficiency, and a lower price on carbon – must be considered in the evaluation of

EXHIBIT 30

alternative scenarios for future supply of electricity. Extracting only the price of carbon from the policy landscape and inserting it in the economic analysis, while ignoring the other aspects of policy, distorts the picture being presented to the Commission. These other policies would further undercut the claim that nuclear reactors are feasible in the long-term. Many of these other aspects have been part of the climate change policy debate for quite some time. Taken together, these changes on the demand side, as well as the renewable standard, will have a substantial impact on the need for new non-renewable generation and undermine the long-term feasibility of building these reactors.

FPL

Q. Would the cost of compliance of fossil fuels be affected as a result of these policies?

A. One would expect that it would. Decreasing demand for allowances due to the efficiency and renewable policies and access to low cost offsets would depress the price. In its “Key Assumptions” FPL has increased the price of carbon compliance above the highest level from the 2007 analysis. As Exhibit MNC–4, page 1 shows, the long run price under all the environmental scenarios has more than doubled. As Exhibit MNC-4, page 2 shows, the “Key Assumption price” is roughly equal to the Env II price. In 2040 the price is almost 50 percent higher than the EPA estimate of carbon costs in the wake of HR 2454. Over the 25-year period, the key assumption price on carbon is over 35 percent higher than the EPA price. In fact, the EPA prices are close to the Env I price.

EXHIBIT 30

Progress

Q. Does the compliance cost assumption of Progress suffer from similar problems?

A. Yes. As shown in Exhibit MNC-4, page 3, the EPA compliance costs associated with HR 2454 are slightly lower than those listed in the Progress prudency filing. The high cost scenarios are way above the most recent projections. Focusing attention on the low range of estimates dramatically alters the perspective the Commission should take on the proposed reactors. In the case of Progress, the reactors were as likely to fail the economic test as pass it with carbon compliance costs in the low range.

Q. Would the cost of natural gas be affected by the suite of federal policies?

A. Yes. The EPA analysis indicates a 20 percent reduction in the cost of gas in 2025. The delivered cost of gas for electricity in 2025 is lower that the Henry Hub futures price in 2021.

TECHNOLOGICAL CONDITIONS

Efficiency and Renewables

Q. Should changing technological conditions factor into the analysis of the long-term feasibility of these reactors?

A. Yes. While climate policy is seen as giving a direct advantage to reactors by putting a price on carbon, that policy does much the same for other technologies. In fact, there are ways in which the alternative technologies are likely to receive an even larger boost. There are also many programs targeted at various technologies that are in earlier

EXHIBIT 30

stages of development that may enjoy larger cost reductions as the science advances and the scale of production ramps up.

I believe there are three technological developments that are shifting the terrain in ways that disfavor nuclear reactors – the availability and cost of conserved energy, the availability and cost of renewables, and the availability and cost of nuclear reactors.

Q. Please describe the emerging terrain for efficiency technologies.

A. There is a growing consensus that the cost of many alternatives is lower than that of nuclear reactors. For efficiency, the change in the terrain is largely a matter of increasing confidence that substantial increases in efficiency are achievable at relatively low cost. The detailed analysis of potential measures and the success of some states at reducing demand through energy policies have increased the confidence that efficiency is a reliable option for meeting future needs for electricity by lowering demand, as shown in Exhibit MNC-5.

I believe that the technology of efficiency has come into much sharper focus in the past year. Numerous studies of the potential for and cost of improvements in efficiency in the residential, commercial and industrial sectors have shown that large quantities of energy can be saved at relatively low cost, as summarized in Exhibit MNC-5. One study was done specifically for Florida, which found that aggressive policies to reduce energy consumption could lower demand by 20 percent at a cost of less than 3.5 cents per kWh.

Thus, independently of any regulatory mandate, as the technology of efficiency is proven out, the Commission should consider greater reliance on it as part of the least cost

EXHIBIT 30

approach to meeting the need for electricity. The combination of regulatory and technological changes will drive efficiency into the electricity sector, undermining the long-term feasibility of the reactors.

Q. Please describe the emerging terrain of renewables.

A. The concern with climate change has sharpened the focus on the cost and availability of renewable technologies. For renewables, the change is in strong cost reductions that are expected as new technologies ramp up production. As shown in Exhibit MNC-6, paged 1 and 2, in half a dozen studies the cost of alternatives that included renewables and/or efficiency, every analyst found several non-fossil resources less costly than nuclear.

The only two technologies on which there is a wide difference of opinion about cost are solar photovoltaics and nuclear, as shown in Exhibit MNC-6, page 3. The other technologies included in recent studies there is much better agreement. The combination of regulatory and technological changes will drive renewables into the electricity sector, undermining the long-term feasibility of the reactors.

Q. How do the regulatory and technology changes alter the context for assessing the long-term feasibility of these reactors?

A. They dramatically alter the context. HR 2454 intends to lower demand for nonrenewable generation resources. It could do so significantly. The renewable energy standard ("RES") builds to 20 percent by 2022. Improvements in the building codes start quickly with a 30 percent reduction in consumption from new buildings by 2010 and

EXHIBIT 30

build to a 50 percent reduction by 2014 for residential building and 2015 for commercial buildings. Additional improvements of 5 percent are called for every three years after 2017/2018. Revenue for retrofitting of existing buildings would begin when the allowances go into force. Appliance efficiency standards will unfold over time. Studies by the American Council for an Energy Efficient Economy suggest that the building codes, appliance standards and retrofitting of existing buildings could lower demand by as much as 7 percent. The renewable energy standard would be on top of the building code, appliance standards and retrofit impacts, pushing the theoretical total reduction of demand for nonrenewable generation past 25 percent, but there are a number of mechanisms that would lower that impact. In particular, states that cannot or choose not to expand renewables can make alternative compliance payments of $25 per MWh to states that exceed the combined efficiency renewable energy standard.

On a national average basis, the EPA projects a 10 percent reduction in demand and growth in renewables equal to 1.1 percent of demand.[1] An earlier analysis suggests the weatherization program in the American Recovery and Reinvestment Act would lower demand by 1.4 percent.[2] The impact varies from state-to-state, however. The American Council for an Energy Efficient Economy estimated the impact of the improvement in building codes and appliance standards in Florida would be 20 percent

---

[1] EPA Analysis of toe American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress, 6/23/09, p. 26

[2] Contrast EPA Analysis of toe American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress, 6/23/09, p. 26, with EPA Preliminary Analysis of toe Waxman Markey Discussion Draft: American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress, 4/20/09, p. 23. the former includes the effect of the ARRA in the reference case, the latter does not. I attribute the difference to the ARRA

EXHIBIT 30

above the national average.[3] In a state where so much efficiency is available at less than 2.5 cents per KWh, it would make sense to petition for the maximum efficiency contribution to the RES (8 percent) and develop as much renewable energy as is economic, before sending money to California, Washington, Minnesota and Massachusetts. Combining these factors, a reasonable range for the impact on Florida would be a 10 to 20 percent reduction in the demand for non-renewable generation.[4]

FPL

Q. What impact does including the efficiency and renewable policies in HR 2454 have on FPL's projections for load growth and demand for nonrenewable resources such as nuclear reactors?

A. They would have a major impact. The 20 percent scenario is described in Exhibit MNC-7, page 1. Under this scenario, FPL does not reach the peak for 2017 projected in the Need Docket until 2036. Exhibit MNC-7, page 2 presents the 10 percent scenario, and under this scenario, FPL does not reach the peak projected in the Need docket for 2017 until 2028. The combination of the great recession and H.R 2454 climate policy extends the decision horizon by one to two decades. In an uncertain environment, that is a lot of breathing room. Utilities should be managing their resources to accommodate this

---

[3] Energy Savings from Codes and Standards Count Towards EERS Savings Goals, available at http://www.aceee.org/energy/national/EERScssavings.pdf

[4] The American Council for and Energy Efficient Economy puts the savings from Title I and Title II of HR2454 at 5.4 quds in 2020 and 12.2 quads in 2030. These savings work out to 12.2 percent of the energy consumed in the electricity sector and in 2020 and 25.6 percent of the energy consumed in 2030 (see HR. 2454 Addresses Climate Change Through a Wide Variety of Energy Efficiency Measures, available at http://www.aceee.org/energy/national/HR2454_Estimate06-01.pdf)

EXHIBIT 30

shift and the first thing they should do is take the least flexible projects out of the queue, such as new nuclear reactors.

Progress

Q. What is the impact of including the efficiency and renewables scenarios on Progress Energy's load growth and demand for nonrenewable resources?

A. It is in the same direction, but smaller because the company assumes a smaller near term impact of the recession on the growth of demand, as shown in Exhibit MNC-8. The peak load for 2017 projected in the 2008 10-year plan does not occur until 2034 under the 20 percent scenario (Exhibit MNC-8, page 1) and 2026 under the 10 percent scenario (Exhibit MNC-8, page 2). Moreover, the 2017 peak has considerable excess capacity above the reserve margin requirement of 20 percent, which adds several years to a projection of when generation resources become constrained.

Q Do the analyses presented to the Commission by the companies reflect these developments?

A. It does not appear to. The demand projections appear to reflect the effects of the "great recession" to differing degrees, but not the aggressive efficiency policy embodied in the legislation that passed the House of Representatives. There is no hint of a renewable energy standard of 12 to 20 percent.

NUCLEAR REACTOR COSTS

Q. Pleases describe the uncertainties about the cost of nuclear reactors.

EXHIBIT 30

A. For nuclear reactor costs, the evidence on technology points in the opposite direction. Early in this decade vendors and contractors at the Department of Energy produced very low estimates of the cost of nuclear reactors, claiming that things have changed since the first generation of reactors. In the eight years since those initial, promotional studies were released, the estimate of the cost of nuclear reactors has increased dramatically, especially among Wall Street and independent analysts. As long as the costs placed before the Commission are "non-binding," the Commission must be aware of the growing uncertainty about the cost of nuclear reactors. As long as they are "non-binding," the prospect of cost escalation places ratepayers at risk, especially where costs for construction work in progress is being granted.

In fact, the extreme uncertainty about nuclear reactor costs has caused FPL to create a whole new framework for evaluating options. As FPL put it in the Need Docket:

> The second difference in the economic analysis approach step that developed the CPVRR costs for the resource plans is that no generation or transmission capital costs associated with Turkey Point 6 & 7 were included in the analysis. The reason for this is that *FPL does not believe it is currently possible to develop a precise projection of the capital cost associated with new nuclear units with in-service dates of 2018-on.* Consequently, FPL's economic analysis approach normally used to evaluate generation options has been modified to include a second economic analysis step." ("Need Study for Electrical Power, Docket No. 07-0650-EI, Florida Power and Light Company, October 16, 2007, pp. 104-105, emphasis added).

EXHIBIT 30

In the 21 months since that statement was made, there have been dozens of studies of the projected costs of nuclear reactors. The cost in 2008 $ have ranged from a low of just under $2400/kW to a high of just over $10,000/kW, as shown in Exhibit MNC-9.

As described in the FPL need study, FPL's cost estimate was derived from an early low estimate for a different type of reactor and its current estimates remain in the low range of projections. Each of FPL's estimates (low, middle and high) is in the bottom quarter of the comparable estimates. The wide range of cost scenarios considered within each of the studies attests to the uncertainty that afflicts all of the studies and to which FPL has testified.

The two conclusions I would draw from this analysis are (1) the range of costs considered by FPL is narrow and too low and (2) the uncertainty is huge. This only reinforces my opinion that the prudent course would be to avoid rigid, expensive choices, especially if there is time to let the uncertainties diminish before decisions must be made.

FINANCIAL CONDITIONS

Q. What financial factors are affecting the long-term feasibility of these reactors?

A. There are two categories of factors – the general financial environment and the specific plant finance. The general environment for raising large sums of money has clearly deteriorated. Money is tight. How long that will last and the nature of the long-term environment remains to be seen.

EXHIBIT 30

In a sense, the marketplace, regulatory and technological risks combine with the nature of nuclear reactors to create the severe financial risk that nuclear reactors face. The financing of the construction of large nuclear reactors has also come under greater scrutiny by Wall Street.

A recent special comment by Moody's underscores the challenges that these huge projects pose. Moody's identifies the developments in the project and regulatory areas that are positives for nuclear reactor construction, but still concludes that the negatives are a great concern and declares that it "is considering taking a more negative view for those issuers seeking to build new nuclear power plants" (p. 1) because "We view nuclear generation plans as a "bet the farm" endeavor for most companies, due to the size of the investment and length of time needed to build a nuclear power facility." (p. 4).

Moody's goes on to outline the complex factors affecting nuclear reactor construction and operation.

> Project risks are somewhat more clear today than during the last build cycle, in the 1970s, since we now have a track record that measures nuclear power's operating performance; strong plant economics due to low fuel cost; proven efficient and safe operating capabilities; new and refined regulatory procedures; and more certainty over reactor designs before construction begins. (p. 2)
>
> Much has changed since the last major nuclear-generation construction cycle (1965-1995). The industry has learned from experience, including up-front regulatory oversight of development and investment; streamlined

EXHIBIT 30

> federal NRC approval procedures; and enhanced construction cycles and techniques.
>
> In addition, new environmental regulations, specifically those aimed at reducing carbon dioxide emissions; appear well positioned for near-term implementation. These environmental developments should otherwise bolster the case for new nuclear generation, as it is viewed as one of the only large-scale generation technology with a no-carbon footprint. (p. 7)

On the other side, there are a host of issues and challenges in Moody's view that weigh in the opposite direction. In each of the important areas of risk, uncertainties and challenges abound.

The inherent nature of the projects continues to be a challenge and creates marketplace and technological risk.

> The sheer size, cost and complexity of new nuclear construction projects will increase a utility's or power company's business and operating risk profile, leading to downward rating pressure. The length of a nuclear construction effort also entails lengthy regulatory reviews and potential delays in recovering investments, changing market conditions, shifting political and policy agendas, and technological developments on both the supply and demand side. (p. 5)

Notwithstanding the fact that public policy has created favorable conditions for reactor construction in some aspects of regulation, there are other aspects that pose continued risk at in both execution risk and regulatory risk.

EXHIBIT 30

> While a constructive regulatory relationship will help mitigate near-term credit pressures, we will remain on guard for potential construction delays and cost overruns that could lead to future rate shock and/or disallowances of cost recovery. Given the lengthy construction time needed for nuclear projects, there is no guarantee that tomorrow's regulatory, political, or fuel environments will be as supportive to nuclear power as today's. (p. 7)
>
> Less clear today is the effect that energy efficiency programs and national renewable standards might have on the demand for new nuclear generation. National energy policy has also begun eyeing lower carbon emissions as a key desire for energy production—theoretically a huge benefit for new nuclear generation—but the price tags associated with these development efforts are daunting, especially in light of today's economic turmoil. It isn't clear what effect such shifts, or changes in technology, will have for new nuclear power facilities. (p. 2)

The result of these market, regulatory and technological uncertainties and risks is to create financial pressure on projects, pressures that are reflected by project specific concerns and the general turmoil in the credit markets.

> Given these long-term risks, a company's financial policy becomes especially critical to its overall credit profile during construction. In general, we believe a company should prepare for the higher risk associated with construction by maintaining, if not strengthening, its balance sheet, and by maintaining robust levels of available liquidity capacity. (p. 5)

EXHIBIT 30

> Credit conditions are yet another question. Few, if any, of the issuers aspiring to build new nuclear power have meaningfully strengthened their balance sheets, and for several companies, key financial credit ratios have actually declined. Moreover, recent broad market turmoil calls into question whether new liquidity is even available to support such capital-intensive projects. (p. 2)

Moody's continues to see execution risk in these projects and points to the history of the financial difficulties that utilities building reactors in the 1970s and 1980s as instructive for evaluating current projects.

> Moody's is considering applying a more negative view for issuers that are actively pursuing new nuclear generation. History gives us reason to be concerned about possible significant balance-sheet challenges, the lack of tangible efforts today to defend the existing ratings, and the substantial execution risk involved in building new nuclear power facilities. (p. 2)

Q. Do these concerns apply to the nuclear reactors proposed by FPL and Progress?

A. Yes. As I have shown above these marketplace, regulatory and technology risks weigh heavily on the proposed Florida reactors. The execution risk remains a serious concern as well. In the case of Florida, where both of these reactors before the commission are still awaiting approval for the 16th and 17th revision in its "standard" design, where the NRC has determined that one utility could not proceed under a Limited Work Authorization ("LWA") and therefore has been forced to delay the project and renegotiate its EPC contract, paying fees just to stand in line, and where the developer of

EXHIBIT 30

the prototype has shelved its plans to make its project the “model,” Moody’s concerns seem well founded and the assumption that execution risk has been solved deserves to be questioned.

The downgrades of utility ratings cut to the heart of the problems encountered by the industry during “the last major nuclear-generation construction cycle (1965-1995).” As shown in Exhibit MNC-10, I have identified 68 firms that engaged in the construction or operation of nuclear reactors in the U.S. Of those 68 firms, three quarters endured cancellation of at least one plant and half suffered a ratings downgrade. Both of the utilities involved in this proceeding suffered downgrades. Cancellations are the ultimate proof of that reactors can become infeasible and financial risk plays a key role in triggering the cancellation.

Moody’s is not the only Wall Street firm to recognize the challenges facing nuclear reactors, as shown in Exhibit MNC-11. Even at a promotional conference, Standard and Poor’s noted that “challenges for the industry participants abound” (p. 18). Even recognizing that there are positive aspects of the current environment, as Moody’s did, Standard and Poor’s identifies more aspects of the current situation that are negative. Interestingly, even with a loan guarantee, Standard and Poor’s sees significant financial issues. The utilities proposing the reactors in Florida are not on the list for the first round of loan guarantees, so the challenges facing these projects are even greater.

Thus, the Commission needs to be sensitive to the potential financial risks of these plants. Credit downgrades raise the cost of capital and can have a significant impact on the cost of electricity and undermine not only the long-term feasibility of the reactors, but also the viability of the utility.

EXHIBIT 30

Let me stress again that the importance of uncertainty is a key fact for the Commission to take into account and the importance of demand projections. One of the key factors contributing to the bust of the nuclear boom of the 1970s was the inability or unwillingness of utilities that had become committed to nuclear construction to cope with reduced demand growth. The oil price shocks of the 1970s and the rate shock of the 1980s destroyed the demand that the nuclear reactors were intended to supply.

Today we have a similar demand shock created by the great recession and the pending climate change policy. It is highly unlikely that demand will reach the levels predicted in the Need Dockets for decades. Between the two utilities, FPL and Progress have lowered their projection of peak demand for 2017 by almost 3700 MW. That is equivalent to the capacity of three of the four units they are planning to build. Climate change policy could reduce the need for nonrenewable capacity by another 3300 to 6600 MW in their service territories in the next two decades. The chance that Florida will actually need these four reactors should climate change legislation be enacted along the line of HR 2454 is virtually zero. If climate change legislation were not enacted now or in the future, the carbon compliance prices assumed by the companies would not come to pass. In that case, the reactors could not be justified on economic grounds. Either way, these reactors are not feasible in the long-term.

DIVERSITY

Q. Do the other goals the Florida legislature has set for the electricity sector alter you conclusion?

EXHIBIT 30

A. Not at all. The goal of promoting diversity of resources to lower vulnerability to a variety of threats argues for efficiency and renewables just as much as nuclear. Efficiency is the most reliable form of meeting needs because it is always on. Lowering demand lowers the reliance on all other forms of energy. Renewables also provide diversity.

To evaluate the effect of alternatives on the diversity of sources, I have calculated an index known as the HHI index. The index is used frequently in economics to evaluate the concentration of markets. In fact, the Merger Guidelines of the Department of Justice and the Federal Trade Commission are written in terms of the HHI. The index is calculated by taking the share of each entity making up the market (in this case the share of the resource in the total) squaring it, summing the squares and multiplying by 10,000 to clear the fraction. A monopoly or utility reliant on a single source would have an HHI of 10,000 [(1 * 1) *10,000].

Exhibit MNC-12 shows the HHI for three scenarios for both FPL and Progress. It has the nuclear and gas scenarios from the Need Docket and contrasts this to an efficiency and renewables scenario in which HR 2454 induced efficiency and renewables are at 15 percent (half way between the 10 and 20 percent scenarios discussed above). Efficiency is assumed to be 12 percent of the total resource, while incremental renewables are set at 3 percent. In both cases, the efficiency and renewable mix is more diverse than either the nuclear or the gas scenarios, when one counts efficiency as a "resource."

ECONOMIC ANALYSIS

EXHIBIT 30

FPL's Breakeven Analysis

Q. Is the breakeven analysis the common approach to making the comparison between alternatives?

A. No. Because FPL is unsure of the cost of nuclear reactors it has created a new methodology to evaluate one option, whether or not to build nuclear reactors. The typical methodology is a levelized cost comparison of the different alternatives.

Q. Are there aspects of the break-even analysis that bear close scrutiny in light of the changed conditions you have identified?

A. Yes there are several aspects. At a general level, the breakeven analysis improperly narrows the scope of the review. Generally, analysts calculate the projected cost per kilowatt-hour. Each alternative would be considered on its merits. In the breakeven analysis, FPL compares two or three large-scale alternatives. It does not ask whether other alternatives would be less costly.

More specifically, there are two aspects of the breakeven framework that FPL has developed which should be examined carefully in light of the changing conditions I have identified. These aspects are escalation and excess capacity.

Q. Please describe your concerns about escalation.

A. The wide variation in the projected costs of power from nuclear reactors stems from a difference of opinion over the overnight costs and escalation of construction costs. In the FPL analysis cost escalation is equal to one-quarter of the overnight costs and it is

EXHIBIT 30

treated separately form overnight costs. FPL assumes a zero real cost escalation. That is, the rate of increase in the cost of construction equals the rate of inflation. Many other studies assume significant, real cost escalation.

FPL calculated a fixed cost recovery factor, which is the cumulative present value of the revenue requirement per $1/kW of overnight capacity (the $1/kW factor). It is not clear to me how the escalation of construction costs is included in the calculation of the revenue requirement. It could have been embedded in the stream of costs as a percentage of the construction cost. If one wants to test an alternative escalation rate, one would have to modify the calculation of the $1/kW recovery factor. The $1/kW factor has changed significantly between 2007 and 2009, as shown in Exhibit MNC-13. The decline in the implicit $1/kW factor accounts for between one-tenth and one-quarter of the increase in the breakeven capital figure.

Q. Please describe your concerns about excess capacity.

A. The breakeven analysis essentially calculates how much nuclear capacity can be purchased with the variable cost savings from building new nuclear reactors. Over 90 percent of the savings comes from variable costs, largely fuel costs. In other words, nuclear capacity is paid for with fuel cost savings. The analysis proceeds in two steps. First, the system costs are calculated with and without nuclear capital costs, then the cost of building nuclear reactors is compared to the amount of money available from the savings.

The operating cost estimates should not include excess production and the variable costs associated with that production. If capacity is idled because of excess, then

EXHIBIT 30

the carrying cost of that excess should be subtracted from the savings. These are costs that would not be incurred if the system were "right" sized. Because nuclear reactors come in larger units and have higher capital costs, while natural gas units are small, lower in capital cost and have higher operating costs, ensuring that the model takes these differences into account become more important when demand declines and excess capacity increases.

Absorbing excess capacity with "off-system" sales raises two issues. First, to the extent that off-system sales are claimed, the net costs of production and net revenues should be deducted from the system cost total for purposes of the breakeven analysis. Second, in an environment where demand is slackening and reserve margins are rising all around, the assumption that off-system sales can take place should be examined.

The cost of operating the system is driven by assumptions about plant capacity, capacity factors and heat rates. The 20 percent reserve margin creates a circumstance in which the implicitly capacity factor (80 percent) is lower than the assumed capacity factors for the major alternatives being compared. The reserve margin is the insurance premium that Floridians pay to ensure that the lights stay on. Reserves in excess of the reserve margin are excessive. Over a long time horizon, the ability to match supply and demand (plus the reserve margin requirement) should be rewarded. If excess capacity is used to make off-system sales, those revenues should be subtracted from the system costs in the break-even analysis.

While the excess capacity is a few percentage points spread over a number of years, it can make a difference if it is handled properly. The economic advantage claimed for nuclear is actually quite small, when compared to the total costs of the

EXHIBIT 30

system. As shown in Exhibit MNC-14, using the high capital costs and the 2007 $1/kW factor, but leaving all other assumptions alone, the cost advantage of nuclear is less than five percent in eight of the nine cost cases. The handling of excess capacity in the context of such a small difference between system costs with and without nuclear reactors could be quite important.

Progress

Q. Does the economic analysis offered by Progress raise similar concerns?

A. Yes. While Progress has pursued a more traditional approach to assessing the economics of nuclear reactors compared to other options, its analysis raises concerns that are similar to those I have expressed for FPL. The excess capacity question is important in the case of Progress because its base case already has a large excess above the reserve margin requirements and the large project creates even greater excess.

This is particularly important in the case of Progress because it has argued that the construction periods of the two reactors must be kept close together to achieve cost savings. Since the economic analysis is done at the average cost of the two reactors and the link between them in time is so tight, this project is not really two 1100 MW reactors, it is one 2200 MW project. If the decision were made to drop the second reactor, the cost of the first reactor would rise and the Commission would have to redo the whole economic analysis at a much higher cost. Slackening demand growth drives a time wedge between the first and second units, as it takes more time for demand growth to reduce the excess capacity resulting from the addition of large units. Progress does not

EXHIBIT 30

need the second units as quickly and capturing the cost economies of the rapid build creates excess capacity that last longer.

This obviously ties directly to the cost escalation issue. Progress used a single point estimate for cost, which was between FPL's mid and high point, but the cost is nonbinding from the Commission's point of view and is being renegotiated in light of the long slippage in schedule. The Commission is being asked to allow the recovery of hundreds of millions of dollars of costs from a project, whose total cost, and therefore long run feasibility, are unknown in the context of an industry that suffered severe cost overruns in the past and is exhibiting a rapid run up in cost projections.

EXHIBIT 30

Q. Please summarize your conclusions.

A. The small cost advantages claimed for these nuclear units in the future underscores how important all of the changing conditions I have identified are. The Florida legislature has created an environment that provides incentives for nuclear reactors, but it has not written a blank check nor created a blindfold. The utilities and the Commission must act prudently within the confines of the incentive structure the legislature has established. In this prudence review the utilities ask for cost recovery for these proposed nuclear reactors by constructing an economic analysis that gives nuclear a slight, or 4-5 percent, cost advantage. However, that analysis rests on a series of assumptions that are no longer consistent with reality, if they ever were – high demand growth, very little contribution from efficiency and renewables, high fossil fuel costs, and low nuclear reactor costs.

My testimony has identified seven factors that are moving strongly against nuclear reactors. Any one of the seven could reverse the conclusion reached by the utilities that nuclear reactors are less expensive.

(1) Slowing demand growth due to a major shift in the economy
(2) Moderating natural gas prices
(3) Federal policies to require a growing role of efficiency and renewables
(4) Moderating CO2 compliance costs
(5) Improving technology and cost of efficiency
(6) Improving technology and cost of renewables
(7) Escalating nuclear reactor costs.

EXHIBIT 30

Given that all seven of these factors are moving strongly against nuclear reactors, it is highly likely that the reactors will cost consumers much more than the alternatives. And, given that relatively little has been spent on the proposed reactors now, this is the moment for the Commission to take the required hard look at the long-term feasibility of the completion of these reactors. Spending more on nuclear reactors and allowing the utilities to recover those costs from ratepayers would be imprudent.

Q. Does this conclude your testimony?

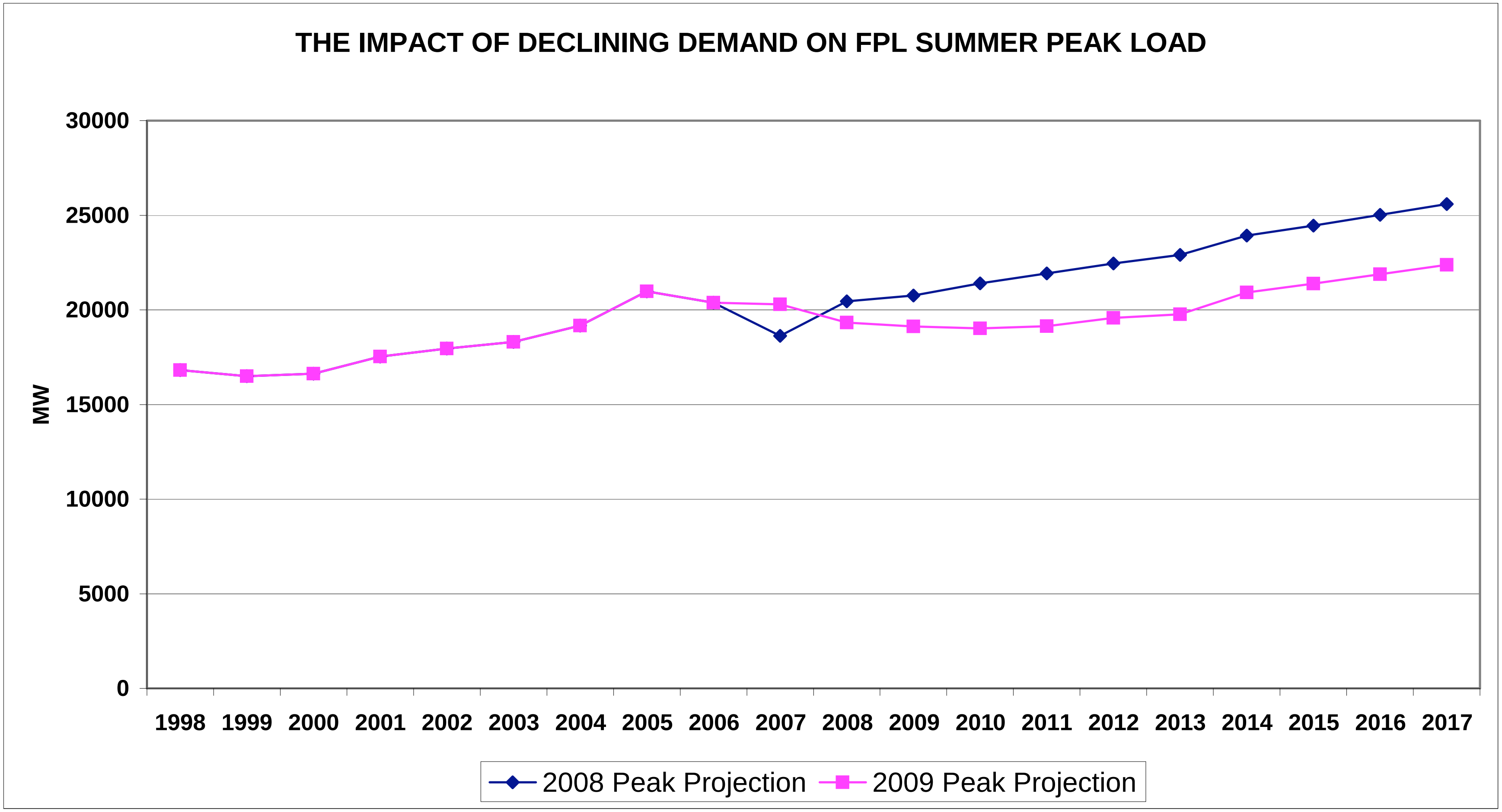
A. Yes it does.

EXHIBIT 30

EXHIBITS ACCOMPANYING DIRECT TESTMONY OF MARK N. COOPER

EXHIBIT 30

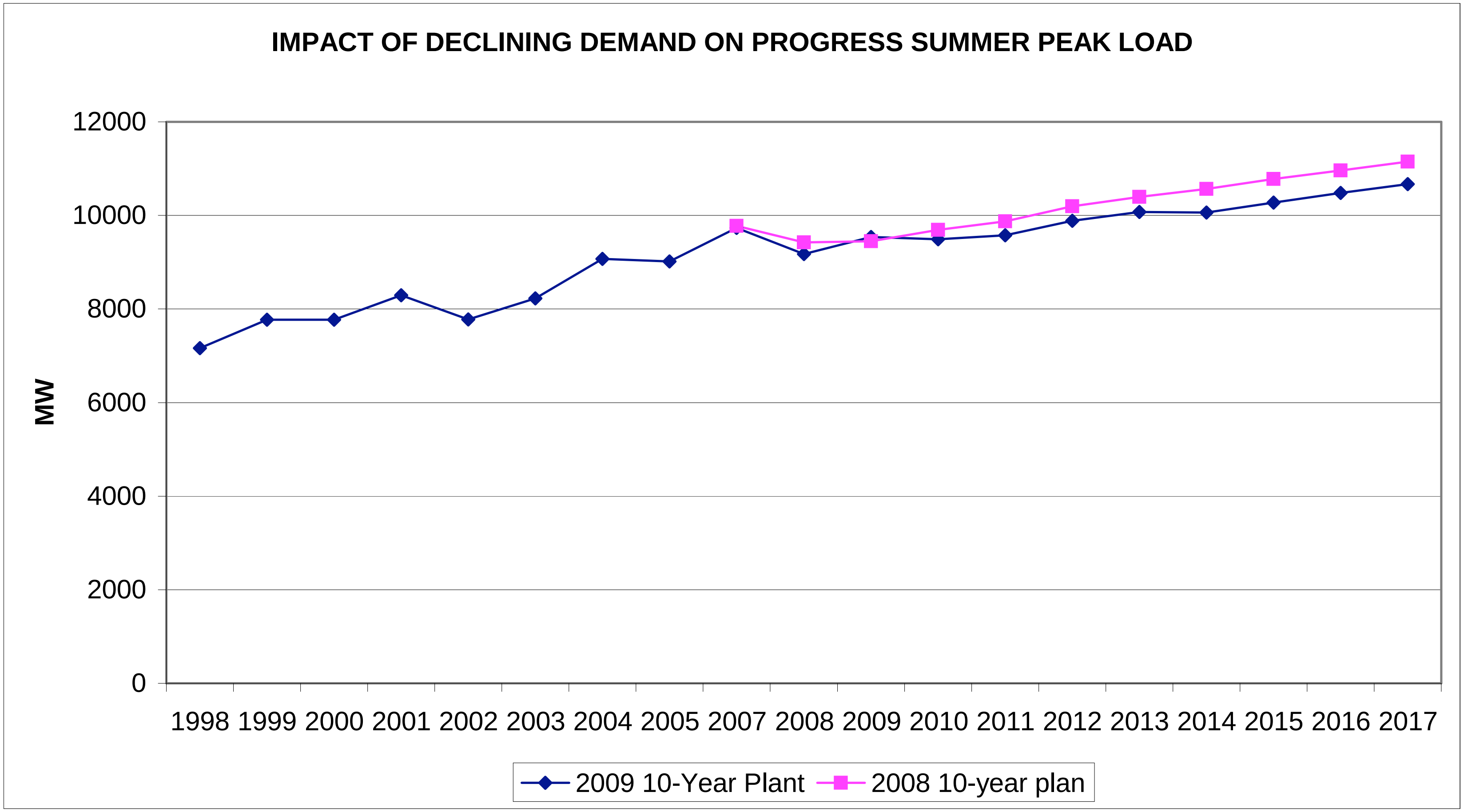
Docket No. 090009-EI
Exhibit MNC-1
Page 1 of 2
IMPACT OF DECLINING DEMAND ON SUMMER PEAK LOAD



Source: 2008 10-year plan, p. 40; 2009 10-year plan, p. 45.

EXHIBIT 30

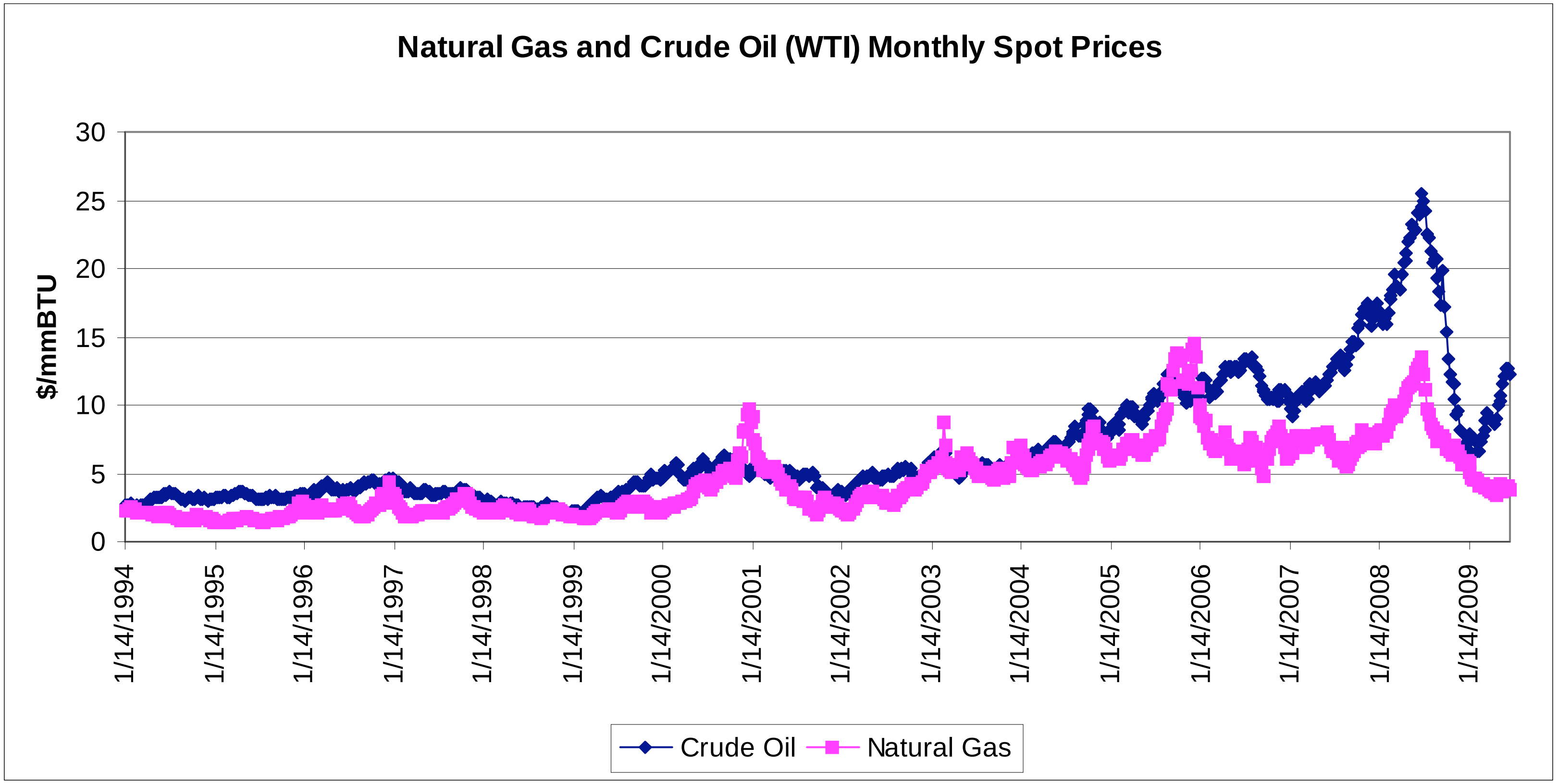
Docket No. 090009-EI
Docket No. 090009-EI
Exhibit MNC-1
Page 2 of 2
IMPACT OF DECLINING DEMAND ON SUMMER PEAK LOAD



Source: 2008 10-year plan, p. 2-7; 2009 10-year plan, p. 2-6.

EXHIBIT 30

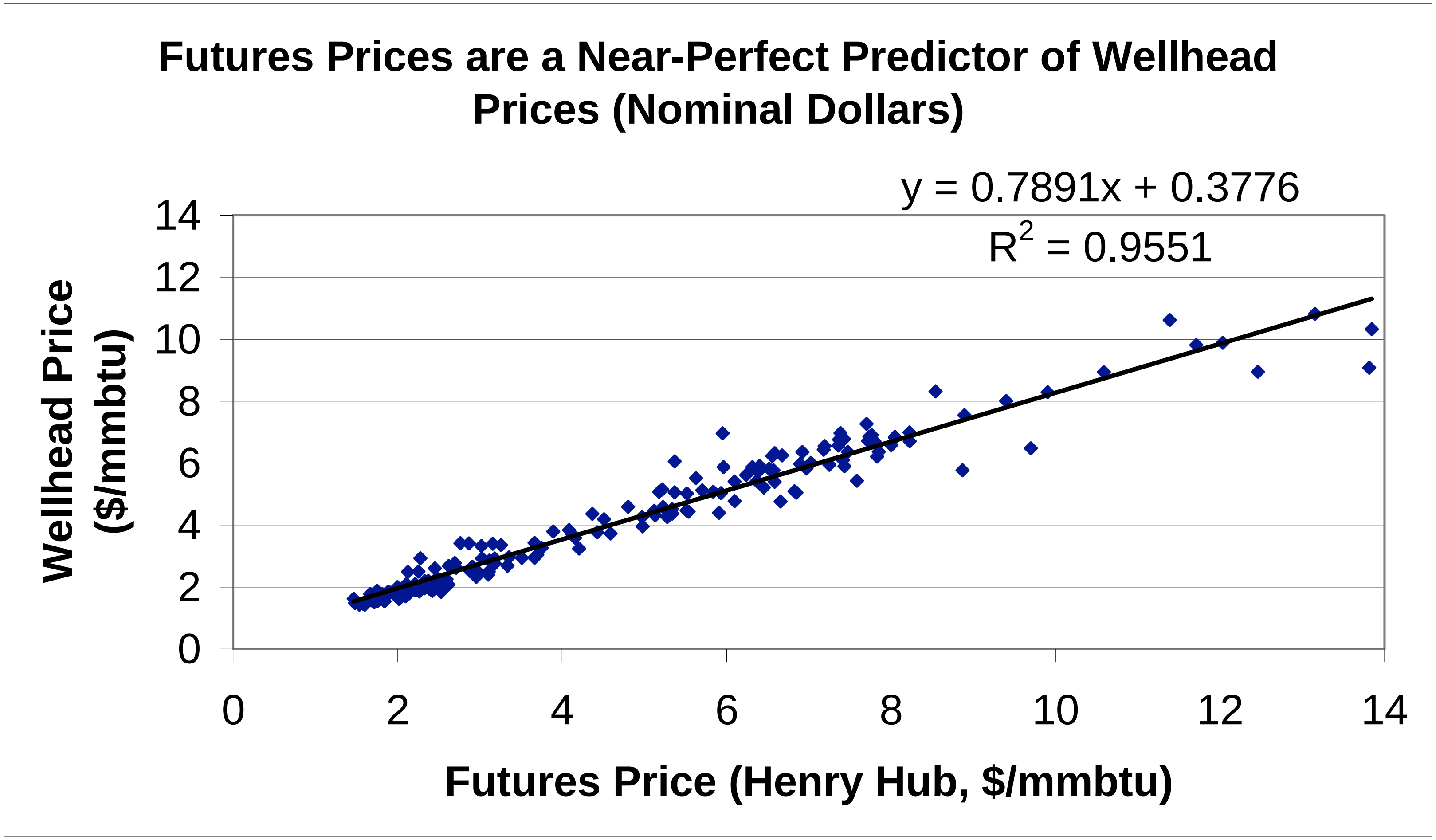
Docket No. 090009-EI
Exhibit MNC-2
Page 1 of 3
NATURAL GAS WELLHEAD, HENRY HUB AND FUTURES PRICES



Source: Energy Information Administration, Petroleum Spot Prices,
http://tonto.eia.doe.gov/dnav/pet/xls/PET_PRI_SPT_S1_M.xls
Natural Gas Future Prices, Contract 1: http://tonto.eia.doe.gov/dnav/ng/xls/NG_PRI_FUT_S1_M.xls

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-2
Page 2 of 3
NATURAL GAS WELLHEAD, HENRY HUB AND FUTURES PRICES



Source: Energy Information Administration: http://tonto.eia.doe.gov/dnav/ng/ng_pri_fut_s1_m.htm, http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_m.htm, visited 7/11/2009

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-2
Page 3 of 3
NATURAL GAS WELLHEAD, HENRY HUB AND FUTURES PRICES

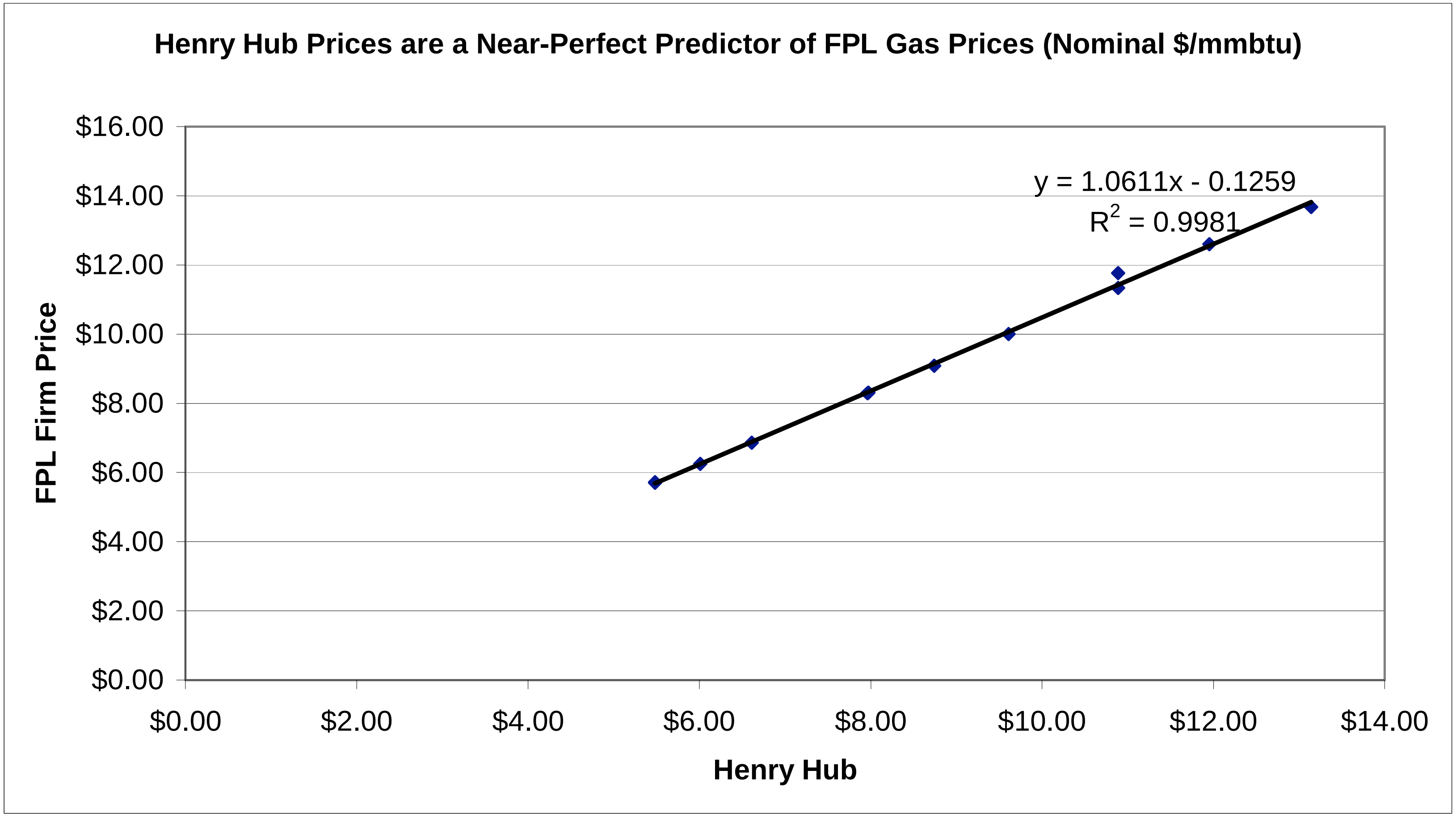
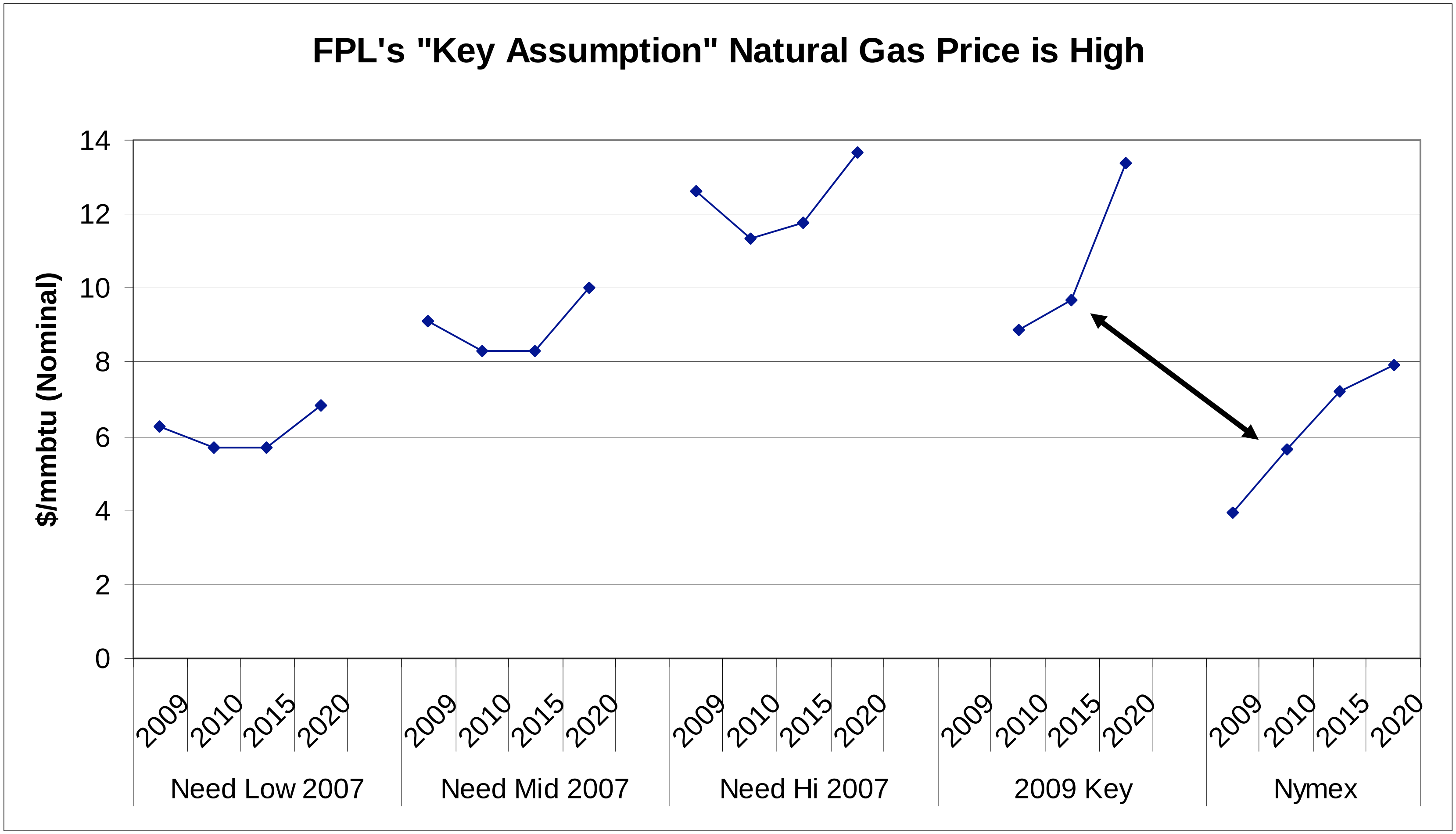


EXHIBIT 30

Source: FPL Need Study for electrical Power Docket No. 07-0650, Appendix E

EXHIBIT 30

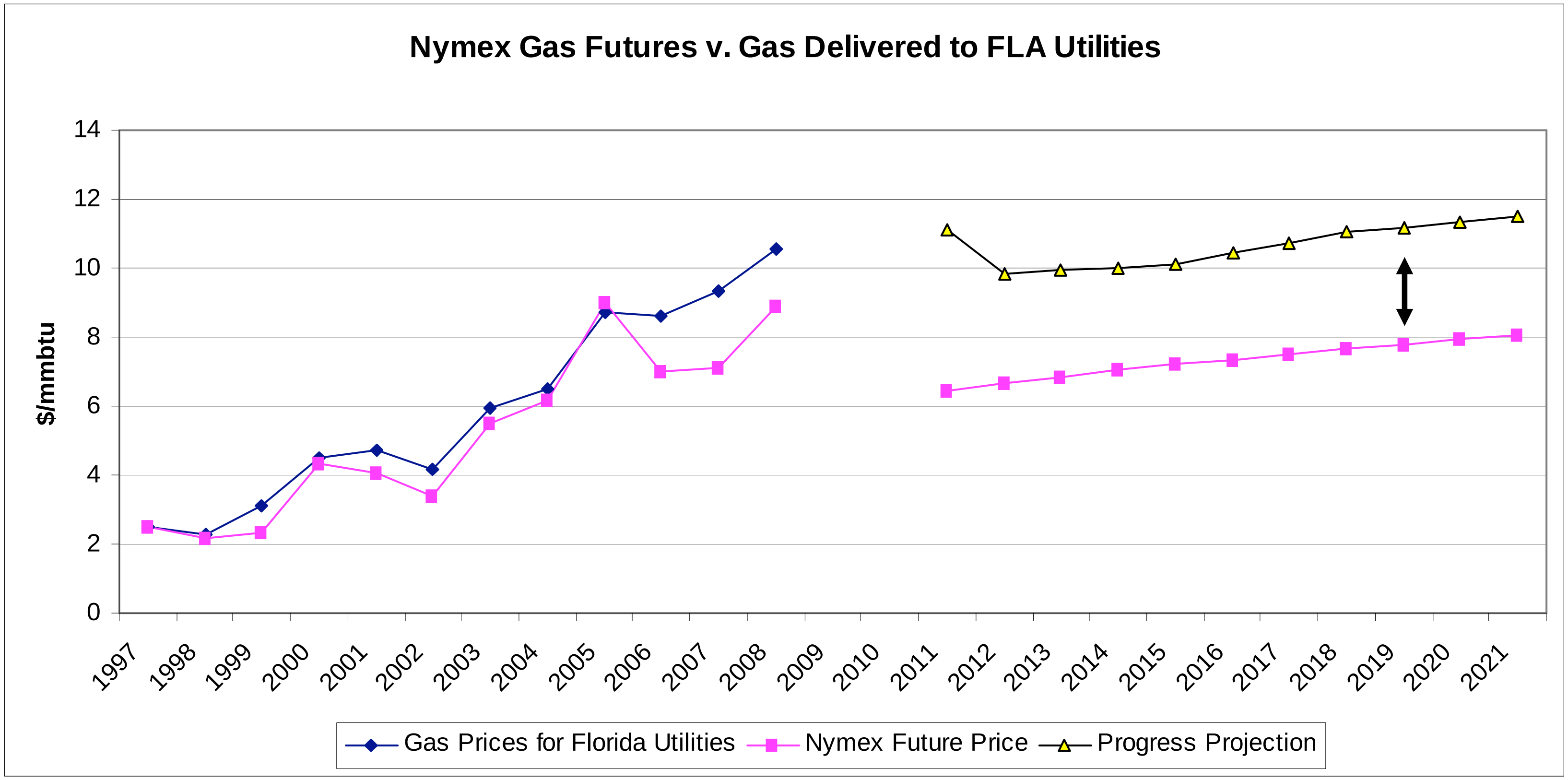
Docket No. 090009-EI
Exhibit MNC-3
Page 1 of 2
PROJECTED NATURAL GAS PRICES COMPARED TO NYMEX FUTURES PRICES



Source: **FPL Need Study for Electrical Power Docket No. 07-0650, Appendix E; Nymex Futures Contract, http://www.nymex.com/ng_fut_csf.aspx, visited 7/11/2009**

EXHIBIT 30

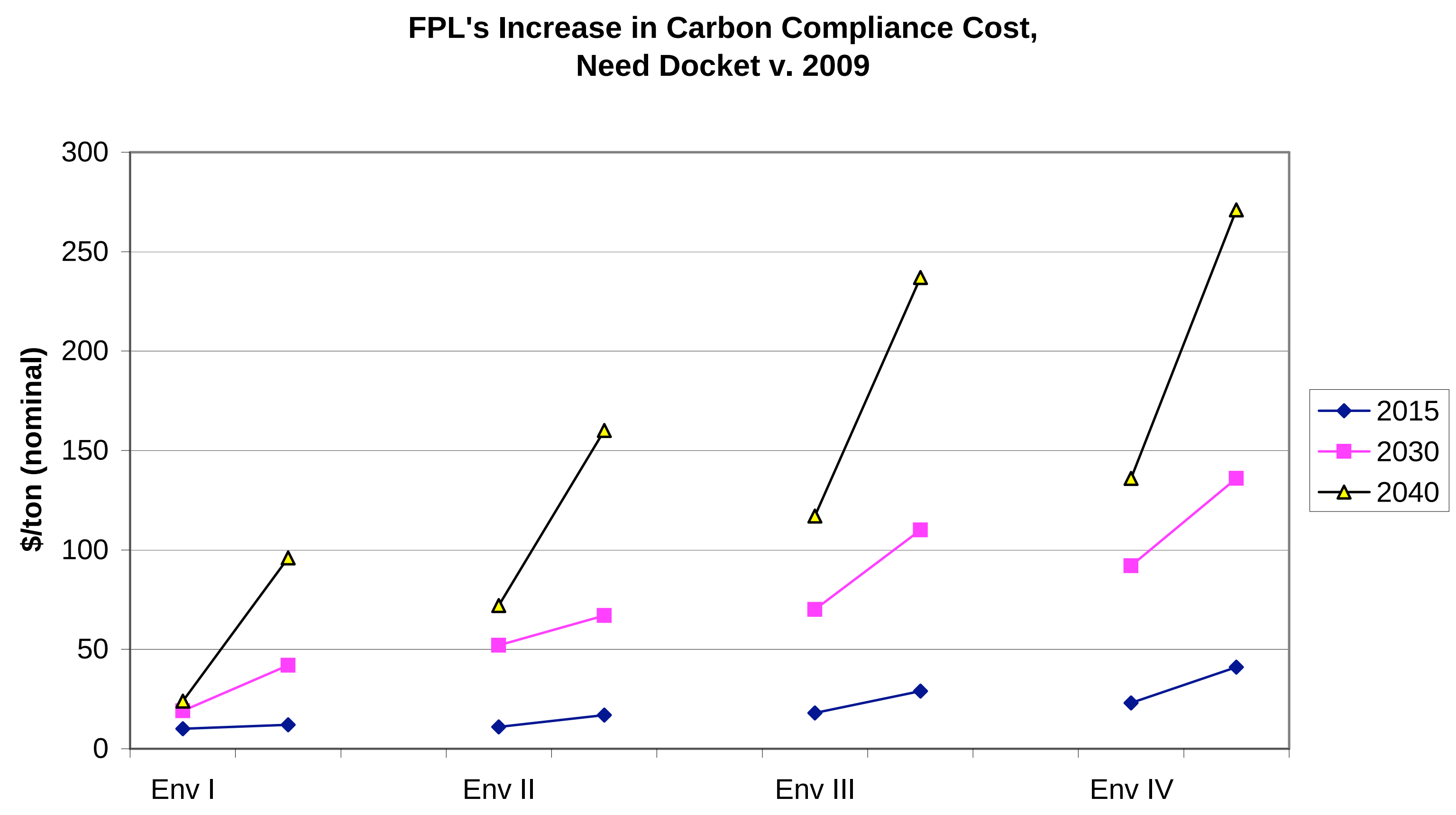
Docket No. 090009-EI
Exhibit MNC-3
Page 2 of 2
PROJECTED NATURAL GAS PRICES COMPARED TO NYMEX FUTURES PRICES



Source: Testimony of Garry Miller, Docket No. 090009, May 1, 2009, Exhibit GM-1, page 2of 2; Energy Information Administration, Annual Natural Gas Futures Contract 1, **http://tonto.eia.doe.gov/dnav/ng/xls/NG_PRI_FUT_S1_M.xls**
Annual Florida Gas Price Sold to Electric Power Companies; *http://tonto.eia.doe.gov/dnav/ng/hist/n3045fl3a.htm;*
FPL Need Study for electrical Power Docket No. 07-0650, Appendix E;
Nymex Futures Contract, http://www.nymex.com/ng_fut_csf.aspx, visited 7/11/2009

EXHIBIT 30

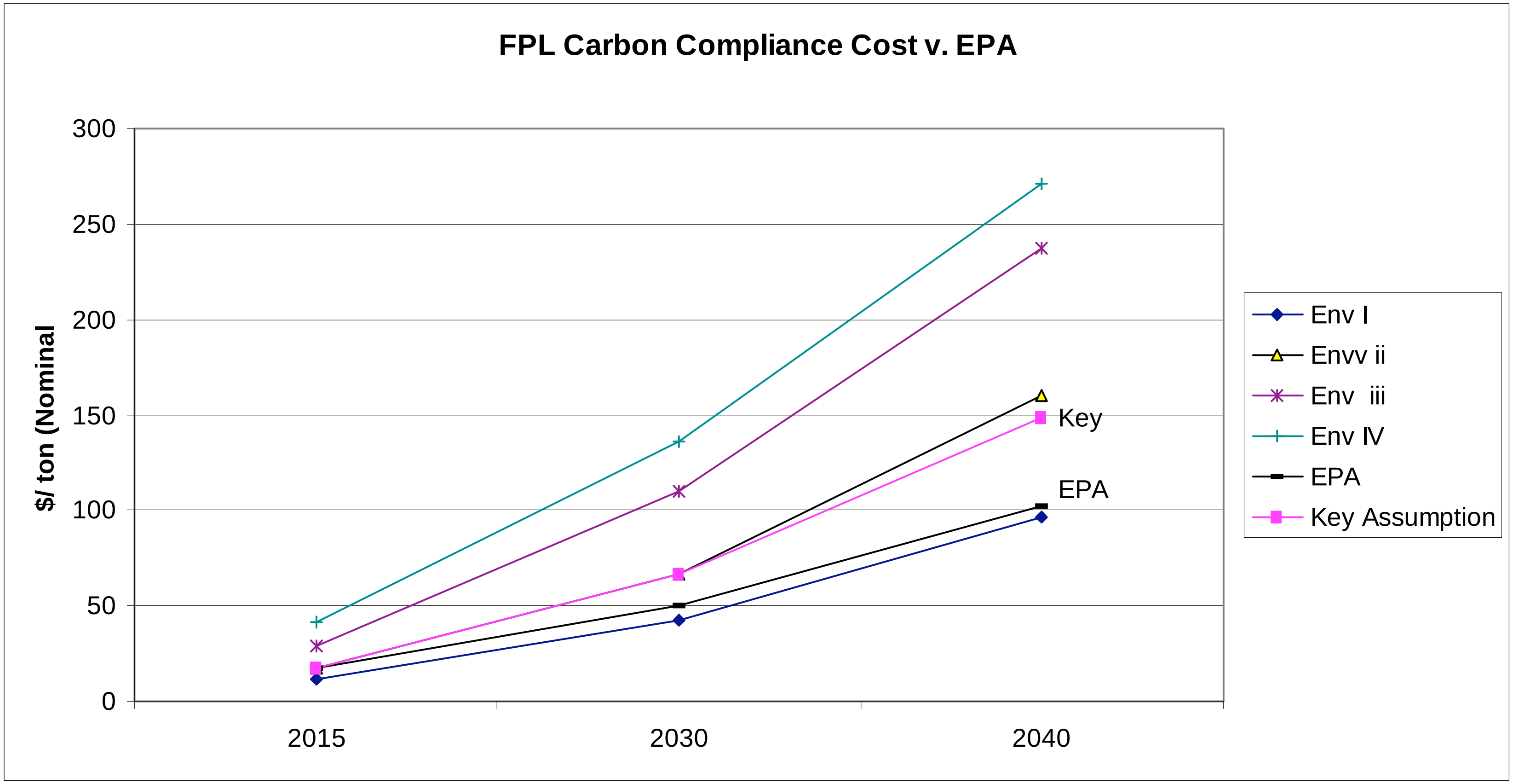
Docket No. 090009-EI
Exhibit MNC-4
Page 1 of 3
PROJECTIONS OF CARBON COMPLIANCE COSTS



Source: Florida Power and Light, Need Study for Electrical Power, Docket No. 070650-EI, Appendix F, page 3 of 4; Florida Power and Light Docket No. 090009 EI, OPC's Third Set of Interrogatories, Question No. 47, p 1 of 2.

EXHIBIT 30

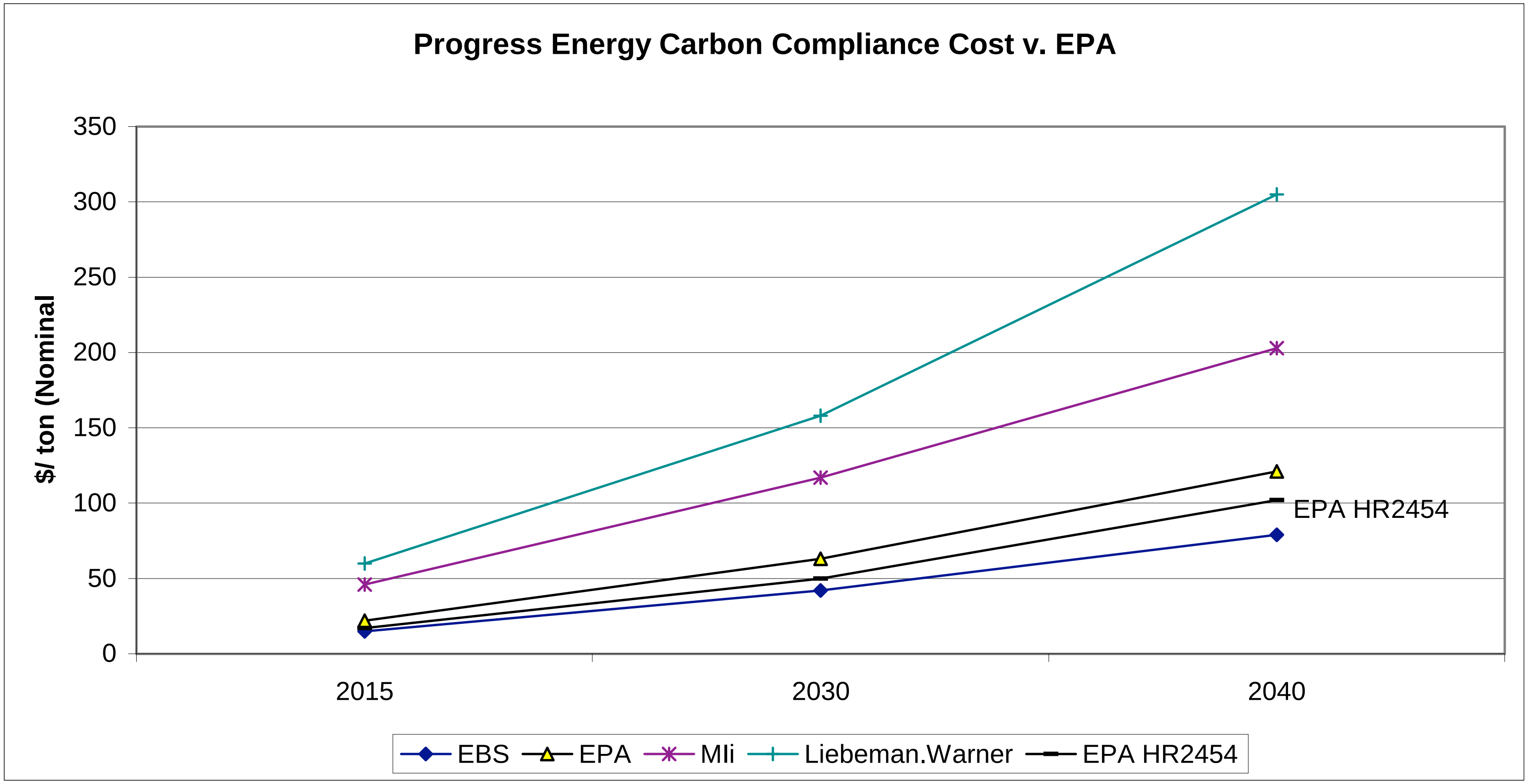
Docket No. 090009-EI
Exhibit MNC-4
Page 2 of 3
PROJECTIONS OF CARBON COMPLIANCE COSTS



Source: Florida Power and Light, Docket No. 090009 EI, OPC's Third Set of Interrogatories, Question No. 47, p 1 of 2; EPA Analysis of toe American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress, 6/23/09, p. 14, using the highest price and converting real to nominal dollars at the 2.5% rate of inflation assumed by FPL

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-4
Page 3 of 3
PROJECTIONS OF CARBON COMPLIANCE COSTS



Source: Testimony of Garry Miller, Docket No. 090009, May 1, 2009, Exhibit GM-1, page 1 of 1; **EPA Analysis of toe American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress, 6/23/09, p. 14, using the highest price and converting real to nominal dollars at the 2.5% rate of inflation assumed by FPL**

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-5
Page 1 of 2.
ESTIMATES OF POTENTIAL MID-TERM EFFICIENCY SAVINGS

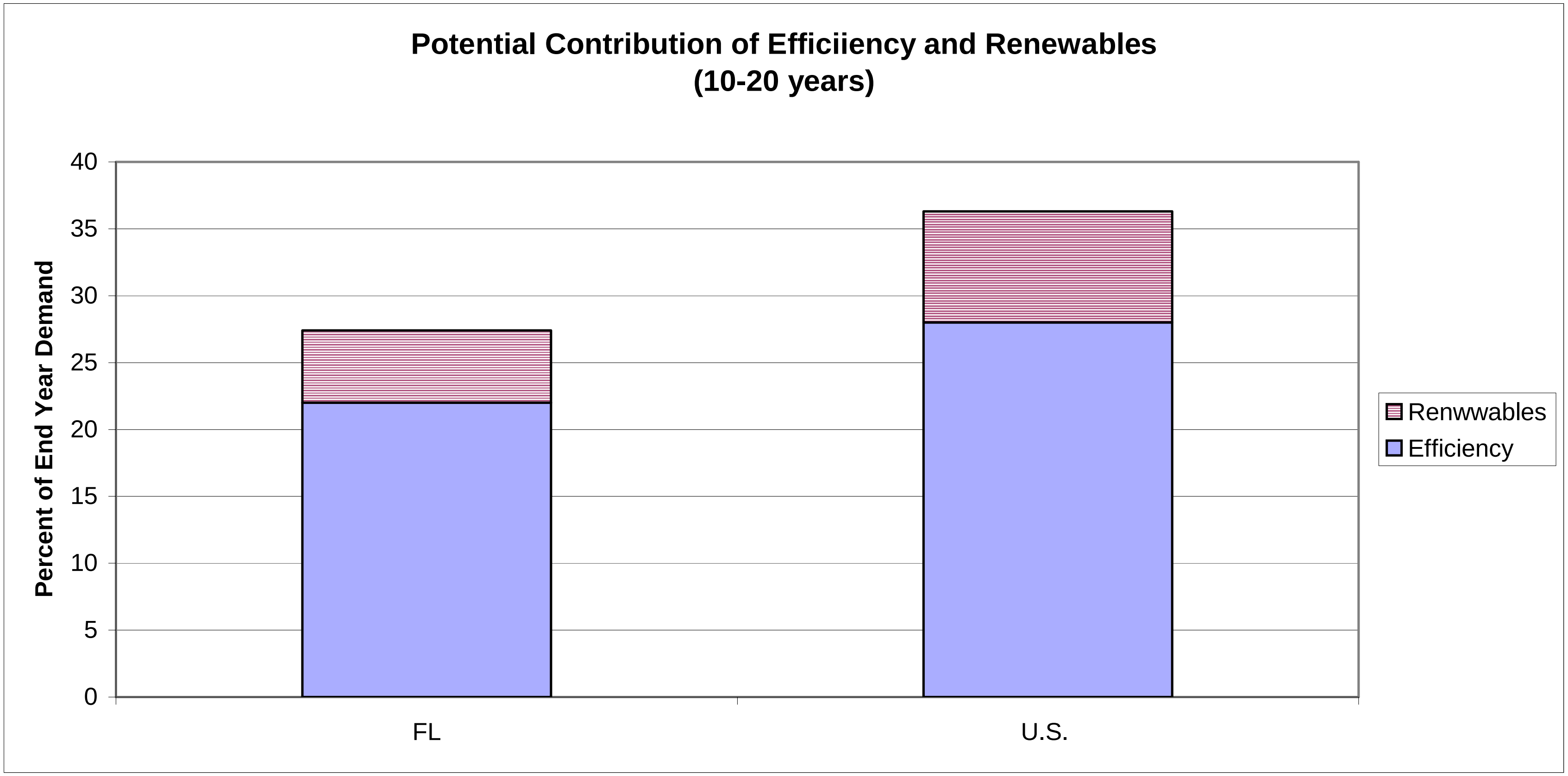


EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-5
Page 2 of 2.

ESTIMATES OF POTENTIAL MID-TERM EFFICIENCY SAVINGS

Source: **Florida is from Elliott, R. Neal, et al. *Potential for Energy Efficiency and Renewable Energy to Meet Florida's Growing Energy Demands*, American Council for an Energy Efficient Economy, June 2007, p. 9, 12. The national average is the simple average individual state studies in the following. American Council of an Energy- Efficient Economy, et al., 2009, *Shaping Ohio's Energy Future*, March 2009, p.13, 15, 17. American Council of an Energy-Efficient Economy, et al., 2008, *Energizing Virginia: Efficiency First*, September 2008, p. 14, 16, 18. American Council for an Energy-Efficient Economy, 2007, Howard Geller, et al., *Utah Energy Efficiency Strategy: Policy Options*, November 2007. American Council for an Energy- Efficient Economy, 2007, *Energizing Virginia: Efficiency First*," September 2008. Beck, Frederic, et al. 2002, *Powering the South: A Clean & Affordable Energy Plan for the Southern United States*, REPP, January 2002. Ecotope, Inc., American Council for an Energy-Efficient Economy, Tellus Institute, Inc., 2003, *Energy Efficiency and Conservation Measure Resource Assessment*, (Energy Trust of Oregon Inc., January 2003. Elliott, R. Neal, et al., 2007, *Potential for Energy Efficiency, Demand Response and Onsite Renewable Energy to Meet Texas' Growing Electricity Needs*, American Council for an Energy-Efficient Economy, March 2007. Laitner, John "Skip," Maggie Eldridge, and R. Neal Elliot, 2007, *The Economic Benefits of an Energy Efficiency and Onsite Renewable Energy Strategy to Meet Growing Electricity Needs in Texas*," American Council for an Energy-Efficient Economy, September 2007. Optimal Energy Inc, et al., 2003, *Energy Efficiency and Renewable Energy Resource Development Potential in New York State*, August 2003. Prindle, William, R. Rooney, Tom, et al., 2004, *Estimating the Potential for Cost Effective Electric and Peak Demand Savings in Connecticut*, 2004 ACEEE Summer Study on Energy Efficiency in Buildings, 2004. Southwest Energy Efficiency Project, *The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest*, November 2002, p. 3-13. Stoft, Steven, *The Economics of Conserved-Energy "Supply" Curves*, Program on Workable Energy Regulation, April 1995.**
Wyandotte Municipal Services Optimization Plan, Michigan Public Service Commission, Case No. U-18558, p. 6.

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-6
Page 1 of 4.

ESTIMATES OF COSTS OF ALTERNATIVES TO MEET ELECTRICITY NEEDS

(Arranged by Author; Nuclear Reactor Cost = 100%)

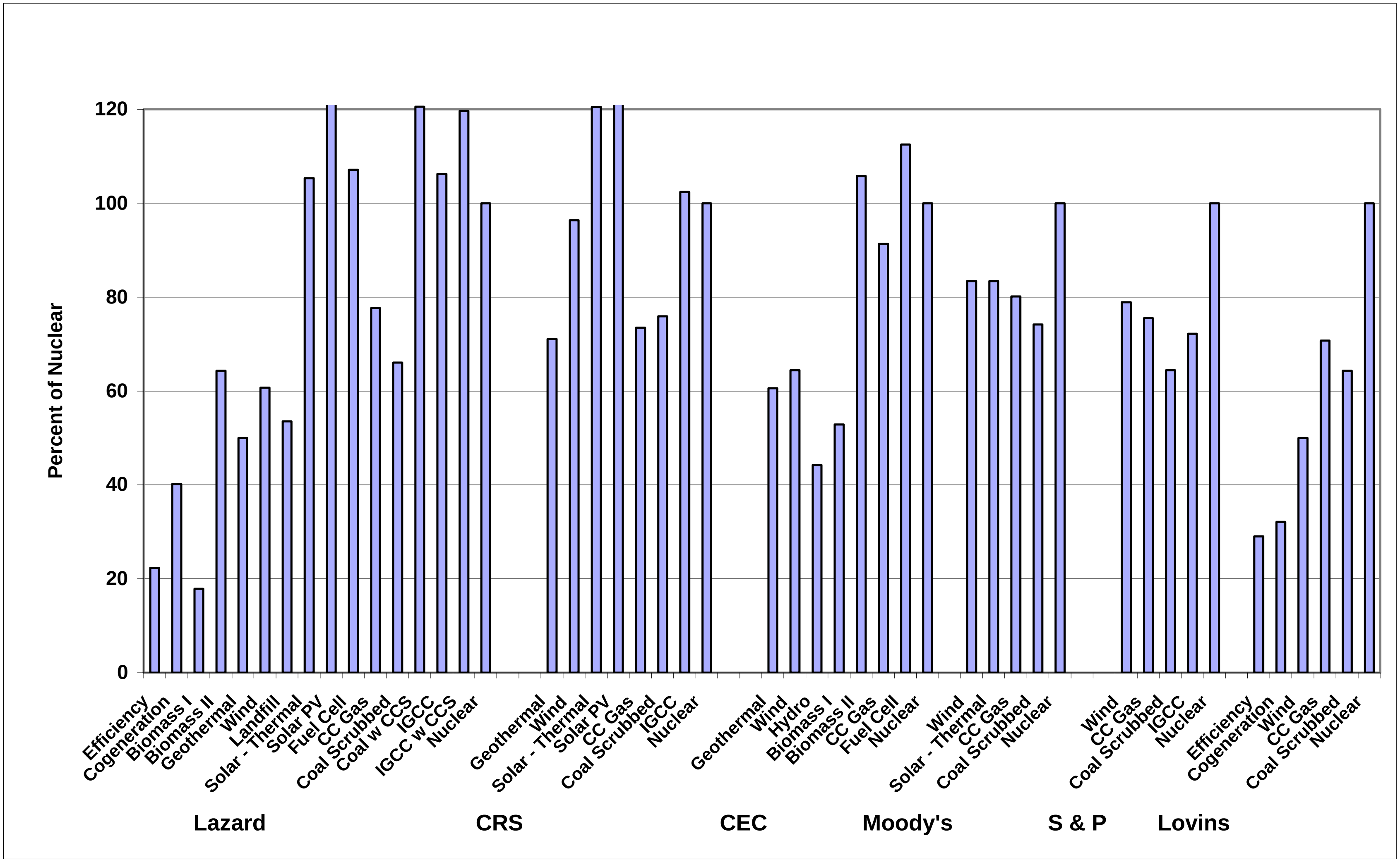


EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-6
Page 2 of 3.

ESTIMATES OF COSTS OF ALTERNATIVES TO MEET ELECTRICITY NEEDS

(Arranged by Technology; Nuclear Reactor Costs = 100%)

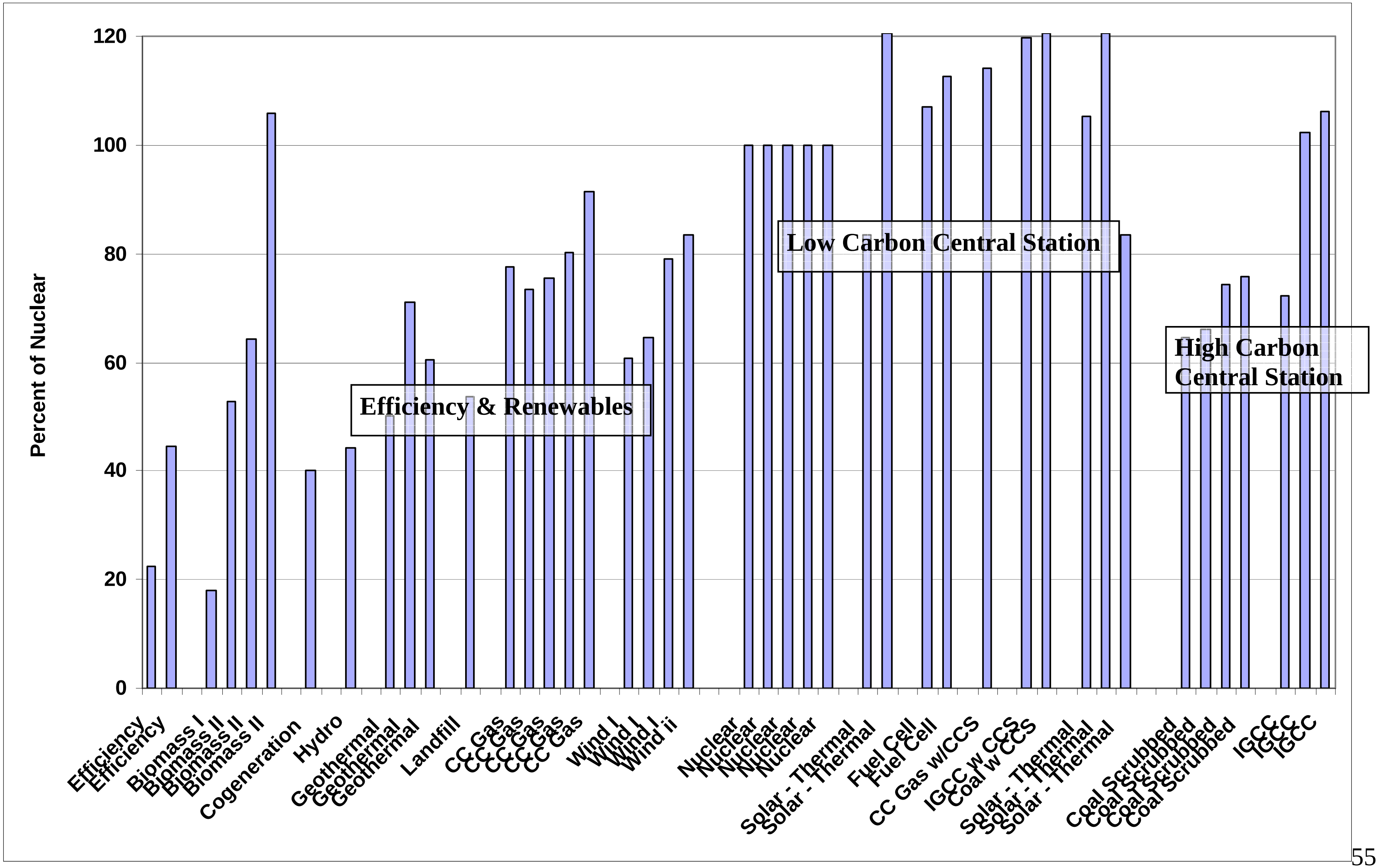
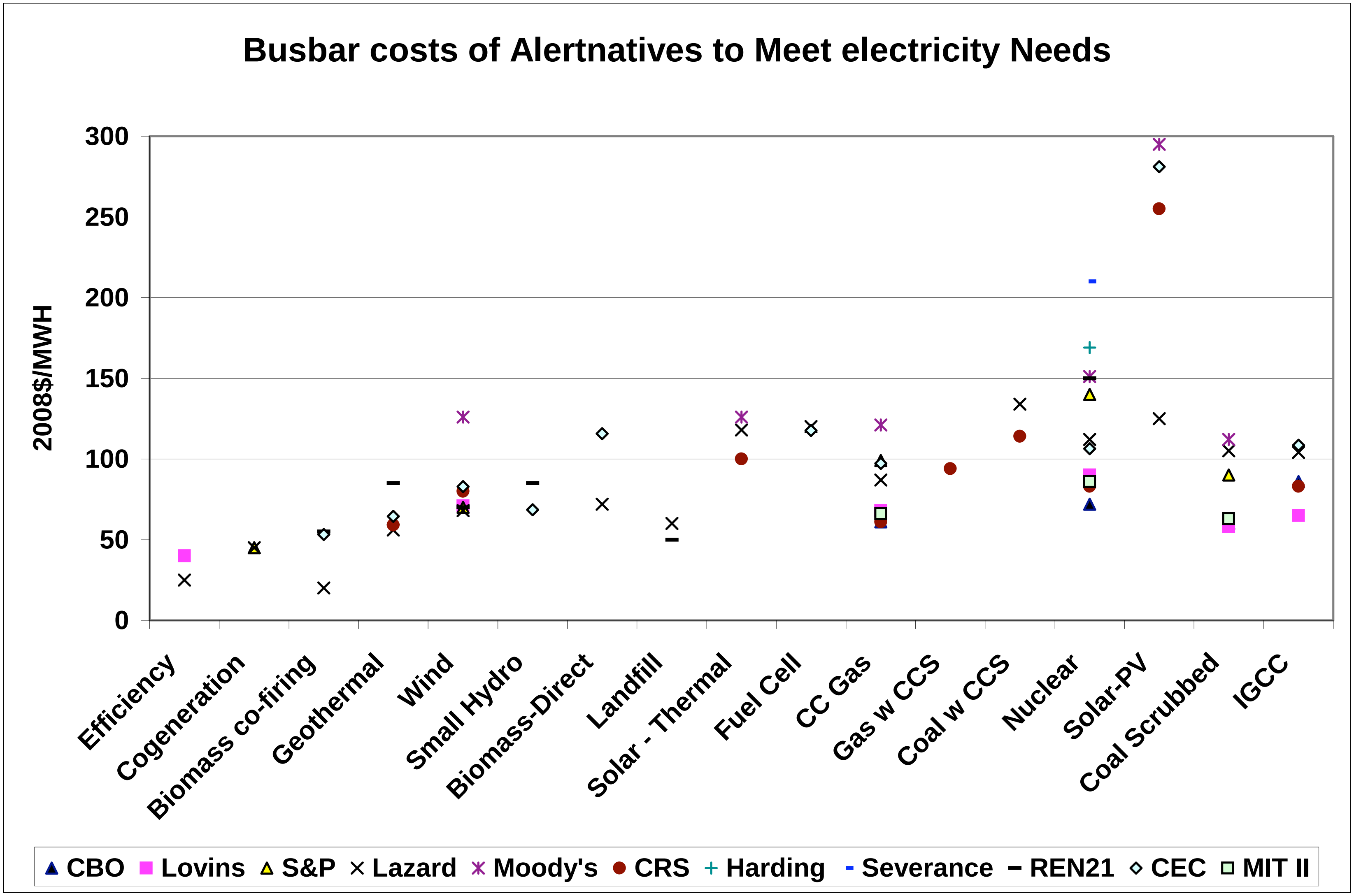


EXHIBIT 30

ESTIMATES OF COSTS OF ALTERNATIVES TO MEET ELECTRICITY NEEDS



Busbar costs of Alertnatives to Meet electricity Needs

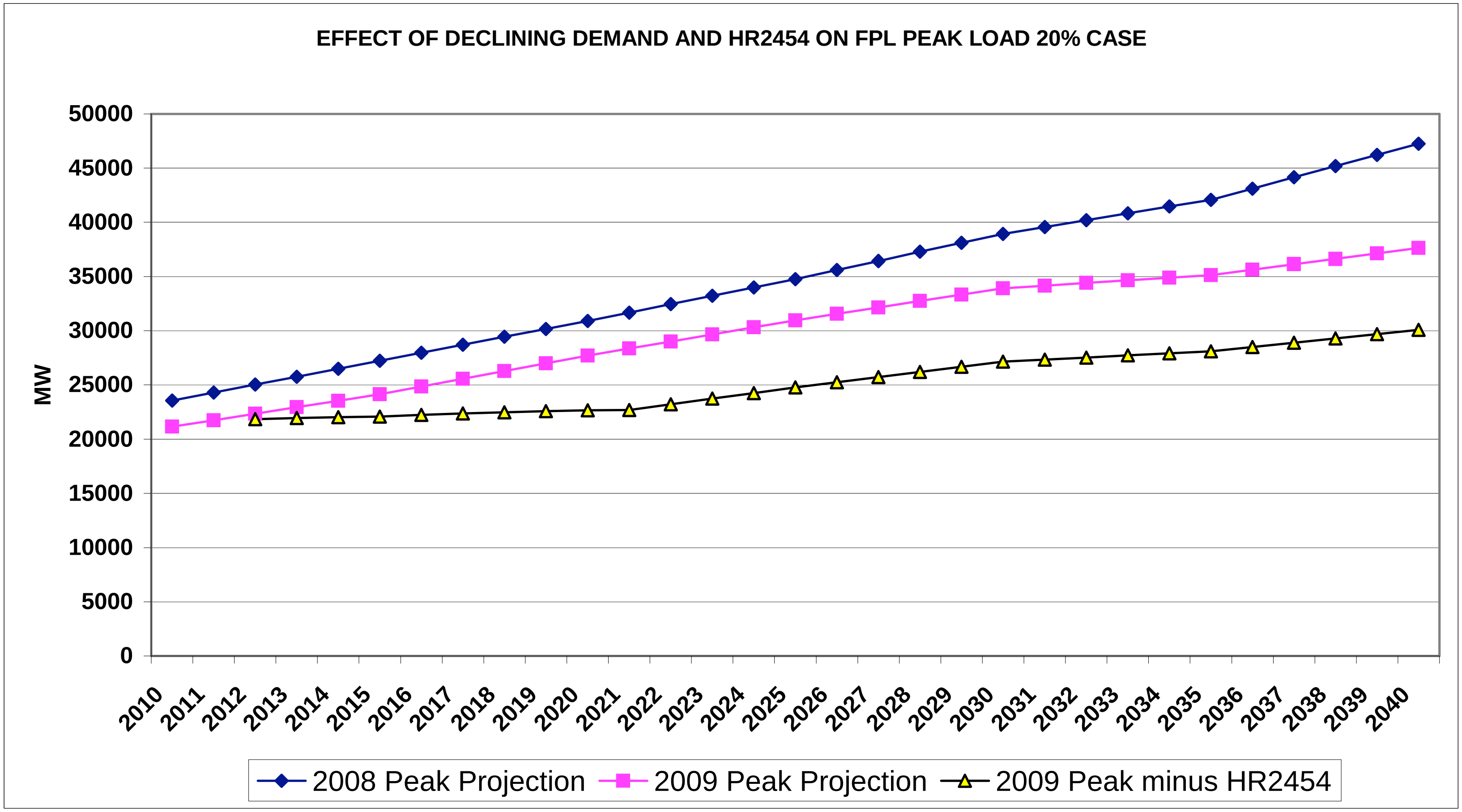
EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-6
Page 4 of 4
ESTIMATES OF COSTS OF ALTERNATIVES TO MEET ELECTRICITY NEEDS

Sources: Congressional Budget Office, 2008, *Nuclear Power's Role in Generating Electricity*, May 2008, p.13; Kaplan, Stan, 2008, *Power Plants: Characteristics and Costs*, Congressional Research Service, November 13, 2008, Appendix B; Deutch, John, M. et al., 2009, *Update of the MIT 2003 Future of Nuclear Power*, MIT Energy Initiative, 2009; p. 6; Du Yangbo and John E. Parsons, 2009, *Update on the Cost of Nuclear Power, Center* for Energy and Environmental Policy Research, May 2009, MIT II; Joel Klein, 2007,Comparative *Costs of California Central Station Electricity Generation Technologies Cost of Generation Model*, ISO Stakeholders Meeting Interim Capacity Procurement Mechanisms, October 15, 2007, p. 14; Lazard, 2008, *Levelized Cost of Energy Analysis—Version 2.0*, June 2008, p. 10; **Lovins Amory, and Imran Shiekh, and Alex Markevich, 2008b, *Nuclear Power: Climate Fix or Folly?*, December 31, 2008.**Draft, p. 2; Moody's, 2008, New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities, May 2008, p. 15; **Renewable Energy Policy Network for the 21st century, 2008, *Renewables 2007: Global Status Report,* 2008; Severance, Craig A. 2009, *Business Risks and Costs of New Nuclear Power*, January 2, 2009;** Standard and Poors, 2008b, *Assessing the Credit Risk of Competing Technologies for New U.S. Nuclear Power Plants*, August 13, 2008, p. 11.

EXHIBIT 30

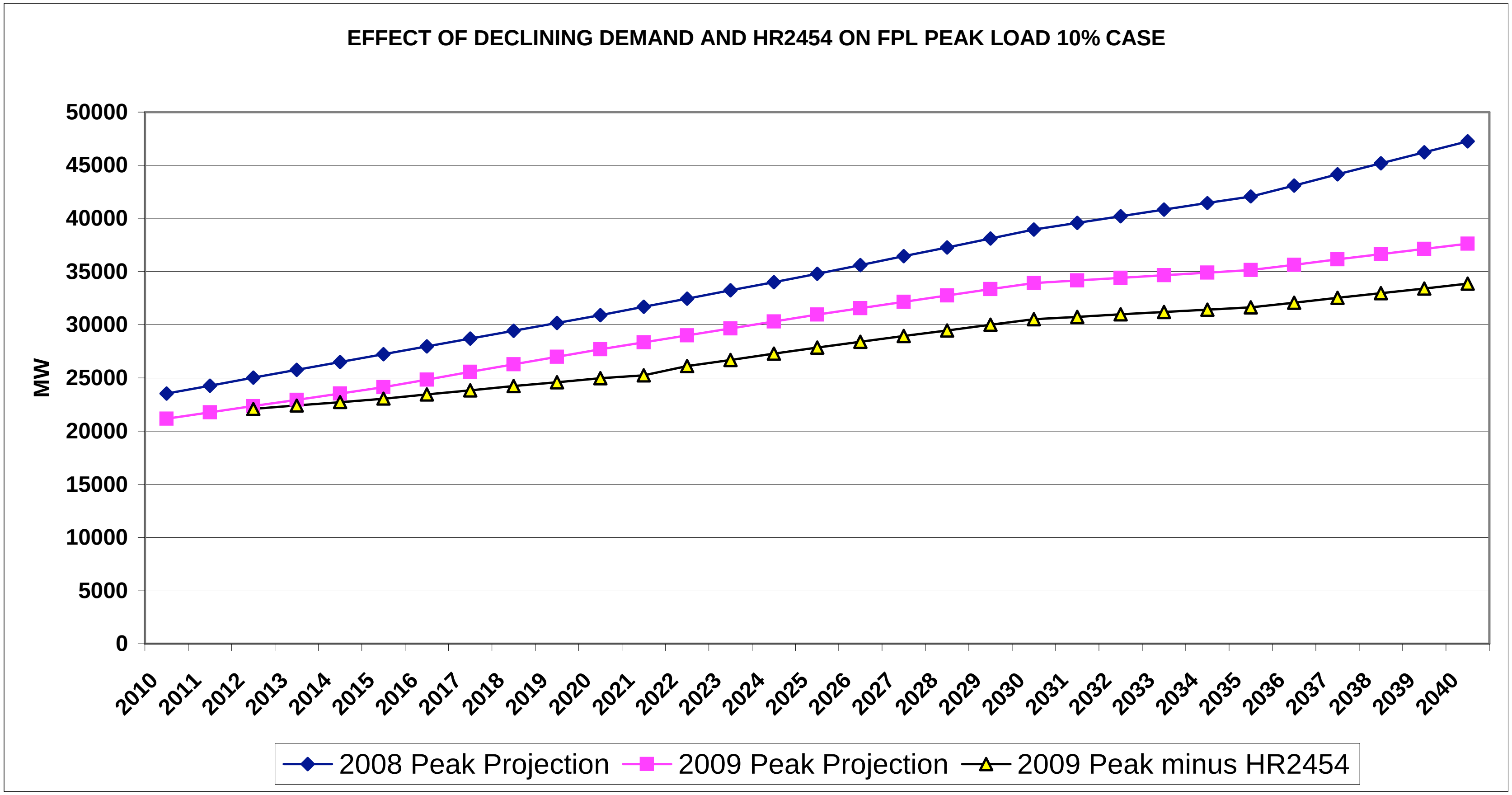
Docket No. 090009-EI
Exhibit MNC-7
Page 1 of 1
IMPACT OF CLIMATE POLICY ON PEAK LOAD: FPL



Source: Direct Testimony of Steven R. Sims, Docket No. 090009-EI, SRS-1; linear interpolation of five-year interval data. H.R. 2454 is set at 20% below 2009 Peak Projection

EXHIBIT 30

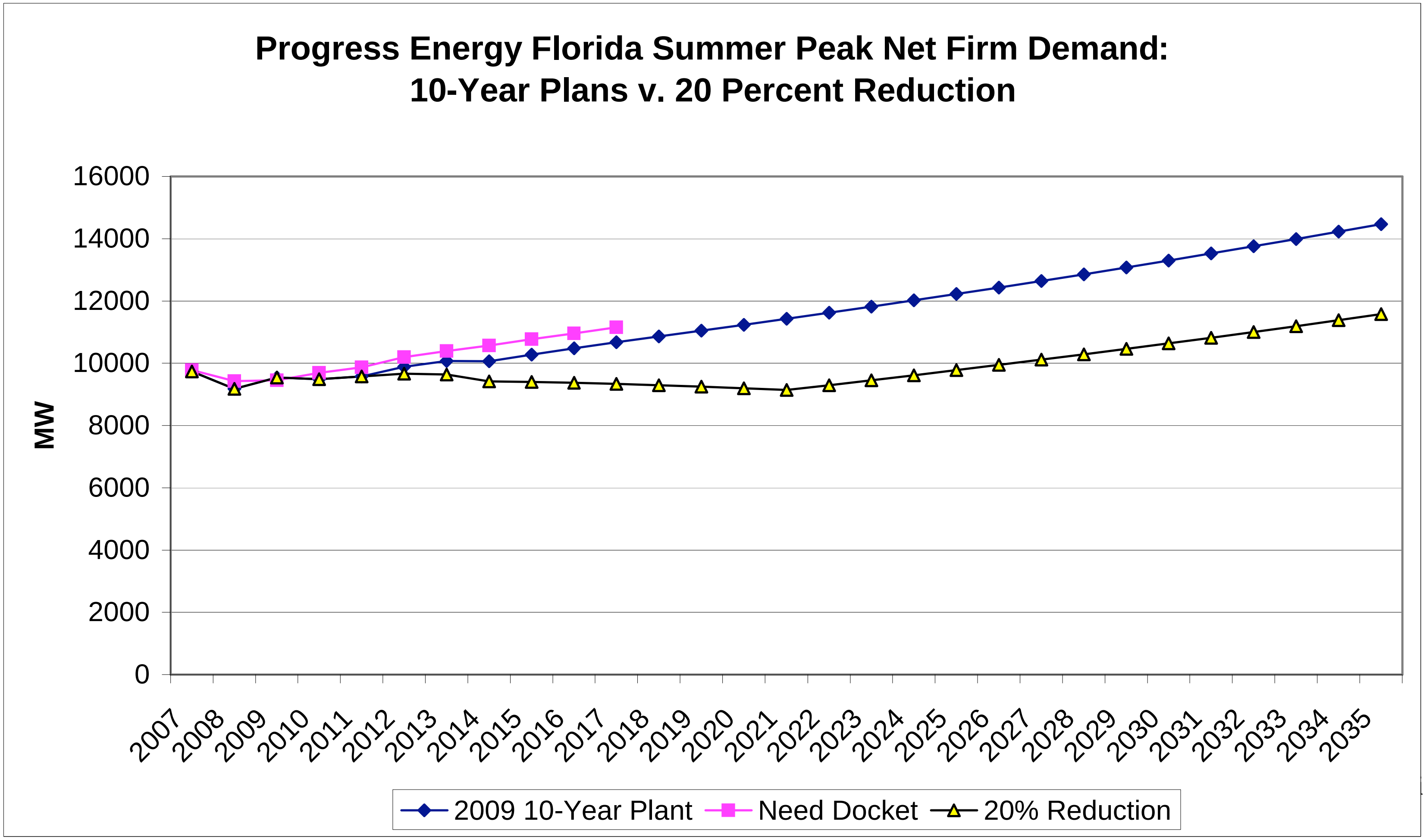
Docket No. 090009-EI
Exhibit MNC-7
Page 2 of 2
IMPACT OF CLIMATE POLICY ON PEAK LOAD: FPL



Source: Direct Testimony of Steven R. Sims, Docket No. 090009-EI, SRS-1; linear interpolation of five-year interval data. H.R. 2454 is set at 20% below 2009 Peak Projection

EXHIBIT 30

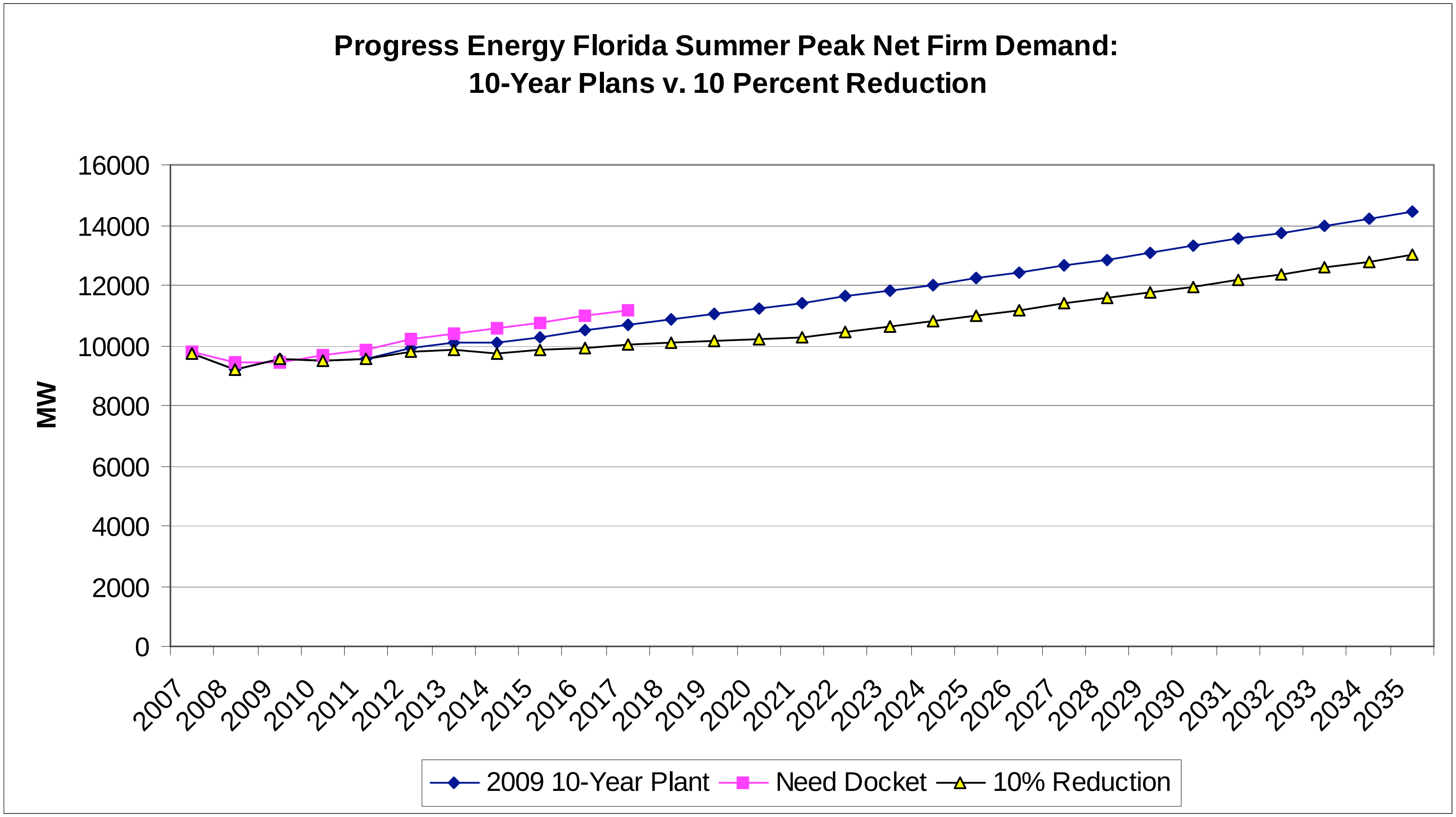
Docket No. 090009-EI
Exhibit MNC-8
Page 1 of 2
IMPACT OF CLIMATE POLICY ON PEAK LOAD: PROGRESS



-6.
on

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-8
Page 2 of 2
IMPACT OF CLIMATE POLICY ON PEAK LOAD: PROGRESS



Source: 2008 10-year plan, p. 2-7; 2009 10-year plan, p. 2-6.
H.R. 2454 set at 20% of projection

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-9
Page 1 of 2

ESTIMATES OF NUCLEAR REACTOR OVERNIGHT, COSTS: 2001-20089

(2008$ derived with the GDP deflator)

Original Estimate	Date of Estimate	Source of Estimate	Overnight Cost kW		
			Low	Mid	High
SAIC	2001	U of C	2300	2300	2300
SAIC	2001	U of C	1840	1840	1840
SAIC	2001	U of C	1570	1570	1570
SAIC	2001	U of C	1295	1295	1295
Scully	2002	U of C	1434	1434	1674
Sandia	2002	U of C	2131	2131	2131
EIA	2003	U of C	215	2015	2217
EIA	2003	U of C	1241	1563	1784
MIT	2003	MIT	1175	2350	
U of C	2004	U of C	1380	1725	2070
TVA	2005	TVA		1853	
CEC	2007	CEC		3021	
Keystone	2007	Keystone	3018		3018
Harding	2007	Harding		3329	
South Texas 3&4	2007	CRS	2931	3214	3754
Turkey Point 3&4	2007	FPL	3179	3678	4644
Calvert 3	2007	CRS		5778	
Levy 1&2	2008	CRS		4260	
Summer 2&3	2008	CRS		4387	
Vogtle	2008	GA PUC		4381	
Callaway 1	2008			4250	
Duke	2008	Lovins		4800	
S&P	2008	S & P		4100	
EIA	2008	EIA		3400	
CRS	2008	CRS		3900	
CBO	2008	CBO		2358	
Lazard	2008	Lazard	3750		5250
Moody's	2008	Moody's		6250	
Severance	2008	Severance	3596	4070	
MIT II	2009	MIT		4092	
Bell Bend	2009	PPL			9375
Harding - Medium	2009	Harding 09	5524	7263	9217
Harding -	2009	Harding	6189	8184	10383

EXHIBIT 30

High		09			

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-12
Page 2 of 2

ESTIMATES OF NUCLEAR REACTOR OVERNIGHT, COSTS: 2001-20089

Sources: Congressional Budget Office, 2008, *Nuclear Power's Role in Generating Electricity*, May 2008, p.13; Deutch, John, M. et al., 2009, *Update of the MIT 2003 Future of Nuclear Power*, MIT Energy Initiative, 2009; p. 6; Du Yangbo and John E. Parsons, 2009, *Update on the Cost of Nuclear Power, Center* for Energy and Environmental Policy Research, May 2009. Energy Information Administration, 2009, "Electricity Market Module," *Annual Energy Outlook,* March 2009, p. 89. **Harding, Jim, 2007, "Economics of Nuclear Power and Proliferation Risks in a Carbon-constrained World,"** ***Public Utilities Fortnightly,*** **December 2007, p. 71;Harding, Jim, 2009, Economics of Nuclear Reactors and Alternatives, Carnegie/NPEC Conference, February 2009; p. 7; Joskow, Paul, 2006,** ***Prospects for Nuclear Power a U.S. Perspective,*** **May 19, 2006; Kaplan, Stan, 2008,** ***Power Plants: Characteristics and Costs,*** **Congressional Research Service, November 13, 2008, Appendix B.; Keystone Center, 2007,** ***Nuclear Power Joint Fact-Finding,*** **June 2007, p. 42; Joel Klein, 2007,Comparative** ***Costs of California Central Station Electricity Generation Technologies Cost of Generation Model,*** **ISO Stakeholders Meeting Interim Capacity Procurement Mechanisms, October 15, 2007, p. 14; Lazard, 2008,** ***Levelized Cost of Energy Analysis—Version 2.0,*** **June 2008, p. 10; Lovins Amory, and Imran Shiekh, and Alex Markevich, 2008b,** ***Nuclear Power: Climate Fix or Folly?,*** **December 31, 2008, Draft, p. 2; MIT, 2003** ***The Future of Nuclear Power,*** **2003, p. 42; Moody's, 2008, New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities, May 2008, p. 15; Schlissel, David and Bruce Biewald, 2008,** ***Nuclear Power Plant Construction Costs,*** **Synapse, July 2008, p. 2; Severance, Craig A. 2009,** ***Business Risks and Costs of New Nuclear Power,*** **January 2, 2009; Standard and Poors, 2008b,** ***Assessing the Credit Risk of Competing Technologies for New U.S. Nuclear Power Plants,*** **August 13, 2008, p. 11; Tennessee Valley Authority, 2005, ABWR Cost/Schedule/COL Project at TVA's Bellafonte Site, August 2005, p. I-7; University of Chicago, 2004,** ***The Economic Future of Nuclear Power: A Study Conducted*** **at the University of Chicago, August 2004.**

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-10
Page 1 of 3

NUCLEAR OPERATORS, REACTOR CANCELLATIONS AND MOODY'S DOWNGRADES

Operator	Current Operator	Cancelled Plant	Moody's Downgrade	Period	Highest Grade	Lowest Grade	Ranks Moved
Alabama Power & Light		1	1	1975-1987	A2 FMB	Baa3	4
Amerern/Union electric	1						
Indiana Michigan/AEP	1		1	1973-1979	A2 FMB	Baa2	3
Arizona Public Service Co.	1	1	1	1981-1993	A2 FMB	Baa3	4
Baltimore Gas & Electric Co./Constellation	1	1	1	1974-1979	A2 FMB	A2	--
Boston Edison Co.		1					
Carolina Power & Light Co.	1	1					
Central Maine Power		1					
Cincinnati Gas & Electric Co.		1					
Cleveland Electric Illuminating. Co./First Energy	1	1	1	1981-1993	Aa2 FMB	Baa3	7
Commonwealth Edison Co./Exelon	1		1	1968-1990	Aa2 FMB	Baa1	5
Connect. Power & Light		1		1972-1978	Aa2 FMB	A2	3
Consolidated Edison Co.		1	1	1972-1978	A2 FMB	Baa2	3
Consumers Power Co.		1	1	1969-1974	Aaa FMB	Aa2	2
Delmarva Power & Light Co.		1					
Detroit Edison Co.	1	1	1	1985-1992	Baa1 SS	Baa2	1
Duke Power Co.	1	1					
Duquesne Power			1	1974-1988	Aa2 FMB	Baa2	6
Florida Power & Light Co.	1	1	1	1972-1984	Aa2 FMB	A2	3
Florida Power Corp.		1					
Georgia Power Co./Southern Company	1	1	1	1975-1990	Baa2 FMB	Baa2	--
Gulf States Utilities Co./Entergy		1		1980-1988	A2 FMB	Ba3	7

EXHIBIT 30

Houston Lighting & Power Co.		1	1	1987-1994	A2 FMB	A3	1
Illinois Power Co/Amergen	1	1	1	1984-1989	A2 FMB	Baa3	4
Iowa Power & Light Co.		1		1973-1977	Aa2 FMB	Baa2	6
Jersey Central Power & Light Co./First Energy		1	1	1968-1980	A2 FMB	Ba2	6
Kansas City G & E				1982-1986	Baa2 FMB	Baa3	1
Long Island Lighting Co.		1	1	1972-1990	Aa2 FMB	B2	12
Metropolitan Edison/Amergen	1		1	1973-1984	A2 FMB	B2	9
Louisiana Power & Light/Entergy	1	1	1	1983-1988	Baa3 FMB	Ba2	2
New England Power Co.		1	1	1971-1992	Aa2 FMB	A1	2
Niagara Mohawk			1	1968-1988	Aaa FMB	Baa2	8
New York State Electric & Gas		1					
Northeast Nuclear Energy Co.		1	1				
Northern Indiana Public Service Co.		1		1973-1985	Aa2 FMB	Baa2	6
Northern States Power Co.		1		1970-1976	Aa2 FMB	Aa2	--
Nuclear Management Company	1						
Ohio Edison Co./First Energy	1	1	1				
Pacific Gas & Electric Co.	1	1	1	1983-1988	A1 FMB	A1	--
Philadelphia Electric Co.		1	1	1973-1991	Aaa FMB	Baa3	9
PPL	1			1982-1986	Aa2 FMB	A2	3
Portland General Electric Co.		1					
Potomac Electric Power Co.		1					
Power Authority of the State of New York		1					
Progress FLA	1			1975-1981	A2 FMB	A2	--
Progress Carolina	1			1970-1987	Aa2 FMB	Baa2	6
Public Service Colorado			1	1976-1990	Aa2 FMB	A3	4
Public Service Co. of New Hampshire		1	1	1980-1991	Baa2 FMB	Caa2	9
Public Service Company of Oklahoma		1					
Public Service Electric & Gas Co.	1	1	1	1973-1987	Aa2 FMB	Aa3	1
Public Service of Indiana		1					
Puerto Rico Water Resources Authority		1					

EXHIBIT 30

Puget Sound Power & Light Co.		1	1	1978-1986	Baa2 FMB	A3	2
Rochester Gas & Electric Corp.		1	1	1969-1975	Aa2 FMB	A2	3
San Diego Gas & Electric Co.		1					
SC Electric & Gas			1	1979-1985	A2 FMB	A1	1
Southern Company	1						
Southern California Edison Co.	1	1	1	1979-1985	Aa2 FMB	Aa2	--
System Energy Resources Inc.		1					
Tennessee Valley Authority		1					
TXU	1						
Toledo Edison Co./First Energy	1	1	1				
Union Electric Co.		1	1				
Virginia Electric & Power Co./dominion	1	1	1				
Wisconsin Electric Power Co.		1	1				
Woolf	1						
Total Unique	22	50	35				

Source: Moody's "New Nuclear Generation: Ratings Pressure Increasing," Special Comment, June 2009; pp. 11-12; Cancelled plants are from http://clonemaster.homestead.com/files/cancel.htm; Current owners from http://www.nei.org/resourcesandstats/documentlibrary/reliableandaffordableenergy/graphicsandcharts/usnuclearpowerplantownersoperatorsandholdingcompanies/; as Moody's only rated investor owned utility reactors owned or cancelled by rural co-ops of munis are not included.

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-11
STANDARD AND POOR'S CREDIT PROFILE CONSIDERATIONS

Business risk profile

- New Technology Risk ⇧
- Construction Risk ⇧
- How much risk is mitigated by EPC contract? ⇧⇩
- Nuclear operating exposure will increase ⇧
- Regulatory framework for recovery of investment ⇧

Financial risk Profile

- Debt imputation: 25% for projects vs. 50% for regulated utilities ⇧
- Even with DOE guarantee, debt loads can increase significantly ⇧
- 80/20 vs. 60/40 capital structure ⇧
- Despite DOE guarantee, debt service will be fully accounted for ⇧
- Ability to recover cash return on work in progress ⇩

Source: Dimitri Mikas, "Financing New Nuclear Construction & Implications for Credit Quality," *Is there a Nuclear Renaissance,* p. 20 Standard and Poor's May 28, 2009, arrows point in the direction of the impact on risk

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-12
Page 1 of 1

DIVERSITY OF RESOURCE UNDER VARIOUS TECHNOLOGY SCENARIOS

Resource	FPL No Nuclear % of total	Gas % of total	Efficiency % of total	PEF No Nuclear % of total	Gas % of total	Efficiency % of total
Coal	6.95	6.95	5.91	24	20	20.4
Gas	73.70	70.00	62.65	56	36	47.6
Oil	1.75	1.95	1.49	5	3	4.25
Nuclear	17.30	20.80	14.71	12	38	10.2
Other	0.30	0.30	7.00	3	3	8
Efficiency			8.00			9
HHI	5782	5385	4290	3890	3158	2949

Source: FPL, average of scenarios at FPL Need Study for electrical Power Docket No. 07-0650, p. 117, PEF: Testimony of John Benjamin Crisp, Docket No. 080148-EI, JBC-8, page 1 of 1;

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-13
Page 1 of 1

THE $1/KW COST FACTOR

Total Cost Diff. 2007	Break Even Cost 2007	Implicit $1/kW Factor 2007	Total Cost Diff. 2009	Break Even Cost 2009	Implicit $1/kW Factor 2009	2009 Breakeven @2007 Factor	Factor Change as % of Break even change
6325	3206	1.972863	9909	5234	1.893198	5022.649	10.42165
8965	4543	1.973366	11943	6308	1.89331	6052.097	14.49876
9994	5065	1.973149	12892	6810	1.893098	6533.718	15.83277
10512	5327	1.973343	14352	7581	1.893154	7272.936	13.66743
11207	5680	1.973063	15334	8099	1.89332	7771.671	13.53157
12148	6157	1.973039	13981	7385	1.893162	7086.024	24.3466
13222	6701	1.973138	14965	7905	1.893106	7584.364	26.63087
13711	6949	1.97309	16377	8650	1.893295	8300.18	20.56553
14367	7281	1.973218	17415	9199	1.893141	8825.685	19.46377

Source: Testimony of Steven R. Sims, Docket No. 070650-EI, Exhibits SRS-7 and SRS-8; Direct Testimony of Steven R. Sims, Docket No. 090009-EI, Table 45

EXHIBIT 30

Docket No. 090009-EI
Exhibit MNC-14
Page 1 of 1

THE NARROW MARGIN IN FPL’S BREAKEVEN ANALYSIS

Nuclear w/o Capital	Capital Cost (Case A)	No Nuclear Gas	Nuclear advantage % of Gas
122528	131940	132437	0.4
143521	152933	155464	1.6
153171	162583	166063	2.1
168265	177677	182617	2.7
164719	174131	190583	8.6
175249	184661	178700	-3.3
174367	183779	189332	2.9
189638	199050	206015	3.4
196670	206082	214085	3.7

**Source: Direct Testimony of Steven R. Sims, Docket No. 090009-EI, Table 45;
Capital costs calculated as Case A multiplied by $1/kW cost factor.**

EXHIBIT 30

APPENDIX A
CV OF DR. MARK COOPER WITH ENERGY RELATED ACTIVITIES

MARK N. COOPER
504 HIGHGATE TERRACE
SILVER SPRING, MD 20904
(301) 384-2204
markcooper@aol.com

EDUCATION:

Yale University, Ph.D., 1978, Sociology

University of Maryland, M.A., 1974, Sociology

City College of New York, B.A., 1968, English

PROFESSIONAL EXPERIENCE:

President, Citizens Research, 1983 - present

Senior Fellow for Economic Analysis, Institute for Energy and the Environment, Vermont Law School - Present

Research Director, Consumer Federation of America, 1983 - present

Fellow, Stanford Center on Internet and Society, 2000 - Present

Fellow, Donald McGannon Communications Research Center, Fordham University, 200 5-present

Director, Digital Society Project, Consumer Federation of America, 2002 - Present

Associated Fellow, Columbia Institute on Tele-Information, 2003-2006

Principle Investigator, Consumer Energy Council of America, Electricity Forum, 1985-1994

Director of Energy, Consumer Federation of America, 1984-1986

Director of Research, Consumer Energy Council of America, 1980-1983

Consultant, Office of Policy Planning and Evaluation, Food and Nutrition Service, United States Department of Agriculture, 1981-1984

Consultant, Advanced Technology, Inc., 1981

Technical Manager, Economic Analysis and Social Experimentation Division, Applied Management Sciences, 1979

EXHIBIT 30

Research Associate, American Research Center in Egypt, 1976-1977

Research Fellow, American University in Cairo, 1976

Staff Associate, Checchi and Company, Washington, D.C., 1974-1976

Consultant, Division of Architectural Research, National Bureau of Standards, 1974

Consultant, Voice of America, 1974

Research Assistant, University of Maryland, 1972-1974

TEACHING EXPERIENCE:

Lecturer, Washington College of Law, American University, Spring, 1984 - 1986, Seminar in Public Utility Regulation

Guest Lecturer, University of Maryland, 1981-82, Energy and the Consumer, American University, 1982, Energy Policy Analysis

Assistant Professor, Northeastern University, Department of Sociology, 1978-1979, Sociology of Business and Industry, Political Economy of Underdevelopment, Introductory Sociology, Contemporary Sociological Theory; College of Business Administration, 1979, Business and Society

Assistant Instructor, Yale University, Department of Sociology, 1977, Class, Status and Power

Teaching Assistant, Yale University, Department of Sociology, 1975-1976, Methods of Sociological Research, The Individual and Society

Instructor, University of Maryland, Department of Sociology, 1974, Social Change and Modernization, Ethnic Minorities

Instructor, U.S. Army Interrogator/Linguist Training School, Fort Hood, Texas, 1970-1971

PROFESSIONAL ACTIVITIES:

Member, Advisory Committee on Appliance Efficiency Standards, U.S. Department of Energy, 1996 - 1998

Member, Energy Conservation Advisory Panel, Office of Technology Assessment, 1990-1991

Fellow, Council on Economic Regulation, 1989-1990

Member, Increased Competition in the Electric Power Industry Advisory Panel, Office of Technology Assessment, 1989

Participant, National Regulatory Conference, The Duty to Serve in a Changing Regulatory Environment, William and Mary, May 26, 1988

Member, Subcommittee on Finance, Tennessee Valley Authority Advisory Panel of the Southern States Energy Board, 1986-1987

EXHIBIT 30

Member, Electric Utility Generation Technology Advisory Panel, Office of Technology Assessment, 1984 - 1985

Member, Natural Gas Availability Advisor Panel, Office of Technology Assessment, 1983-1984

Participant, Workshop on Energy and the Consumer, University of Virginia, November 1983

Participant, Workshop on Unconventional Natural Gas, Office of Technology Assessment, July 1983

Participant, Seminar on Alaskan Oil Exports, Congressional Research Service, June 1983

Member, Thermal Insulation Subcommittee, National Institute of Building Sciences, 1981-1982

Round Table Discussion Leader, The Energy Situation: An Open Field For Sociological Analysis, 51st Annual Meeting of the Eastern Sociological Society, New York, March, 1981

Member, Building Energy Performance Standards Project Committee, Implementation Regulations Subcommittee, National Institute of Building Sciences, 1980-1981

Participant, Summer Study on Energy Efficient Buildings, American Council for an Energy Efficient Economy, August 1980

Member, University Committee on International Student Policy, Northeastern University, 1978-1979

Chairman, Session on Dissent and Societal Reaction, 45th Annual Meeting of the Eastern Sociological Society, April, 1975

Member, Papers Committee, 45th Annual Meeting of the Eastern Sociological Society, 1975

Student Representative, Programs, Curricula and Courses Committee, Division of Behavioral and Social Sciences, University of Maryland, 1973-1974

President, Graduate Student Organization, Department of Sociology, University of Maryland, 1973-1974

HONORS AND AWARDS:

American Sociological Association, Travel Grant, Uppsala, Sweden, 1978

Fulbright-Hayes Doctoral Research Abroad Fellowship, Egypt, 1976-1977

Council on West European Studies Fellowship, University of Grenoble, France, 1975

Yale University Fellowship, 1974-1978

Alpha Kappa Delta, Sociological Honorary Society, 1973

Phi Delta Kappa, International Honorary Society, 1973

Graduate Student Paper Award, District of Columbia Sociological Society, 1973

EXHIBIT 30

Science Fiction Short Story Award, University of Maryland, 1973

Maxwell D. Taylor Award for Academic Excellence, Arabic, United States Defense Language Institute, 1971

Theodore Goodman Memorial Award for Creative Writing, City College of New York, 1968

New York State Regents Scholarship, 1963-1968

National Merit Scholarship, Honorable Mention, 1963

PUBLICATIONS:

ENERGY

Books and Chapters

"Recognizing the Limits of Markets, Rediscovering Public Interest in Utilities," in Robert E. Willett (ed), Electric and Natural Gas Business: Understanding It! (2003 and Beyond) (Houston: Financial Communications: 2003)

"Protecting the Public Interest in the Transition to Competition in New York Industries," The Electric Utility Industry in Transition (Public Utilities Reports, Inc. & the New York State Energy Research and Development Authority, 1994)

"The Seven Percent Solution: Energy Prices, Energy Policy and the Economic Collapse of the 1970s," in Energy Concerns and American Families in the 1980s (Washington, D.C.: The American Association of University Women Educational Foundation, 1983)

"Natural Gas Policy Analysis," in Edward Mitchell (Ed.), Natural Gas Pricing Policy (Washington, D.C.: American Enterprise Institute, 1983)

Equity and Energy: Rising Energy Prices and the Living Standard of Lower Income Americans (Boulder, Colorado: Westview Press, 1983)

Articles and Papers:

"The Failure of Federal Authorities to Protect American Energy Consumers From Market Power and Other Abusive Practices," *Loyola Consumer Law Review,* 19:4 (2007)

"Too Much Deregulation or Not Enough," *Natural Gas and Electricity*, June 2005

"Real Energy Crisis is $200 Billion Natural Gas Price Increase," Natural Gas and Electricity, August 2004

"Regulators Should Regain Control to Prevent Abuses During Scarcity," Natural Gas, August 2003

"Economics of Power: Heading for the Exits, Deregulated Electricity Markets Not Working Well," *Natural Gas,* 19:5, December 2002

"Let's Go Back," Public Power, November-December 2002

EXHIBIT 30

"Conceptualizing and Measuring the Burden of High Energy Prices," in Hans Landsberg (Ed.), High Energy Costs: Assessing the Burden (Washington, D.C.: Resources For the Future, 1982)

"Energy Efficiency Investments in Single Family Residences: A Conceptualization of Market Inhibitors," in Jeffrey Harris and Jack Hollander (Eds.), Improving Energy Efficiency in Buildings: Progress and Problems (American Council for An Energy Efficient Economy, 1982)

"Policy Packaging for Energy Conservation: Creating and Assessing Policy Packages," in Jeffrey Harris and Jack Hollander (Eds.), Improving Energy Efficiency in Buildings: Progress and Problems (American Council for An Energy Efficient Economy, 1982)

"The Role of Consumer Assurance in the Adoption of Solar Technologies," International Conference on Consumer Behavior and Energy Policy, August, 1982

"Energy and the Poor," Third International Forum on the Human Side of Energy, August, 1982

"Energy Price Policy and the Elderly," Annual Conference, National Council on the Aging, April, 1982

"Energy and Jobs: The Conservation Path to Fuller Employment," Conference on Energy and Jobs conducted by the Industrial Union Department of the AFL-CIO, May 1980

Research Reports

A Consumer Analysis of the Adoption of the California Clean Cars Program in Other States: Florida, Consumer Federation of America, November 2008

Climate Change and the Electricity Consumer: Background Analysis to Support a Policy Dialogue, Consumer Federation of America, June 2008

Ending America's Oil Addiction: A Quarterly Report on Consumption, Prices and Imports, Consumer Federation of America, April 2008

A Consumer Analysis of the Adoption of the California Clean Cars Program in Other States: Arizona, Consumer Federation of America, March 2008

A Step Toward A Brighter Energy Future, Consumer Federation of America, December 2007

A Consumer Analysis of the Adoption of the California Clean Cars Program in Other States: New Mexico, Consumer Federation of America, November 2007

Not time to Waste: America's Energy Situation Is Dangerous, But Congress Can Adopt New Policies to Secure Our Future, Consumer Federation of America, October 2007

Technology, Cost and Timing, Consumer Federation of America, July 2007

Florida's Stake in the Fuel Economy Battle, July 2007

Big Oil v. Ethanol, Consumer Federation of America, July 2007

Too Little, Too Late: Why the Auto Industry Proposal To Go Low and Slow on Fuel Economy Improvements Is Not in the Consumer or National Interest, Consumer Federation of America, July 2007

EXHIBIT 30

The Senate Commerce Committee Bill Is Much Better For Consumers and The Nation Than the Automobile Industry Proposal, Consumer Federation of America, June 2007

Rural Households Benefit More From Increases In Fuel Economy, Consumer Federation of America, June 207

A Consumer Pocketbook And National Cost-Benefit Analysis of "10 in10", Consumer Federation of America, June 2007

Time to Change the Record on Oil Policy, Consumer Federation of America, August 2006

50 by 2030: Why $3.00 Gasoline Makes the 50-Miles Per Gallon Car Feasible, Affordable and Economic, Consumer Federation of America, (May 2006)

The Role of Supply, Demand, Industry Behavior and Financial Markets in the Gasoline Price Spiral (Prepared for Wisconsin Attorney General Peggy A. Lautenslager, May 2006)

Debunking Oil Industry Myths and Deception: The $100 Billion Consumer Rip-Off (Consumer Federation of America and Consumers Union, May 3, 2006)

The Role of Supply, Demand and Financial Markets in the Natural Gas Price Spiral (prepared for the Midwest Attorneys General Natural Gas Working Group: Illinois, Iowa, Missouri, Wisconsin, March 2006)

The Impact of Rising Prices on Household Gasoline Expenditures (Consumer Federation of America, September 2005)

Responding to Turmoil in Natural Gas Markets: The Consumer Case for Aggressive Policies to Balance Supply and Demand (consumer Federation of America, December 2004)

Record Prices, Record Oil Company Profits: The Failure Of Antitrust Enforcement To Protect American Energy Consumers (Consumer Federation of America, Consumers Union, September 2004)

Fueling Profits: Industry Consolidation, Excess Profits, & Federal Neglect: Domestic Causes of Recent Gasoline and Natural Gas Price Shocks (Consumer Federation of America and Consumers Union, May 2004)

Spring Break in the U.S. Oil Industry: Price Spikes, Excess Profits and Excuses (Consumer Federation of America, October 2003)

How Electricity Deregulation Puts Pressure On The Transmission Network And Increases It's Cost (Consumer Federation of America, Consumers Union and U.S. PIRG, August 2003)

A Discouraging Word (or Two, or Three, or Four) About Electricity Restructuring in Texas, Pennsylvania, New England and Elsewhere Consumer Federation of America, U.S. Public Interest Research Group and Consumers Union, March 2003)

All Pain, No Gain: Restructuring and Deregulation in the Interstate Electricity Market (Consumer Federation of America, September 2002)

EXHIBIT 30

U.S. Capitalism and the Public Interest: Restoring the Balance in Electricity and Telecommunications Markets (Consumer Federation of America, August 2002)

Electricity Deregulation and Consumers: Lesson from a Hot Spring and a Cool Summer (Consumer Federation of America, August 30, 2001)

Ending the Gasoline Price Spiral: Market Fundamentals for Consumer-Friendly Policies to Stop the Wild Ride (Consumer Federation of America, July 2001)

Analysis of Economic Justifications and Implications of Taxing Windfall Profits in the California Wholesale Electricity Market (Consumer Federation of America and Consumers Union, June 13, 2001)

Behind The Headlines Of Electricity Restructuring A Story Of Greed, Irresponsibility And Mismanagement Of A Vital Service In A Vulnerable Market (Consumer Federation of America, March 20, 2001)

Reconsidering Electricity Restructuring: Do Market Problems Indicate a Short Circuit or a Total Blackout? (Consumer Federation of America, November 30. 2000)

Mergers and Open Access to Transmission in the Restructuring Electric Industry (Consumer Federation of America, April 2000)

Electricity Restructuring and the Price Spikes of 1998 (Consumer Federation of America and Consumers Union, June 1999)

The Residential Ratepayer Economics of Electric Utility Restructuring (Consumer Federation of America, July 1998)

Consumer Issues in Electric Utility Restructuring (Consumer Federation of America, February 12, 1998)

A Consumer Issue Paper on Electric Utility Restructuring (American Association of Retired Persons and the Consumer Federation of America, January, 1997)

Transportation, Energy, and the Environment: Balancing Goals and Identifying Policies, August 1995

A Residential Consumer View of Bypass of Natural Gas Local Distribution Companies, February 1988

The National Energy Security Policy Debate After the Collapse of Cartel Pricing: A Consumer Perspective, January 1987

The Energy, Economic and Tax Effects of Oil Import Fees, October 25, 1985

The Bigger the Better: The Public Interest in Building a Larger Strategic Petroleum Reserve, June 12, 1984

The Consumer Economics of CWIP: A Short Circuit for American Pocketbooks, April, 1984

Public Preference in Hydro Power Relicensing: The Consumer Interest in Competition, April 1984

Concept Paper for a Non-profit, Community-based, Energy Services Company, November 1983

EXHIBIT 30

<u>The Consumer and Energy Impacts of Oil Exports</u>, April 1983

<u>Up Against the Consumption Wall: The Impact of Rising Energy Prices on Lower Income Consumers</u>, March 1983

<u>A Decade of Despair: Rising Energy Prices and the Living Standards of Lower Income Americans</u>, September 1982

<u>The Impact of Rising Energy Prices on the Delivery of Public Service by Local Governments</u>, August 1982

<u>The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South, and the Gulf Cost Region</u>, July, 1982

<u>A Comprehensive Analysis of the Impact of a Crude Oil Import Fee: Dismantling a Trojan Horse</u>, April 1982

<u>The Past as Prologue II: The Macroeconomic Impacts of Rising Energy prices, A Comparison of Crude Oil Decontrol and Natural Gas Deregulation</u>, March, 1982

<u>The Past as Prologue I: The Underestimation of Price Increases in the Decontrol Debate, A Comparison of Oil and Natural Gas</u>, February 1982

<u>Oil Price Decontrol and the Poor: A Social Policy Failure</u>, February 1982

<u>Natural Gas Decontrol: A Case of Trickle-Up Economics</u>, January 1982

<u>A Comprehensive Analysis of the Costs and Benefits of Low Income Weatherization and Its Potential Relationship to Low Income Energy Assistance</u>, June 1981

<u>Summary of Market Inhibitors</u>, February 1981

<u>Program Models and Program Management Procedures for the Department of Energy's Solar Consumer Assurance Network Project: A Rapid Feedback Evaluation</u>, February 1981

<u>An Analysis of the Economics of Fuel Switching Versus Conservation for the Residential Heating Oil Consumer</u>, October 1980

<u>Energy Conservation in New Buildings: A Critique and Alternative Approach to the Department of Energy's Building Energy Performance Standards</u>, April, 1980

<u>The Basics of BEPS: A Descriptive Summary of the Major Elements of the Department of Energy's Building Energy Performance Standards</u>, February, 1980

TESTIMONY:

FEDERAL AGENCIES AND COURTS

"Initial Comments of the Consumer Federation of America," Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity market Design, Federal Energy Regulatory Commission, Docket No. RM-01-12-000, October 15, 2002

EXHIBIT 30

"An Economic Explanation of Why the West and South Want to Avoid Being Infected by FERC's SMD and Why Market Monitoring is Not an Effective Cure for the Disease," SMD Market Metrics Conference, Federal Energy Regulatory Commission, October 2, 2002

"Motion To Intervene And Request For Rehearing Of The Consumer Federation Of America," before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Docket Nos. EL00-95-000 et al,

"Reply Comments of the Consumer Federation Of America," before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Docket Nos. EL00-95-000 et al,

"Consumer Federation Of America, Request For Reconsideration Regional Transmission Organizations," Federal Energy Regulatory Commission, Docket No. RM99-2-000; Order No. 2000, January 20, 2000

"Comments of the Consumer Energy Council of America Research Foundation," before the Environmental Protection Agency, 40 CFR Part 73, July 5, 1991

"Joint Comments of the Consumer Federation of America and the Environmental Action Foundation," Federal Energy Regulatory Commission, Dockets Nos. RM88-4, 5,6-000, July 18, 1988

"Comments of the Consumer Federation of America on the Initiation of National Security Investigations of Imports of Crude Oil and Refined Petroleum Products," Notice of Investigation Under Section 232 of the Trade Expansion Act of 1962, U.S. Department of Commerce, January 28, 1988

"Comments of the Consumer Federation of America on the Department of Energy's Study of the Impact of Falling Oil Prices on Crude Oil Production and Refining Capacity in the United States, U.S. Department of Energy, November 30, 1986

"Comments of the Consumer Federation of America on the Notice of Proposed Rule making Issued May 30, 1985," before the Federal Energy Regulatory Commission, Docket No. RM85-1-000 (Part A-D), July 15, 1985

"Utility Fuels, Inc. v. Burlington Northern Railroad Co., Fort Worth and Denver Ry. Co, and Atchison, Topeka and Santa Fe Ry. Co, before the Interstate Commerce Commission, Docket No. 39002, December 16. 1983, on Behalf of Utility Fuels, Inc.

"In the Matter of Coal Rate Guidelines -- Nationwide, ExParte No. 347 (Sub No. 1)," before the Interstate Commerce Commission, July 28, 1983

"Federal Energy Conservation Programs," before the United States Environmental Protection Agency, July 14, 1981

"Building Energy Performance Standards," before the Department of Energy, March 27, 1980

EXHIBIT 30

"Comment on the Incremental Pricing Provisions of the Natural Gas Policy Act," before the Federal Energy Regulatory Commission, Docket No. RM 80-10

FEDERAL CONGRESSIONAL

"Excessive Speculation In Energy Commodities," Agriculture Committee, United States House of Representatives, July 10, 2008

"Oversight of Energy Markets and Oil Futures Contract," Joint Hearing of the Senate Appropriations Subcommittee on Financial Services and General Government and The and the Committee on Agriculture, Nutrition and Forestry United States Seante, June 17, 2008

"Energy Market Manipulation and Federal Enforcement Regimes," Committee On Commerce, Science And Transportation, United States Senate, June 3, 2008

"Consumer Effects of Retail Gas Prices," before the Judiciary Committee Antitrust Task Force, United States House of Representatives, May 7, 2008

"Pumping up Prices: The Strategic Petroleum Reserve and Record Gas Prices," Select Subcommittee on Energy Independence and Global Warming, United States House of Representative, April 24, 2008

"Prices at the Pump: Market Failure and the Oil Industry," House Judiciary Committee, May 16, 2007

"Price Gouging," Senate Committee on Commerce, Science and Transportation, May 23, 2006

"Gasoline: Supply, Price and Specifications," House Committee on Energy and Commerce, May 10, 2006

"Antitrust Should Promote Competition on Top of Well Regulated Infrastructure Platforms," Antitrust Modernization Commission, December 5, 2005

"Testimony of Mark Cooper on behalf or The Consumer Federation of America and Consumers Union on the Status of the U.S. Refining Industry," Subcommittee on Energy and Air Quality, Committee on Energy, U.S. House of Representatives, July 15, 2004

"Testimony of Dr. Mark N. Cooper on Behalf of the Consumer Federation of American and Consumers Union on Environment Regulation in Oil Refining," Environment and Public Works Committee, May 12, 2004

"Testimony Of Dr. Mark Cooper, On Behalf Of Consumer Federation Of America And Consumers Union On Crude Oil: The Source Of Higher Prices? Before The Senate Judiciary Committee, Antitrust, Competition Policy And Consumer Rights Subcommittee, April 7, 2004

"Testimony Of Dr. Mark Cooper, Director Of Research On Gasoline Price Volatility," Senate Commerce Committee, October 9, 2003

EXHIBIT 30

“Statement of Dr. Mark Cooper on Behalf of the Consumer Federation of America and Consumers Union on The Federal Response to the 2003 Blackout: Time to Put the Public Interest First,” Subcommittee on Oversight of Government Management, The Federal Workforce and the District of Columbia, Committee on Government Affairs, United States Senate, September 10, 2003

“Statement Of Dr. Mark Cooper on Electricity Markets: California,” Subcommittee On Energy And Air Quality House Energy And Commerce Committee’s Subcommittee, March 22, 2001

“Testimony of Dr. Mark N. Cooper on behalf of the Consumer Federation of America and Consumers Union,” Electricity Restructuring at the Federal Level, Subcommittee on Energy and Power, U.S. House of Representatives, October 6, 1999

“Testimony of Dr. Mark N. Cooper on Electricity Competition: Consumer Protection Issues,” before the Subcommittee on Energy and Power, Energy and Commerce Committee, United States House of Representatives, May 26, 1999

“Testimony of Dr. Mark N. Cooper on The Regulation of Public Utility Holding Companies,” Committee on Banking, Housing, and Urban Affairs, United States Senate, April 29, 1997

"Testimony of Dr. Mark N. Cooper on Behalf of the Consumer Federation of America and the Environmental Action Foundation on Exempting Registered Holding Companies from the Public Utility Holding Company Act for Diversification into Telecommunications," Committee on Energy and Commerce, United States House of Representatives, July 29, 1994

"Testimony of Dr. Mark N. Cooper on Regulatory Reform in the Electric Utility Industry," before the Committee on Energy and Natural Resources, U.S. Senate, March 14, 1991

"Testimony of Mark Cooper and Scott Hempling on Electric Utility Policies of the Federal Energy Regulatory Commission," before the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, U.S. House of Representatives, October 11, 1990

"Testimony of Dr. Mark N. Cooper on Independent Power Producers and the Public Utility Holding Company Act of 1935" Subcommittee on Energy and Power, Committee on Energy and Commerce, United States House of Representatives, September 14, 1989

"Testimony of Dr. Mark N. Cooper on Acid Rain Legislation, Subcommittee on Energy and Power, Committee on Energy and Commerce, United States House of Representatives, September 7, 1989

"Joint Testimony of the Consumer Federation of American and the Citizen Labor Energy Coalition on Bypass of Natural Gas Local Distribution Companies," before the Subcommittee on Energy Regulation and Conservation, Committee, on Energy and Natural Resources, United States House of Representatives, September 29, 1988

"Independent Power Producers and the Public Utility Holding Company Act of 1935, Subcommittee on Energy and Power of the Energy and Commerce Committee, U.S. House of Representatives, September 14, 1988

EXHIBIT 30

"Joint Testimony of the Consumer Federation of American and the Citizen Labor Energy Coalition on Bypass of Natural Gas Local Distribution Companies," before the Subcommittee on Energy and Power, Energy and Commerce Committee, United States House of Representatives, May 25, 1988

"Administrative Modifications in the Implementation of the Public Utility Regulatory Act of 1978," before the Committee on Energy and Natural Resources, U.S. Senate, February 2, 1988

"Excess Deferred Taxes," before the Subcommittee on Select Revenue Measures, Ways and Means Committee, U.S. House of Representatives, December 14, 1987

"Electric Utility Regulation," Testimony before the Subcommittee on Energy and Power of the Energy and Commerce Committee, U.S. House of Representatives, September 23, 1987

"Oil Industry Taxes," before the Committee on Finance, U.S. Senate, June 5, 1987

"Comprehensive Natural Gas Legislation," before the Subcommittee on Regulation, Committee on Energy and Natural Resources, U.S. Senate, May 20, 1987

"Comprehensive Natural Gas Legislation," before the Subcommittee on Regulation, Energy and Natural Resources Committee, U.S. Senate, May 20, 1986

"Electric Utility Regulation," before the Subcommittee on Energy Conservation and Power, Energy and Commerce Committee, U.S. House of Representatives, March 20, 1986

"Oil Import Fees," Committee on Energy and Natural Resources, U.S. Senate, March 20, 1986

"Recent Developments in the Natural Gas Industry," before the Subcommittee on Energy Regulation and Conservation of the Energy and Natural Resource Committee, U.S. Senate, July 11, 1985

"The World Energy Outlook," before the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, United States House of Representatives, April 1, 1985

"Legislative Proposals Governing Construction Work In Progress," before the Subcommittee on Energy Regulation of the Energy and Natural Resources Committee, United States Senate, April 12, 1984

"Legislation Affecting Oil Company Mergers," before the Subcommittee on Energy and Mineral Resources of the Committee on Energy and Natural Resources, United States Senate, April 10, 1984

"Review of Federal Policies Affecting Energy Conservation and Housing," before the Subcommittee on Housing and Community Development of the Committee on Banking, Finance and Urban Affairs, United States House of Representatives, March 21, 1984

"The Export of Alaskan Crude Oil," before the Subcommittee on East Asian and Pacific Affairs of the Committee on Foreign Relations, United States Senate, July 19, 1984

EXHIBIT 30

"Economics of Natural Gas Deregulation," before the Joint Economic Committee, United States Congress, April 15, 1983

"Bills to Amend the Export Administration Act," before the Subcommittee on International Finance and Monetary Policy of the Committee on Banking, Housing and Urban Affairs, United States Senate, April 14, 1983

"Reauthorization of the Export Administration Act," before the Subcommittee on International Economic Policy and Trade of the Committee on Foreign Affairs, United States House of Representatives, April 12, 1983

"Pending Natural Gas Legislation," before the Subcommittee on Fossil and Synthetic Fuels of the Committee on Energy and Commerce, United States House of Representatives, March 22, 1983

"Energy Conservation and Jobs," before the Subcommittee on Energy Conservation and Power of the Committee on Energy and Commerce, United States House of Representatives, March 15, 1983

"Natural Gas Hearings," before the Committee on Energy and Natural Resources, United States Senate, March 10, 1983

"The Impacts of Various Energy Tax Options," before the Subcommittee on Fossil and Synthetic Fuels of the Committee on Energy and Commerce, June 15, 1982

"Various Energy Tax Options," before the Subcommittee on Energy and Agricultural Taxation of the Committee on Finance, United States Senate, June 9, 1982

"Natural Gas Policy and Regulatory Issues," before the Committee on Energy and Natural Resources, United States Senate, March 23, 1982

"The Economic Implications of Natural Gas Deregulation," before the Subcommittee on International Trade, Finance and Security Economics of the Joint Economic Committee, United States Congress, February 18, 1982

"The Implementation of Title I of the Natural Gas Policy Act of 1978," before the Committee on Energy and Natural Resources, United States Senate, November 5, 1981

"The National Home Weatherization Act of 1981," before the Subcommittee on Energy Conservation and Supply of the Committee on Energy and Natural Resources, United States Senate, July 15, 1981

"An Alternative Energy Budget," before the Subcommittee on Energy Conservation and Power of the Energy and Commerce Committee, United States House of Representatives, February 27, 1981

"Institutional Analysis of Policy Options to Promote Energy Conservation in New Buildings," before the Subcommittee on Energy Development and Applications of the Committee on Science and Technology, United States House of Representatives, September 25, 1980

"Building Energy Performance Standards," before the Subcommittee on Energy Regulation of the Committee on Energy and Natural Resources, United States Senate, June 26, 1980

EXHIBIT 30

"Analysis of No. 2 Distillate Prices and Margins with Special Focus on the Department of Energy's Methodology," before the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, United States House of Representatives, February 12, 1980

STATE AND PROVINCE

"Prefiled Testimony Of Dr. Mark N. Cooper On Behalf Of The Virginia Citizen Consumers Council," In The Matter Of Application Of Virginia Electric And Power Company For Approval Of A Functional Separation Plan, Virginia State Corporation Commission, Case No. Pue000584, August 24, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Public Service Company of Oklahoma To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00096, May 18, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Oklahoma Gas and Electric Company To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00095, May 18, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Arkla, A Division of Reliant Energy Resources Corporation To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00094, May 18, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Oklahoma Natural Gas Company To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00097, May 14, 2001

EXHIBIT 30

"Statement of Dr. Mark N. Cooper before the Governor's Task on Electricity Restructuring," Las Vegas Nevada, November 30, 2000

"Testimony of Dr. Mark N. Cooper on Behalf of the Arizona Consumers Council," In the Matter of the Competition in the Provision of Electric Services Throughout the State of Arizona, The Arizona Corporation Commission, January 21, 1998

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Virginia Citizens Consumers Council," Virginia Electric Power Company, Application of Approval of Alternative Regulatory Plan, State Corporation Commission of Virginia, December 15, 1997

"Electric Industry Restructuring: Who Wins? Who Loses? Who Cares?" Hearing on Electric Utility Deregulation, National Association of Attorneys General, November 18, 1997

"Direct Testimony of Dr. Mark N. Cooper in Response to the Petition of Enron Energy Services Power, Inc., for Approval of an Electric Competition and Customer Choice Plan and for Authority Pursuant to Section 2801 (E)(3) of the Public Utility Code to Service as the Provider of Last Resort in the Service Territory of PECO Energy Company on Behalf of the American Association of Retired Persons," Pennsylvania Public Utility Commission v. PECO, Docket No. R-00973953, November 7, 1997.

"Policies to Promote Universal Service and Consumer Protection in the Transition to Competition in the Electric Utility Industry," Regulatory Flexibility Committee, Indiana General Assembly, September 9, 1997

"Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," Application of Pennsylvania Power and Light Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code, Pennsylvania Public Utility Commission, Docket No. R-00973954, July 2, 1997

"Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," Application of PECO Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code, Pennsylvania Public Utility Commission, June 20, 1997

"Statement of Dr Mark N. Cooper," Project on Industry Restructuring, Public Utility Commission of Texas, Project No. 15000, May 28, 1996

"Direct Testimony of Dr. Mark N. Cooper Submitted on behalf of The American Association of Retired Persons, before the Public Service Commission, State of New York, In the Matter of Competitive Opportunities Case 94-E-0952 New York State Electric and Gas Co. 96-E-0891; Rochester Gas and Electric Corp. 96-E-0898 Consolidated Edison Company of New York, Inc. 96-E-0897

"Statement of Dr. Mark N. Cooper to the System Benefits Workshop," Project on Industry Restructuring, Project No. 15000, before the Public Utility Commission of Texas, May 28, 1996

"Statement of Dr. Mark N. Cooper, Joint Hearing on the Public Utility Holding Company Act of 1935," Committees on Finance and Technology and Electricity, National Association of Regulatory Utility Commissioners, February 28, 1989

EXHIBIT 30

"On Behalf of the Evelyn Soloman, Proceeding on Motion of the Commission as to the Rates, Charges and Regulations of Niagara Mohawk Power Corporation, Case Nos. 29670 and 29671," before the State of New York Public Service Commission, February 16, 1988

"On Behalf of Mississippi Legal Services Coalition in the Matter of the Citation to Show Cause Why the Mississippi Power and Light Company and Middle South Energy Should not Adhere to the Representation Relied Upon by the Mississippi Public Service Commission in Determining the Need and Economic Justification for Additional Generating Capacity in the Form of A Rehearing on Certification of the Grand Gulf Nuclear Project," Before the Mississippi Public Service Commission, Docket No. U-4387, August 13, 1984

"The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South, and the Gulf Coast Region," before the Mississippi Public Service Commission, Docket No. U4224, November 1982

"The Impact of Rising Utility Rates on he Budgets of Low Income Households in the Region of the United States Served by the Mississippi Power Company and South Central Bell Telephone Company," before the Chancery Court of Forrest County, Mississippi, October 6, 1982

"The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South and the Gulf Coast Region," before the Mississippi Public Service Commission, Docket No. U-4190, August 1982

EXHIBIT 30

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Nuclear Plant Cost	**)**	
Recovery Clause	**)**	**DOCKET NO. 100009-EI**
	)	**FILED: July 8, 2010**
_________________________________	**)**	

DIRECT TESTIMONY OF DR. MARK COOPER

ON BEHALF OF
SOUTHERN ALLIANCE FOR CLEAN ENERGY (SACE)

E. LEON JACOBS, JR.
Florida Bar No. 0714682
WILLIAMS & JACOBS, LLC
1720 S. Gadsden Street MS 14
Suite 201
Tallahassee, FL 32301
Tel: (850) 222-1246
Fax: (850) 599-9079
ljacobs50@comcast.net

GARY A. DAVIS
N.C. Bar No. 25976
JAMES S. WHITLOCK
N.C. Bar. No. 34304
GARY A. DAVIS & ASSOCIATES
PO Box 649
Hot Springs, NC 28779
Tel: (828) 622-0044
Fax: (828) 622-7610
gadavis@enviroattorney.com
jwhitlock@enviroattorney.com

EXHIBIT 30

IN RE: NUCLEAR PLANT COST RECOVERY CLAUSE
BY THE SOUTYHERN ALLIANCE FOR CLEAN ENERGY
FPSC DOCKET NO. 100009-EI
DIRECT TESTIMONY OF
DR. MARK COOPER

INTRODUCTION AND QUALIFICATIONS

Q. Please state you name and address.

A. My name is Dr. Mark Cooper. I reside at 504 Highgate Terrace, Silver Spring, Maryland.

Q. Briefly describe your qualifications

A. I have a Ph.D. from Yale University and have been providing economic and policy analysis for energy and telecom for almost thirty years. I have been the Director of Energy and the Director of Research at the Consumer Federation of America for 27 years, although the opinions I express in this testimony are my personal opinions and not those of the Consumer Federation. I am a Fellow at various universities on specific issues, including the Institute for Energy and the Environment at Vermont Law School. I have testified over 100 times before public utility commissions in 44 jurisdictions in the U.S. and Canada on energy and telecommunications issues and about twice as many times before federal agencies and Congress on a variety of issues, including energy and electricity. A copy of my resume with energy related activities is attached as Exhibit MNC- 20.

PURPOSE, OVERVIEW AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

EXHIBIT 30

A. I have been asked by the Southern Alliance for Clean Energy ("SACE") to examine the long-term feasibility of completion of Florida Power & Light's ("FPL") Turkey Point 6 & 7 Reactors ("Turkey Point") and Progress Energy Florida's ("PEF" or "Progress") Levy Nuclear Reactors ("Levy") (collectively "reactors" or "projects"), and to determine whether or not it is reasonable and/or prudent for FPL and PEF to incur any additional costs on these proposed reactors given current economic and other uncertainties.

Q. Please provide a general overview of your testimony.

A. In a mere four years since the passage the Florida Renewable Energy Technologies and Energy Efficiency Act of 2006, which sought to promote nuclear power in the state, the "nuclear renaissance" in Florida has been reduced to the largest investor - owned utilities in the state, PEF and FPL, urging the Commission to allow them to charge ratepayers hundreds of millions of dollars to do nothing more than hold their place in a line of proposed nuclear projects at the Nuclear Regulatory Commission. The number of utilities in the line has shrunk dramatically as other proposed new nuclear projects have been cancelled around the country. For PEF and FPL, the movement of the line has slowed to a crawl, and reserving their place in the line has little if any value to the Florida ratepayers because the line is almost certainly leading nowhere any time soon.

Ironically, this sad state of affairs represents significant progress from last year. In contrast to the utilities' testimony in last year's cost recovery docket (Docket No. 090009-EI), PEF and FPL now admit that the economics of nuclear reactor construction are highly uncertain. For FPL the uncertainty is so great and the risks so high that they now say they have not determined whether they will actually build these proposed new reactors in the state.

EXHIBIT 30

Progress hopes that a five-year delay will resolve the uncertainty, but maintains that it is still committed to construction.

The movement in the utility positions is in the direction I pointed them in my testimony last year, but they have not moved far enough, and as a result, additional millions of ratepayer dollars have been wasted and more is proposed to be wasted over the coming years. Furthermore, while PEF and FPL promise a thorough economic review before they make the momentous decision to proceed with construction of these proposed reactors, in the interim they continue to ask that the Florida ratepayers foot the bill, without a well-grounded showing that completion of these reactors is feasible in the long-term. In my opinion, it is not reasonable or prudent to allow PEF and FPL to incur additional costs of these proposed reactors from Florida ratepayers so that the utilities can do nothing more than sit in line until they themselves determine if completion of the reactors is feasible. This is a decision that the Commission can and should make now.

In light of these developments, in my testimony I repeat two of my primary recommendations that I made in my testimony last year. First, the Commission should not allow the recovery of the line-sitting fee from ratepayers. If anything, the Commission should only allow a small sum to allow FPL and PEF to continue to monitor and study the nuclear option.

Second, the Commission should develop a comprehensive and careful template for evaluating the build-no-build decision, when, if ever, it is presented to the Commission.

Q. Please summarize your findings.

A. In the 2009 nuclear cost recovery proceeding, Docket 090009-EI, I presented evidence that the fundamental economics of nuclear reactor construction no longer supported the construction of

EXHIBIT 30

new reactors in Florida, if they ever did. I emphasized the dramatic changes, for the worse, in key variables that affect the economics of nuclear reactors:

- declining natural gas costs,
- declining estimates of carbon prices,
- declining demand due to the economic slowdown,
- reduced need for nonrenewable generation due to likely efficiency and renewable mandates in climate change legislation,
- rising projections of nuclear construction costs, and
- the high degree of uncertainty in the economic environment that new reactors face.

All of these factors are still at work and many have continued to develop in a manner that further undermines the long-term feasibility of ever completing these proposed nuclear reactors in Florida. As a result, it is neither reasonable nor prudent to incur additional costs for these proposed reactors.

The decisions by Progress and FPL to seek to build these proposed nuclear reactors were based on a number of important assumptions that have been called into question in the time since the evidence was filed in their petitions for determination of need ("Need Docket"), as well as the evidence filed in Docket 090009-EI. More specifically:

(1) They assumed a high rate of demand growth. While the utilities have lowered their demand projections in testimony filed this year, they still have not recognized the full implications of lowered demand in the evaluation of the proposed reactors in the timing and pattern of need for new generation assets.

(2) They downplayed the contribution that efficiency and renewables can make to meet the need for electricity. The utilities continue to fail to incorporate the impact of these policies on

EXHIBIT 30

demand growth and the need for non-renewable generation in the evaluation of the proposed reactors.

(3) They assumed high prices for fossil fuels based on high commodity prices. While they have lowered those projections in testimony filed this year, they have not lowered the price projections to accord with reality.

(4) Based on the belief that public policy would put a high price on carbon, they assumed natural gas would be much more costly than the latest analysis prepared by the EPA indicates. While they have lowered their estimates of the price of carbon, they are still too high and have not dealt with the possibility that carbon taxes may be delayed, or that flexibility may be built into the allowance regime to keep costs low and make emissions allowances available.

(5) They used a low estimate of the cost of nuclear reactors. Although they have raised these estimates in testimony filed this year as compared to last year, both PEF's and FPL's estimates remain well below estimates of other analysts. Furthermore, PEF and FPL have not offered a firm, fixed cost estimate or proposed any mechanism to insulate ratepayers from future cost increases.

(6) They assumed that the design review of the AP-1000 reactor technology would proceed quickly, but that has proven to not be the case. The 17th revision is still unresolved, while contentions have been admitted at the Nuclear Regulatory Commission.[1]

(7) They use an approach to modeling the need for generation that systematically biases the results in favor of construction of nuclear reactors. Slowing demand growth makes it even

---

[1] Lyash, p. 9, notes that the Atomic Safety Licensing Board, "ruled on their contentions and admitted parts of three contentions to the LNP COL.

EXHIBIT 30

more important to properly value the flexibility of generation resources, including, but not limited to, natural gas generation, that can add needed increments to capacity but do not require long lead times like nuclear reactors.

The impact of the changed factors on these assumptions that have developed since the Need Docket and Docket 090009-EI can be summarized as follows:

Market Factors

Declining Demand	Eliminates need for large quantity of new generation
Falling price of natural gas	Makes natural gas more attractive

Policy

Uncertainty	Federal carbon policy is not defined State policies supporting nuclear or alternative resources remain uncertain

Regulatory Factors

Efficiency/renewable standards	Reduces need for non-renewable generation, such as nuclear
Carbon cost reduction	Makes low carbon resources less attractive

Technological Factors

Nuclear cost uncertainties	Raises prospects of cost overruns
Growing confidence in cost and availability of alternatives	Makes alternatives more attractive

Financial Factors

Tight Financial markets	Makes finance more difficult
Increasing concerns on Wall Street about nuclear reactors	Makes finance more expensive

EXHIBIT 30

Execution Risk

Design problems Raises questions about the ability to execute and
Increasing cost estimates the long-term feasibility of completing these proposed reactors

In Mr. Lyash's testimony, Progress identifies many of these risks lumped together as "enterprise risk." Whatever we call them, they combine to make it clear that the construction of the proposed new nuclear reactors is not feasible, and incurring substantial costs to continue to pursue these projects at this time is imprudent. Exhibit MNC-1 defines the six categories of risk I use in the evaluation of nuclear reactors and identifies over three dozen specific risks. Exhibit MNC-2 notes how the early assumptions made generally to justify nuclear reactor construction and create the illusion of a nuclear renaissance have proven to be incorrect. Exhibit MNC-3 identifies the risks and uncertainties that Progress now cites as reason to delay the project. These are the same factors that have led FPL to defer the decision to build Turkey Point 6 and 7.

Any of these changed factors alone could demonstrate that completion of these reactors is not feasible in the long term, and that incurring additional costs on these proposed reactors is neither reasonable nor prudent. However, taken together, these factors thoroughly undermine the case that the companies have tried to make to demonstrate (1) the long-term feasibility of these nuclear reactors at this time and (2) the prudence of incurring additional costs on these proposed reactors. The evidence presented by the companies to the Commission does not take these changed factors fully into account and does not reflect the highly uncertain future that nuclear reactors face.

If the Commission were to merely conclude that the changes in conditions make the future highly uncertain, that conclusion alone would argue strongly against continuing to invest ratepayer's money for these reactors. In an uncertain environment, the assets a prudent person acquires should be flexible, have short lead times, come in small increments and not involve the sinking of large

EXHIBIT 30

capital costs. The characteristics of nuclear reactors are the antithesis of those best suited to an uncertain environment. They are large, "lumpy" investments that require extremely long lead times and sink massive amounts of capital. Therefore, it would be imprudent to allow the companies to recover any more costs from ratepayers at this time because the companies have failed to demonstrate the long-term feasibility of completing the reactors.

There are other factors that will be documented by other witnesses that reinforce the conclusion that these reactors are not feasible in the long-term, and that as a result it is not prudent to incur additional costs, including the failure of some of the projects to obtain regulatory approvals, which were being counted on to stay on schedule and uncertainties and delays in the Nuclear Regulatory Commission ("NRC") licensing process. While one can point to some positive developments for the construction of nuclear power plants, such as the possibility of the creation by the U.S. Congress of a Clean Energy Development Authority, these are vastly outweighed by the negative developments.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes, I am sponsoring the following exhibits:

Exhibit MNC-1: Risk Factors Facing Construction Of New Nuclear Reactors
Exhibit MNC-2: Unrealistic Assumptions Masking The Real Economics Of Nuclear Reactors
Exhibit MNC-3: Increasing Risks Facing Nuclear Reactor Construction Projects
Exhibit MNC-4: Negative Events In The Nuclear Renaissance
Exhibit MNC-5: Exelon's View Of The Deteriorating Nuclear As A Carbon Abatement Option
Exhibit MNC-6: Projected Natural Gas Prices Compared To EIA Projections

EXHIBIT 30

Exhibit MNC-7: The Decade Of Volatile Natural Gas Prices May Have Been The Exception, Not The Rule

Exhibit MNC-8: Declining Peak Load Projections: Progress

Exhibit MNC-9: Declining Peak Load And Capacity Needs Progress

Exhibit MNC-10: Declining Peak Load Projections: FPL

Exhibit MNC-11 Declining Peak Load And Capacity Needs: FPL

Exhibit MNC-12: Projections Of Carbon Compliance Costs

Exhibit MNC-13: Projections Of Overnight Construction Costs

Exhibit MNC-14; Declining Cost Of Renewables

Exhibit MNC-15: Flexible Gas Additions Lower Revenue Requirements

Exhibit MNC-16: Cumulative Cost Difference: Flexible v. Lumpy Treatment of Natural Gas Generation Additions

Exhibit MNC-17: Nuclear Construction Pressures Capital Requirements

Exhibit MNC-18: Overnight Costs As A Predictor Of Net Savings: FPL

Exhibit MNC-19: The Risk of Nuclear Reactors in the Eyes of Industry Analysts

Exhibit MNC-20: C.V. of Dr. Mark Cooper

Q. How is your testimony organized?

A. First, I briefly summarize my testimony from Docket 090009-EI. I then discuss the changing approaches of both PEF and FPL from Docket 090009-EI to the current docket due to the profound and fundamental changes in the economic landscape facing new nuclear reactor construction, and the fact that, although the approaches have changed, PEF and FPL continue to utilized flawed analyses to reach the conclusion that building these proposed new nuclear reactors

EXHIBIT 30

remains feasible and prudent. Next, I discuss and rely upon the opinions that other experts, specifically Wall Street analysts and other electric utility executives, have in regards to new nuclear construction. I then proceed to reevaluate the risk factors that I identified in my testimony in Docket 090009-EI and update my 2009 analysis with a focus on recent developments. Finally, I quantify the benefits of retaining flexibility in generation resources rather than continuing to imprudently spend money on these proposed nuclear reactors which are not feasible in the long term.

Q. Please briefly summarize your testimony in Docket 090009-EI.

A. In my testimony in the 2009 Nuclear Cost Recovery proceeding I concluded that the proposed new nuclear reactor construction is uneconomic, uncertain and risky. I presented evidence on the marketplace, policy, regulatory, technological, execution and financial risks of these reactors proposed for construction in Florida by Progress and FPL. I showed that, whatever the circumstances might have been in the 2008 Need Determination Proceeding, circumstances had dramatically changed since affirmative determinations of need were made by this Commission for these reactors. These changed circumstances and resulting risks led me to conclude that completion of the Turkey Point and Levy reactors was no longer feasible in the long term and that incurring additional costs on these reactors would not be prudent.

Q. Have your conclusions regarding long-term feasibility and the prudence of incurring additional costs on these reactors changed since the time of your testimony last year?

A. No. In fact, my conclusions have been only been further substantiated by developments occurring since my testimony last year. In fact, PEF and FPL have now been forced to admit the extreme uncertainty surrounding construction of new nuclear reactors, and, as a result, the utilities

EXHIBIT 30

have resorted to mere "line sitting" in the hopes that the Commission will continue to approve costs for these proposed reactors until the utilities are in fact ready to decide whether or not it would be beneficial to their bottom lines to actually construct the reactors.

Q. Have the utilities changed their approach from Docket 090009-EI?

A. Yes, but not enough. In Docket 090009-EI, the companies rejected the suggestion that they be required to update their economic analyses for purposes of demonstrating long-term feasibility, claiming that it did not make sense to let short-term changes in economic projections affect long-term decisions. However, both FPL and PEF underestimated the profound and fundamental changes in the economic landscape facing new nuclear reactor construction. As the adverse economic evidence continued to mount, the utilities have had to belatedly concede that their approach in 2009 could not be credible in 2010. When shifts in key economic variables appear to be permanent, or at least long-term, it would be imprudent and irrational for the utilities not to adjust the economic analyses on which they base their decisions. This year PEF and FPL have modified their economic analyses and both now admit that building a new nuclear reactor today would be imprudent. The Commission should acknowledge this admission as progress.

Unfortunately, the progress stops short of the correct conclusion. The utilities continue to recommend the imprudent expenditure of ratepayer funds, and the methodology they apply to evaluate the long-term feasibility of these reactors is fundamentally flawed. For example, FPL states in its Petition for Approval of Nuclear Power Plant Cost Recovery (May 3, 2010, p. 8):

> The developments at the national level, state level and project level needed for a clear path to construction have not achieved a high level of predictability. Therefore expenditures beyond those required to obtain the necessary licenses, permits and approvals would be premature in 2010 and 2011.

EXHIBIT 30

> By continuing to seek the necessary licenses, permits and approvals, FPL is maintaining progress toward delivering the benefits of new nuclear generation to FPL's customers without experiencing unnecessary costs or schedule risks. Once this phase of the project is complete, FPL will be able to review the then-existing economics, the accumulated experience of other new nuclear projects and the state and federal energy policy environment in its consideration of project next steps

Q. Do you agree with FPL's assessment?

A. I whole heartedly agree with the first and last sentences, but thoroughly disagree with the middle two sentences. FPL is correct in stating that now is not the time to be committing resources to the construction of nuclear reactors. However, FPL is incorrect in stating that it would be prudent to continue to expend funds to seek permits, licenses and other approvals. The expenditure of over $28 million for FPL in 2010 and 2011 for those purposes is a total waste of ratepayer money and therefore imprudent. FPL does not need to be seeking these licenses in 2010 and 2011 in order to bring the reactors on line in 2022, when they might be needed, if they are ever needed.

Q. What about Progress Energy Florida?

A. Progress takes a somewhat different view. Having signed an EPC contract very early in the overall process, it has chosen to remain fully committed to building the proposed LNP reactors, although on a much longer time schedule, "deferring significant capital expenditures to a later time period when the Company may benefit from, among other things, additional certainty with respect to federal and state energy policy, plant licensing, and improved financial conditions. More importantly, our decision moves forward with the EPC agreement, and thus preserves the long-term benefits of nuclear generation for the Company and its customers in Florida." (Testimony of Lyash, p. 6). While FPL states "the developments at the national levels, state level and project level needed

EXHIBIT 30

for a clear path to construction have not achieved a level of predictability" to create "a clear path to construction," Progress hopes the uncertainties will resolve themselves in time to validate its conclusion that the nuclear reactor is beneficial. Progress and its shareholders should bear the risk of this ill-considered gamble, not ratepayers. Meanwhile, Progress is seeking to have ratepayer pay in excess of $164 million to keep its place in line.

The difference between the FPL and the Progress positions may be the result of the fact that Progress has signed an EPC and is liable for penalties if it backs out of the contract. If the risks and uncertainties surrounding nuclear generation that have become so clear lead the Commission to conclude that these proposed reactors are no longer feasible, the cancellation fees should certainly not be recoverable from ratepayers. The Commission should make this clear immediately.

Q. What aspects of the analysis do PEF and FPL have in common?

A. While the two utilities take different positions with respect to whether they are moving ahead with actual construction of the proposed reactors, both FPL and PEF's analyses continue to make erroneous assumptions, all of which favor nuclear reactors. These erroneous assumptions lead them to erroneously conclude that nuclear power will be needed in the mid-term and will be less expensive than meeting demand with combined-cycle gas plants. These erroneous assumptions in the 2010 analyses include, but are not limited to, the following:

- The cost of natural gas used in the analyses is still higher than projections by the U.S. Department of Energy Information Administration ("EIA").
- The cost of carbon is still higher than the U.S. Environmental Protection Agency projects from the energy bill that has passed one house of Congress.

EXHIBIT 30

- The utilities have also failed to take the full implications of climate change policy into account. Both FPL and PEF assume a price of carbon is going to be imposed, but at the same time ignore the efficiency and renewable mandates that are likely to be included in any climate change legislation. As a result, they propose to build new reactors well before there will be a need for them to meet system reserve margin requirements if climate change policy is enacted.
- Their electricity and financial models do not reflect the problem of excess capacity and the value of being able to add natural gas generation resources in smaller increments and with shorter lead times than large central station facilities like nuclear reactors.

Q. What conclusions can you draw based on these erroneous assumptions made by PEF and FPL?

- A. Taking these erroneous assumptions into account, I reach two specific conclusions about the long-term feasibility of the proposed FPL and PEF reactors: First, contrary to the utility findings that nuclear reactors are a little less costly than natural gas – saving ratepayers about $ 5 billion in discounted, 2010 dollars in the base case – my analysis demonstrates that they are likely to be more expensive, costing ratepayers $10 to $20 billion more in discounted, 2010 dollars.
- Second, because of the high cost and other inherently unattractive economic characteristics of new nuclear reactors (long-lead time, sunk costs), it will be at least a decade, probably two, and maybe even more, before nuclear generation can

EXHIBIT 30

potentially become cost competitive with the other options available in a carbon constrained world. During this long time frame, the economics of other options can change dramatically. Therefore, it is imprudent to spend ratepayer funds on nuclear reactors at present, especially given that the utilities are at present merely line sitting as I discuss in more detail below.

These two findings reinforce my overall conclusion, that spending hundreds of millions of dollars of ratepayer funds today so that PEF and FPL can continue to sit in the line waiting to build new nuclear reactors is imprudent, unreasonable, and wasteful. In fact, the imprudence of continuing to spend ratepayer money on these projects is symbolized by the fact that the generation resources that these projects would bring on line would not even appear in the utility's ten year site plan for another two years, if then.

Q. If the reactors will not be needed for such a long time, why are the utilities continuing to seek ratepayer funds to develop them?

A. For both utilities the primary concern now is line sitting. For example, Progress Energy Florida claims to need to stay in line because of the activity in the industry.

> If we terminated the EPC agreement and cancelled the project, the nuclear option will be lost for the foreseeable future as both private (the Consortium and other vendors) and federal (the NRC) resources shift to nuclear projects under development elsewhere in the country or around the world. Our decision therefore preserves for our customers and the Company the long term benefits of fuel portfolio diversity, reduced reliance on fossil fuels for energy production, carbon free energy generation, and base load capacity at a low cost fuel source that nuclear generation provides (Lyash, p. 6).

EXHIBIT 30

FPL makes a similar argument, claiming that the decision to move forward is just around the corner, based in part, on a fiction that the nuclear industry is thriving and therefore FPL must move ahead quickly, or lose its place in line.

> The input representing the greatest risk for the Company is skilled labor trained to construct advanced nuclear facilities. At this time, however, FPL does not anticipate any major problems with respect to procurement of raw materials, long lead components, or skilled workers. Nevertheless, with development in the nuclear industry gaining steam, competition for these resources will increase (Testimony of Reed, p. 49).

The suggestion that the vendors are in the driver's seat and the utilities will lose their chance if they do not continue to spend ratepayer funds does not accord with reality. The vast majority of projects in the U.S. have been delayed or cancelled, as summarized in Exhibit MNC-4. There is little demand for the technology the Florida utilities have chosen.[2] Frankly, if the supply-train is stretched as thin as the utilities suggest, the danger of delays and escalating costs is probably much greater than being bumped out of the line because once the project starts, delays escalate, which is what drove cost escalation during the first nuclear building cycle.

Q. Do other experts share your view of the economics of nuclear reactors have continued to deteriorate?

A. Yes. Both FPL and Progress claim that the economics of nuclear reactors have improved dramatically since the Need Determination two years ago. The analysis of FPL claims that the break even capital cost – the amount of money FPL could spend on nuclear construction in overnight costs

---

[2] The number of reactors under construction outside of Russia and China has been basically flat increasing from 21 to 24 since the certificate of need was issued, http://www.world-nuclear.org/info/reactors.html. The vendor for both FPL and Progress appears to have a total of 4 units under construction, all in China, http://ap1000.westinghousenuclear.com/ap1000_nui_ic.html. In the U.S. two projects using this technology appear to be ahead of the Florida reactors (Georgia and South Carolina), but there does not appear to be a crowd behind them. One AP-1000 has been delayed, the other abandoned.

EXHIBIT 30

– has increased by more than one-third since the need determination in 2008.[3] For Progress, the mid fuel, no CO2 scenario has gone from a negative $3 billion to a positive $1 billion.[4] However, this is the opposite of what most analyses say, including those of Wall Street utility analysts and other utilities.

My review of utility industry analysts on Wall Street and elsewhere finds that they generally see the economics of new nuclear reactors moving in the opposite direction than what PEF and FPL claim, as demonstrated by Exhibit MNC-19. They definitely do not see an improvement. Some of the biggest nuclear utilities have also concluded that the economics have become so unfavorable that they have abandoned their plans for new nuclear reactors at present. A most stunning example was provided in a recent analysis from the CEO of Exelon. See Exhibit MNC-5. In his evaluation the cost of nuclear has more than doubled, and nuclear has moved well down in the list of options for carbon abatement. In the 2008 view, new natural gas was somewhat less costly than nuclear, but by 2010, gas was seen as much less costly. The CEO of Entergy, another major nuclear utility, has expressed similar sentiments.[5] The service territory conditions that J. Wayne Leonard indicates led him to the conclusion that "no same [sic] businessman would currently build a nuclear power plant" – plentiful reserves and slow growth – are exactly the conditions in which the Florida utilities now find themselves. Cushioned by the promise of cost recovery from the ratepayers, PEF and FPL have simply failed to adjust adequately to the new reality.

ANALYSIS OF RISK FACTORS

---

[3] Sim, 2009, Table 45, inflated at 1.03 per year to $5456, compared to Sim 2010, Ex. SRS-1.

[4] Progress Energy Florida, *Levy Nuclear Project NCRC Updated Life-Cycle Net Present Worth (CPVRR) Assessment*, Exhibit JL-3, 2007 results inflated at 2 percent per year.

[5] Thomson Reuters, *Entergy at Thomson Reuters Global Energy Summit-Houston*, May 24, 2010.

EXHIBIT 30

Q. Have you updated your analysis of the risk factors since you prepared your testimony in Docket 090009-EI based on recent developments?

A. Yes. I have reevaluated how each of the categories of risk that affects new nuclear construction in Florida, with an emphasis on the importance of recent developments. In each case I also show the benefits of waiting to make the build-no build decision and the folly of incurring costs while we are waiting. While FPL has decided to wait, Progress has declared it is going ahead with the construction decision, just on a slower time line. The self-serving economic analysis of nuclear reactors that both utilities present still indicate that these proposed new reactors are the preferred option. My analysis indicates otherwise.

MARKETPLACE RISK

Natural Gas Prices

Q. Are the utilities' projected natural gas prices still a concern to you?

A. Yes. There are two key components of gas costs in this analysis – the commodity cost and the compliance cost. Both are overestimated by both FPL and PEF.

In regards to commodity cost, the reality of lower natural gas prices is slowly sinking in. However, both utilities continue to overestimate the price of natural gas. As shown in Exhibit MNC-6, using the EIA long-term projection of wellhead natural gas prices and adding in the cost of transportation, I find that the utilities have projected prices that are higher than indicated by EIA by about 13 percent (14 percent undiscounted, 12 percent discounted). Since natural gas prices account for two-thirds or more of the total cost of gas generation, this represents almost a nine percent overestimation of the cost of the project. That difference alone is large enough to reverse the conclusion that gas is more expensive in most of the scenarios analyzed by the utilities.

EXHIBIT 30

I discuss compliance costs below under the analysis of policy risk.

Demand

Q. Have there been changes in demand that affect the long-term feasibility of these nuclear reactors and the prudence of incurring additional costs on the proposed reactors?

A. Yes. There has been a dramatic change in the marketplace, and demand more specifically, since the companies prepared their need analyses in the respective need dockets and the testimony in Docket 090009-EI. The nation has plunged into the worst recession since the Great Depression. Some even call it a depression. Moreover, there is a growing recognition that this change is not simply a severe dip in the business cycle, but rather a major shift in the economy. The spending binge on which the U.S. embarked for a decade, in which households and business became highly leveraged, is likely over. A massive amount of household wealth was destroyed when the housing market bubble burst. Retirement accounts have been devastated by the collapse of the stock market.

Ironically, the decade on which the projections were based in the Need Determination coincided almost exactly with the decade in which the housing and consumption bubbles were pumped up by excessive leverage. That level of growth was unsustainable. It is my opinion that the shift in consumption is permanent and signals slower growth in the future. However, even if this were just a severe downturn in the business cycle, it would affect the demand for electricity sufficiently to raise questions about the long-term feasibility of these new nuclear reactors.

A reduction in the growth rate of demand has two implications for large central station facilities like nuclear reactors. Since both FPL and Progress have excess capacity at present, slowing demand growth pushes the date at which new generation will be needed farther into the future. In my 2009 testimony I estimated that the need for the nuclear reactors was at least half a decade away.

> In 2017, which is a crucial year in the 2008 analysis because that was the year the reserve margin hit the limit of 20 percent, the 2009-projected peak is 11 percent lower than the peak projected in 2008. Under the 2009 projection, the FPL does not reach the 2017 peak projected in 2008 until 2022, five years later.[6]

In the current proceeding the utilities affirm my calculations, having pushed the in-service dates to the 2021-2023 period.

Slower demand growth has a second effect. It makes smaller increments to capacity preferable since lumpy generation additions create excess capacity. Excess capacity that is capital intensive imposes unnecessary costs on consumers. To avoid this excess capacity, I later demonstrate that it is preferable for PEF and FPL to build a series of natural gas-fired power plants instead of these proposed nuclear reactors.

Q. Have the utilities reflected this change in demand in their analysis?

A. Yes, they have pushed their expected in-service dates out by about four or five years. The online dates for these reactors are now more than a decade away, beyond the ten-year plan, 2021 and 2022 for Progress, 2022 and 2023 for FPL.   That delay makes it unnecessary, imprudent and unreasonable to continue incurring the costs of licensing today. This becomes even more apparent when the impact of likely energy efficiency and renewable energy mandates are taken into account, as I discuss below in the policy risk section.

Q. How does waiting to make a build-no-build decision reduce marketplace risk?

---

[6] Cooper, 2009, p. 9 line 51.

EXHIBIT 30

A. The uncertainty about both natural gas prices and demand growth are likely to diminish. In both of these areas we are coming off of unprecedented events. The decade of growth in demand prior to the need determination was extremely high. Repairing the economy and learning whether it is on a whole new trajectory will take time, and continuing to incur costs on these proposed nuclear reactors during this time is in my opinion unreasonable and imprudent.

Similarly, the volatile natural gas prices were unique to the past decade. That decade may be the exception, rather than the rule, as Exhibit MNC-7 suggests.

POLICY RISK

Need for Non-renewable Resources

Q. Should policy considerations enter into the Commission's evaluation of the long-term feasibility of these reactors and the prudence of incurring additional costs for these reactors?

A. Yes. The companies' economic feasibility analyses were driven by assumptions about federal regulatory policy. The companies have put a high price on carbon in their economic analyses. Without the high price on carbon, the economics of nuclear reactors would look very different. To my knowledge, the state of Florida has not put a price on carbon, nor is it contemplating doing so. Thus, the companies have decided to pursue these projects and the Commission has allowed cost recovery based, in part, on assumptions about federal climate change policy.

Q. Are you suggesting that the Commission should not take future climate change policy into account when considering the long-term feasibility of these reactors?

EXHIBIT 30

A. Quite the contrary. I believe the Commission should take federal policy into account when considering the long-term feasibility of these reactors, since that is a major source of regulatory risk to state decisions. However, I believe the Commission must take the **entirety** of projected federal policy into account. The idea of putting a price on carbon is only a part of the legislation that is moving through the Congress. H.R. 2454, the American Clean Energy and Security Act, the first piece of climate change policy legislation to pass a house of Congress, does not simply put a price on carbon directly. Rather, it establishes an elaborate scheme of allowances to emit carbon, which will indirectly set a price on carbon. Moreover, policies other than putting a price on carbon, particularly policies to promote efficiency and renewables, play a large role as well.

Q. Please describe the full suite of federal policies that affect the long-term feasibility of these nuclear reactors.

A. On the supply-side, the legislation that has passed the House has a renewable energy standard that would require utilities to meet an increasing part of their load with renewables. Within a decade, they would be required to get 20 percent of their generation from renewables, with as much as 8 percent of that total coming from efficiency. At the same time, the legislation includes a number of provisions that have sharply lowered projections of the cost of carbon credits, such as efficiency and renewable mandates, subsidies for carbon control technologies and domestic and international offsets. All of these lower the demand for allowances and therefore the price of allowances. This means that the assumed compliance costs of fossil fuels are lower than projected by the companies in prior proceedings and this proceeding.

On the demand side, there is a substantial mandate for energy efficiency. This is embodied, in part, in the ability to meet two-fifths of the renewable resource standard with efficiency and, in

EXHIBIT 30

part, in dramatic improvements in building codes and appliance standards. Mandates to improve the energy efficiency of new buildings by 30 percent in the near term and 50 percent in the longer term will have a substantial impact on energy demand over the life of the reactors being considered in this proceeding. Funds from certain allowances are set-aside to improved efficiency, particularly for natural gas. Similarly, the American Recovery and Reinvestment Act of 2009 includes a huge increase in funding to improve the energy efficiency of existing buildings. As the efficiency of buildings and appliances improves, the demand for electricity and natural gas declines.

These regulatory factors – increased renewables, lower demand through efficiency, and a lower price on carbon – must be considered in the evaluation of alternative scenarios for future supply of electricity. Extracting only the price of carbon from the policy landscape and inserting it in the economic analysis, while ignoring the other aspects of policies, distorts the picture being presented to the Commission. Factoring in these other policies would further undercut the claim that nuclear reactors are feasible in the long-term. Many of these other aspects have been part of the climate change policy debate for quite some time. Taken together, these changes on the demand side, as well as the renewable standard, will have a substantial impact on the need for new non-renewable generation and undermine the long-term feasibility of building these reactors.

Q. What impact does including the efficiency and renewable policies in HR 2454 have on projections for load growth and demand for nonrenewable resources such as nuclear reactors?

A. They would have a major impact. Exhibits MNC-8 and MNC-9 set forth demand scenarios that model the impact of the efficiency and renewable mandates in HR 2454 on the need for non-renewable generation in the Progress territory.. It applies the national average results estimated in the EPA analysis of the legislation to Florida. I have factored in planned retirements in this

EXHIBIT 30

calculation. The results are similar to the analyses I provided in the 2009 Nuclear Cost Recovery Proceeding. As shown in Exhibit MNC-9, under this scenario, Progress does not reach the peak demand projected in the Need Docket for 2017 until 2040.

Exhibits MNC-10 and MNC-11 present a similar analysis for FPL. New resources to meet the reserve margin requirement are not needed by FPL until 2037. Simply put, with the efficiency and renewables factored in on top of the declining growth rate of demand, neither utility needs new capacity to cover the reserve requirement out until well past 2030.

Q. Are there constraints, other than the reserve margin requirement, that might affect the utilities?

A. Yes. In modeling the full impact of the climate legislation we must pay attention to the mandates to reduce greenhouse gas emissions. Doing the minimum under HR 2454 is not enough for long-term compliance. In the mid-term, allowances can be purchased to keep compliance costs under control and economically attractive options are available beyond the minimum. Buying time in the current environment, at least a decade, perhaps a quarter of a century, to develop the next generation of low cost, low carbon resources is the key strategy.

Under the pending legislation, the entire industry will be working on the problem, as will the public sector institutions. A full range of alternatives will be examined including more efficiency and renewables, whose costs are projected to decline, new forms of storage, which will make renewables more cost effective, expanded transmission that improves access to out of territory renewables, carbon capture and storage, and nuclear generation. Using the maximum amount of time possible to gather information before making these decisions is very valuable because it keeps options open. National policy will be promoting the development of low cost, low carbon options.

EXHIBIT 30

Florida ratepayers can benefit by keeping their options open rather than committing to a high cost, long lead-time approach like nuclear reactors.

Compliance Costs

Q. Are there other ways in which delaying the build/no-build decision is valuable in this uncertain regulatory environment?

A. Yes, several. First, and most obviously, the contours of climate policy will become clearer. It is unclear that Congress will pass any climate legislation this year or that any legislation that passes will put a price on carbon. Emphasis seems to be shifting to complementary policies that promote or require efficiency and renewable, and this will have an impact on the need for non-renewable generation and the cost of carbon, as well as the cost of natural gas. The targets and timing, as well as the mechanisms for setting the price will have a big impact on the cost of carbon. However, Commission approval of costs necessary for PEF and FPL to sit in line, as the utilities are requesting, is simply a waste of ratepayers' money at this time and is not necessary in order to delay the build/no-build decision.

Q. Are the utility estimates of compliance costs still a concern?

A. Yes. The analyses continue to be centered on compliance costs that are higher than those projected by EPA, as shown in Exhibit MNC-12. FPL has dropped its highest cost compliance scenario, but its mid case is still above the EPA estimate for HR 2454 and the Kerry Lieberman bill in the Senate. Progress has a zero carbon cost analysis, but its mid-range estimate is still 30 percent above the EPA estimate.

EXHIBIT 30

Q. How does waiting to spend ratepayer moneys on these reactors reduce the policy risk?

A. The uncertainty about federal policy is likely to diminish. With the need for generation resources now farther out in the future and the large impact that federal policy can have on the need for non-renewable resources, it would be prudent to wait to see what course federal policy takes before committing any more resources to the reactors, especially resources which are only necessary to allow PEF and FPL to continue to line sit, and certainly the resources that would be committed with the build/no-build decision. The issues that will affect the need for the reactors in the federal legislation include targets and timing of carbon reductions, mandates for alternatives and flexibility in approaches, including the ability to purchase allowances at lower costs than building reactors.

REGULATORY RISK

Q. What regulatory risks do nuclear reactors face?

A. The major regulatory policy risk remains at the Nuclear Regulatory Commission. There are continuing issues with the licensing of the generic design of the AP-1000 technology, as discussed in more detail by Arnold Gundersen on behalf of SACE in this proceeding. The certification of a standard design was supposed to be a key to speeding up the process. The design proposed by the utilities/vendors has encountered numerous problems. Therefore, allowing PEF and FPL to spend ratepayers' money to stand in line while the regulatory hurdles are passed provides no benefit whatsoever to the ratepayers.

Q. How can taking the maximum time possible to make the build, no-build decision lower regulatory risk?

EXHIBIT 30

A. The AP-1000 design will possibly have been certified and the licensing process at the NRC may have become more routine after the initial plants have gone through the process. Later plants will benefit from the smoother certification process.

TECHNOLOGICAL RISK

Nuclear Reactor Costs

Q. Have the utilities increased their estimates of nuclear construction costs?

A. Yes, but I still have the opinion that they are underestimating the costs. Furthermore, they have still not offered firm, fixed prices. Therefore, these reactors are likely subject to ongoing future increases, putting ratepayers at risk.

Q. Pleases describe the uncertainties about the cost of nuclear reactors.

A. As described in Exhibit MNC-13, early in this decade vendors and contractors at the Department of Energy produced very low estimates of the cost of nuclear reactors, claiming that things had changed since the first generation of reactors. In the eight years since those initial, promotional studies were released, the estimates of the cost of nuclear reactors has increased dramatically, especially among Wall Street and independent analysts. As long as the costs placed before the Commission are "non-binding," the Commission must be aware of the growing uncertainty about the cost of nuclear reactors. As long as they are "non-binding," the prospect of cost escalation places ratepayers at risk, especially where costs for construction work in progress is being granted.

In fact, the extreme uncertainty about nuclear reactor costs has caused FPL to create a whole new framework for evaluating options. As FPL stated in the Need Docket:

EXHIBIT 30

> The second difference in the economic analysis approach step that developed the CPVRR costs for the resource plans is that no generation or transmission capital costs associated with Turkey Point 6 & 7 were included in the analysis. The reason for this is that *FPL does not believe it is currently possible to develop a precise projection of the capital cost associated with new nuclear units with in-service dates of 2018-on.* Consequently, FPL's economic analysis approach normally used to evaluate generation options has been modified to include a second economic analysis step." ("Need Study for Electrical Power, Docket No. 07-0650-EI, Florida Power and Light Company, October 16, 2007, pp. 104-105, emphasis added).

Similarly, Progress has recently increased the cost estimate previously placed before the commission for construction of the LNP.

In the 33 months since that statement was made, there have been dozens of studies of the projected costs of nuclear reactors. The cost in 2008 $ have ranged from a low of just under $2400/kW to a high of just over $10,000/kW. The Florida utilities' estimates are still in the low end of the range of estimates. Recent cost trends in generation construction suggest that the utility cost projections did not incorporate the run up in nuclear construction costs. Moreover, the cost of construction for non-nuclear generation rose more slowly during the recent phase of price increases and has fallen more quickly in recent months.

The two conclusions I would draw from this analysis are (1) the range of costs considered by FPL and PEF is too narrow and too low, and (2) the uncertainty is huge. This only reinforces my opinion that the prudent course would be to avoid rigid, expensive choices, especially if there is time to let the uncertainties diminish before decisions must be made. The Commission should not allow ratepayer funds to be spent to hold the utilities place in line or to fund a build, no build decision made prematurely.

Efficiency and Renewables

EXHIBIT 30

Q. Should changing technological conditions factor into the analysis of the long-term feasibility of these reactors?

A. Yes. While climate policy is seen as giving a direct advantage to reactors by putting a price on carbon, that policy does much the same for other technologies. In fact, there are ways in which the alternative technologies are likely to receive an even larger boost. There are also many programs targeted at various technologies that are in earlier stages of development that may enjoy larger cost reductions as the science advances and the scale of production ramps up.

I believe there are two technological developments that are shifting the terrain in ways that disfavor nuclear reactors, in addition to the uncertainties about nuclear technology discussed above – the availability and cost of conserved energy and the availability and cost of renewables.

Q. Please describe the emerging terrain for efficiency technologies.

A. There is a growing consensus that the cost of many alternatives is lower than that of nuclear reactors. For efficiency, the change in the terrain is largely a matter of increasing confidence that substantial increases in efficiency are achievable at relatively low cost. The detailed analysis of potential measures and the success of some states at reducing demand through energy policies have increased the confidence that efficiency is a reliable option for meeting future needs for electricity by lowering demand. At the same time that the policy process has opened a range of uncertainty and flexibility, studies from three major national research institutions have sent a strong signal indicating the direction that the effort to meet energy needs in a carbon-constrained environment must follow.

In fact, since I filed testimony in the 2009 cost recovery proceeding, three major national research organizations have affirmed the potential of efficiency to contribute to an affordable, low carbon future. The National Research Council (NRC), relying on a study by the Lawrence Berkeley

National Laboratory (LBL),[7] and McKinsey and Company[8] concluded that efficiency could cut energy consumption by 25 percent to 30 percent at costs that are far below the current and projected future cost of new energy generation. The American Council for an Energy-Efficient Economy (ACEEE) took a somewhat different approach by modeling the energy efficiency provisions of the House bill. It found that, as passed, ACES would result in an 8 percent reduction in energy use nationwide by 2030, relative to the *Annual Energy Outlook 2009* forecast.[9] At the same time, the ACEEE study found that more aggressive efficiency policies would save a great deal more energy, approximately 27 percent, and produce much larger dollar savings. Another ACEEE that was done specifically for Florida found that aggressive policies to reduce energy consumption could lower demand by 20 percent at a cost of less than 3.5 cents per kWh.[10]

Thus, independently of any regulatory mandate, as the technology of efficiency is proven out, the Commission should consider greater reliance on it as part of the least cost approach to meeting the need for electricity. The combination of regulatory and technological changes will drive efficiency into the electricity sector, undermining the long-term feasibility of the reactors and the prudence of spending ratepayer money on these proposed reactors at this time.

Q. Please describe the emerging terrain of renewables.

---

[7] National Research Council of the National Academies, *America's Energy Future*, August 2009. The National Research Council relied on a study from Lawrence Berkeley National Laboratory (Brown, Richard, Sam Borgeson, Jon Koomey and Peter Biermayer, *U.S. Building-Sector Energy Efficiency Potential*, September 2008).

[8] McKinsey & Company, *Unlocking Energy Efficiency in the U.S. Economy*, July 2009.

[9] Gold, Rachel, Laura, et al., Energy Efficiency in the American Clean Energy and Security Act of 2009: Impact of Current Provisions and Opportunities to Enhance the Legislation, American Council for an Energy Efficient Economy, September 2009), page 5.

[10] Elliott, R. Neal, et al. *Potential for Energy Efficiency and Renewable Energy to Meet Florida's Growing Energy Demands,* American Council for an Energy-Efficient Economy, June 2007

A. The concern with climate change has sharpened the focus on the cost and availability of renewable technologies. For renewables, the change is in strong cost reductions that are expected as new technologies ramp up production, as shown in Exhibit MNC-14. The combination of regulatory and technological changes will drive renewables into the electricity sector, undermining the long-term feasibility of these proposed nuclear reactors and the prudence of spending ratepayer money on these proposed reactors at this time.

Execution Risk

Q. What is Execution Risk?

A. This is the risk that the project will not be implemented on time and on budget. It focuses on the internal management of the project by the companies. On the one hand, utilities tend to deny that execution risk exists. On the other hand, they tend to blame the slippage in execution of the project on other factors or actors, insisting that causes were beyond their control. This is most evident in the case of Progress, which is attempting to explain a five-year delay in the LNP.

I believe the Commission should look back at PEF’s decision to move forward with the project to ensure that a similarly flawed analysis is not used this year to determine whether or not completion of the LNP is feasible. Rushing ahead with the wrong project using models that distort the decision are execution problems from the broader perspective of least cost planning

Q. Can you quantify the benefits of making flexible investments in generating resources, as compared to nuclear power plants?

A. In my 2009 testimony I emphasized the importance of factoring excess capacity into the analysis when I stated.

EXHIBIT 30

> The operating cost estimates should not include excess production and the variable costs associated with that production. If capacity is idled because of excess, then the carrying cost of that excess should be subtracted from the savings. These are costs that would not be incurred if the system were "right" sized. Because nuclear reactors come in larger units and have higher capital costs, while natural gas units are small, lower in capital cost and have higher operating costs, ensuring that the model takes these differences into account become more important when demand declines and excess capacity increases….
>
> Over a long time horizon, the ability to match supply and demand (plus the reserve margin requirement) should be rewarded….
>
> While the excess capacity is a few percentage points spread over a number of years, it can make a difference if it is handled properly. The economic advantage claimed for nuclear is actually quite small, when compared to the total costs of the system.[11]

Having concluded that the need to meet the reserve margin should not be the driver of generation investments with demand growth slowing, developing approaches that allow the Commission to consider the differences between large, lumpy additions of capacity and smaller more flexible additions becomes critical. This is one area where the utilities have done nothing, so I have worked up an example of how important this consideration can be.

Q. What data did you use to develop this example?

A. I have used the detailed data on the CVPRR of the individual cost components provided by FPL in the 2009 docket, since this is the only such detail that has been provided in any of the dockets.[12] I use the high capital cost estimate from 2009, since that is close to the reference cases used in this docket. I have adjusted the discount rate since that has a large impact on the present value of costs. To make the adjustment, I inflated the 2009 PV numbers by the 2009 discount rate to arrive at a real, undiscounted estimate of the revenue requirement. I discounted those costs at the 2010 discount rate. I have also adjusted the natural gas costs to the 2010 estimates. By using these

---

[11] Cooper Testimony in Docket 090009-EI, pp. 34-36.

[12] Response to Staff Seventh Set of Interrogatories Question 64, attachment 1, page 7 of 9.

data provided by FPL, I am not agreeing with the cost inputs assumed by FPL in 2009 or 2010. This example is used to show the relative overall costs of a different scenario of adding natural gas generating capacity.

I used the 2009 capital costs as originally stated because several factors offset one another. The weighted average cost of capital has been reduced from 10.2 percent to 8.4 percent, but the capital cost of the project has been increased by 9 percent. Since I am focusing on the relative cost of nuclear and gas, not the absolute numbers, the example provides good insight into the impact of treating gas generation flexibly. In the 2009 analysis in the mid-gas, mid-compliance cost case, FPL calculated gas as 7.5 percent more costly than nuclear (without the capital cost of the new reactors). In the 2010 analysis, the difference was 7.7 percent.[13]

Q. How do you model the impact of installing smaller gas fired units incrementally?

A. FPL assumes that natural gas must be added in large increments that are roughly the same size at roughly the same time. Ironically, they sequence two nuclear reactors (about 18 months apart), but they do not sequence three combined cycle natural gas units to gain the economics of sequencing. If gas is treated as a more flexible source of generation, which it is, the Commission gets a very different picture of the relative economics.

Since FPL assumes three combined cycle units added at one time, Exhibit MNC-15 contrasts a scenario in which gas plants are added in three separate steps five years apart. Progress adds combined cycle units two at a time, suggesting there is some flexibility.

Exhibit MNC – 15 shows the small advantage that nuclear has in the FPL base case, because FPL projects that the large capital costs are eventually offset by rising natural gas prices. However,

---

[13] Compares Response to Staff Second Set of Interrogatories Question 45, attachment 1, to Sim Ex. SRS-10.

EXHIBIT 30

the net effect of treating gas as a more flexible resource is to lower the cost of gas by 17 percent, giving natural gas a cost advantage over nuclear that is larger than the base case advantage claimed for nuclear.

Exhibit MNC-15 also shows the effect of flexible gas additions with gas prices set at EIA gas projections. The combination of treating gas a resource that can be added in small increments and using a more reasonable projected price of gas lowers the gas cost by almost one-quarter.

Finally, MNC-15 shows the impact of a ten-year delay in the online operation of the proposed nuclear reactors. This would be consistent with the scenario in which climate policy reduced need for non-renewable resources as discussed above. The gas scenario would be almost 40 percent less costly than the scenarios that bring these reactors on line in the early 2020s.

Q. Do these results apply to Progress?

A. The reference cases for the two utilities are quite similar. As noted above, the gas price and carbon cost assumptions are similar. Progress has a slightly lower weighted average cost of capital because of assumed lower borrowing costs and a slightly lower discount rate. In the end, their base case results are quite similar, although that similarity is obscured by the methodology adopted by FPL to back into the capital cost number. FPL calculates how much it could spend on the nuclear project and still have it be less costly than gas. Progress estimates how much the nuclear project would cost if it spent a specific amount on the nuclear project and then asks how much consumers would save at the assumed cost of nuclear.

Using the data from the FPL scenarios, we can reconcile the two approaches. Exhibit MNC-16 shows that for every $1000/KW of overnight costs added to the nuclear project, the CVPRR of the nuclear project increases by $2.81 billion. Using FPL's high-end estimate of overnight costs of

EXHIBIT 30

$4950, which appears to be in the middle of the range considered by Progress, I calculate that FPL claims the nuclear project saves consumers $4.511 billion. This is quite close to the Progress mid-fuel, mid- carbon cost case reference capital cost case, which claims consumers would save $4.77 billion.

There are differences, however. Progress adds gas facilities in smaller increments. It has more excess capacity in the early years and is retiring gas plants, which could be put into inactive reserve. Moreover, Progress claims a very large cost savings by adding the two nuclear units in a year apart (i.e. the first unit costs almost twice as much as the second, (Updated Life-Cycle Net Present Works Assessment, JL –3, p. 3), which makes the increase in generation capacity from the nuclear project extremely large in an environment with more slowly growing demand.

The purpose of this example is not to offer a precise estimate of the costs, but to impress upon the Commission the importance of looking at the excess capacity issue and the value of the addition of smaller and more flexible increments. The specific parameters and assumptions that are applicable will affect the outcome of the analysis, but the order of magnitude of these effects indicate that they are extremely important for the Commission to consider.

Financial Risk

Q. Are there other quantifiable benefits of deferring the decision on nuclear construction further than the time proposed by PEF and FPL?

A. Yes. Utilities face capital constraints in the current environment and pursuing nuclear projects will make them worse, as shown in Exhibit MNC-17. The near-term capital requirements of nuclear reactors are much larger than those of gas plants. The financial ratios of the utilities can be

EXHIBIT 30

analyzed with and without the nuclear project and the impact of the weaker ratios of the cost of capital can be estimated.

Q. Are there other capital cost issues that the Commission needs to aware of?

A. Yes. The Commission must be careful not to establish a "Catch 22" that could ultimately costs ratepayers billions. It recently lowered the return on equity allowed for FPL. This has the effect of lowering the cost of capital-intensive project like nuclear reactors. FPL also uses the lower ROE to lower the discount rate in its analysis of long-term feasibility in this docket. This has the effect of increasing the net present value cost of alternatives with rising fuel prices, like natural gas.

However, FPL claims that the ROE set by the Commission may not be high enough to enable it to attract capital for nuclear reactors.[14] If the utility has trouble raising capital and the Commission is convinced to increase the ROE, then the long-term feasibility analysis required as part of this docket should be revisited, because both the changed ROE and discount rates will affect the results. This is not just an accounting question. Nuclear reactors have a higher cost of capital because they are more risky. It may be appropriate to use different costs of capital to assess different types of projects. Alternatively, the Commission could estimate the cost to consumers of the increase in the overall cost of capital resulting form the pursuit of the riskier project.

The Commission also needs to examine the discount rate used in the analysis. The utility is conducting the analysis from the utility point of view, decreasing the discount rate when the ROE is reduced. This has the anomalous effect of lowering the overall cost of both the nuclear and natural gas projects at the higher cost of capital. The higher the return on equity, the higher the nominal

---

[14] FPL response to OPC's Third Set of Interrogatories, Interrogatory No. 40, p.1.

EXHIBIT 30

value of the revenue requirement, but the lower the present value because the entire revenue requirement (not just the capital cost revenue requirement) is being discounted at a higher rate.

A case can be made that the investments should be viewed through the eyes of the ratepayer, not the utility. The ultimate objective of public utility regulation is to deliver reliable electricity at the least cost to consumers. If we take least cost to mean to the consumer, then an argument can be made that the consumer discount rate should be used. The utility cost of capital already reflects the primary utility concern about the revenue requirement. The consumer discount rate and the utility discount rate may or may not move in tandem. Moreover, utilities make choices that affect their cost of capital, but not the consumer discount rate.

Q. Please summarize your conclusions.

A. As I predicted in Docket 090009-EI, dramatically changed circumstances surrounding the licensing and construction of new nuclear reactors has forced PEF and FPL to push the possible construction of these proposed nuclear reactors off into the future beyond the time horizon of the ten-year planning process and even the extremely long lead time that they originally claimed was needed to construct new reactors. Nevertheless, despite even more uncertainty at this point in time, both PEF and FPL want to continue to spend ratepayer funds in the near term, even though those expenditures would provide little benefit to ratepayers. Put simply, the near term expenditure of funds to allow PEF and FPL to sit in line at the NRC is not only unnecessary, but also unreasonable and imprudent. Ultimately, neither PEF nor FPL can demonstrate the long-term feasibility of these proposed nuclear reactors if realistic assumptions are made about future demand and the cost of various alternatives as I have discussed above.

EXHIBIT 30

Instead of forcing ratepayers to pay for PEF and FPL to sit in line, the time that recent developments afford the utilities and the Commission should be used to study the landscape and gather information, as opposed to plowing ahead and continuing to spend ratepayer funds on proposed reactors that increasingly look like bad decisions. Over the next few years the high degree of uncertainty regarding all of the key parameters that affect the decision may be sharply reduced:

- Market factors including demand growth after the recession and gas prices.
- Federal climate policy including targets and timing of emission reductions, efficiency and renewable mandates affecting the need for non-renewable generation, the existence, mechanism and level of a price on carbon, flexibility in the purchase of allowances.
- Regulatory uncertainty in the NRC design certification and reactor licensing
- Technology factors including the cost of nuclear, particularly, first of a kind v. later costs, and alternatives
- Financial pressures on the utility balance sheets may alleviate

The Commission can, and should, use this time to require the utilities to build and test models that reflect a broader view of least cost generation supply.

Ultimately, spending valuable ratepayer dollars in the near term to advance projects that are not feasible in the long-term is imprudent. The delays in projected online operation of these proposed reactors should provide a respite from these spending of funds until the utilities can demonstrate that completion of these proposed reactors is feasible in the long-term and that continuing to incur costs on the reactors is reasonable and prudent.

Q. Does this conclude your testimony?

A. Yes.

EXHIBIT 30

Docket 100009-EI
Exhibit MNC-1
Page 1 of 2

RISK FACTORS FACING CONSTRUCTION OF NEW NUCLEAR REACTORS

Category	**Source**	**Specific Risks**
Technology risk stems from the fact that the new generation of nuclear reactors are new and uncertain. Cost estimates have increased dramatically over the past five years, doubling or tripling. At the same time, the technologies of alternatives, efficiency and renewables are stable and well known. Costs are declining and availability is rising	New Technology Risk	First of a kind costs Long-lead time
	Alternative technologies	Efficiency potential identified Renewable cost declines
Policy risk stems for the fact that federal policy is in flux. While nuclear advocates have looked to climate policy, which may put a price tag on carbon emissions, as a primary driver of the opportunity to expand the role of nuclear power, they have failed to take account of the equally strong possibility that climate policy will create a very substantial mandate for conservation and renewables, which will dramatically shrink the need for new, nonrenewable generating capacity	Shifting focus	Emphasis on efficiency reduces need Emphasis on renewables reduces need
	Flexible GHG reductions	Lowers carbon cost
Regulatory risk stems from the chance that regulators will move slowly in approving reactors or authorizing their cost recovery. The new designs has proven challenging, with the reference designs going through dozens of revisions. Site-specific issues, which cannot be standardized, have proven contentious. While a few states have approved construction work in progress and other measures to ensure cost recovery, the vast majority has not.	NRC Regulatory Reviews	Lack of Experience Change of requirements Design flaws and revisions Site specific contentions
	Loan Guarantee Conditions	Taxpayer protections inhibit loans
	Rate Review	Recovery of costs challenged

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-1
Page 2 of 2

Execution risk stems from the fact that these reactors are new and the industry does not have a great deal of capacity. Of the 20 projects that have applied for licenses at the Nuclear Regulatory Commission, eighteen have suffered from one or more of the following problems, delay, cancellation, cost escalation or financial downgrade.

Construction Risk	Lack of experience
	Counterparty risk
EPC contract uncertainties	Cost escalation and volatility
Size, cost and complexity	Cost overruns
	Delays

Marketplace risk on the demand-side flow from the current recession, the worst since the Great Depression, which has not only resulted in the largest drop in electricity demand since the 1970s, but also appears to have caused a fundamental shift in consumption patterns that will lower the long term growth rate of electricity demand dramatically. On the supply-side of the market, there are a host of alternatives that have lower cost to meet the need for electricity in a carbon-constrained environment and there is growing confidence in the cost and availability of alternatives.

Uncertain demand growth	Slowing due to recession
	Shifting due to debt and loss of wealth
Uncertain fuel costs	Natural gas price decline
Reactor Costs	Long lead time
	Cost overruns
	Rate shock reduces demand

Financial risk stems from all of the above risks and are magnified tight conditions in money markets and the fact that utility balance sheets are weak and too small to support the large size of nuclear reactor projects. The nature of the projects imposes additional financial risks, so much so that, for most utilities, the projects are so large that Moody's has called them "bet the farm" decisions.

General Conditions	Tight money
	New Liquidity requirements
	High-risk premiums
Utility Finance	Increased nuclear operating exposure
	Existing debt and need to refinance
	Financial ratio deterioration
	Rising cost of debt
	Limited & declining cash & equivalents
	Weak balance sheets
	Underfunded pension plans
Project Finance	High hurdle rate for risky projects
	Impact of large project
	Debt load and service burden impact
	Capital structure distortion

Source: Mark Cooper, *All Risk, No Reward* (Institute for Energy and the Environment, December 20009)

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-2
Page 1 of 1

Unrealistic Assumptions Masking the Real Economics of Nuclear Reactors

Technology:

- **Assumption:** Nuclear cost projections were low, while the cost characteristics of alternatives were ignored. The contribution that alternatives (efficiency and renewables in particular) can make to meet the need for electricity was downplayed.
- **Reality:** Nuclear costs are much higher than originally claimed and remain highly uncertain. There is growing confidence in the cost and availability of alternatives that makes them more attractive.

Policy:

- **Assumption:** Public policy would put a high price on carbon and escalate the demand for nuclear because alternatives (especially efficiency and renewables) would not also be promoted by public policy.
- **Reality:** Efficiency/renewable standards are likely to play a large part in climate policy. This makes alternatives more attractive. Reliance on efficiency, international offsets, and other policies that provide flexibility in meeting greenhouse gas abatement goals lowers the cost of carbon.

Regulatory:

- **Assumption:** The standardized designs would lead to rapid approval of licenses and work authorizations. Loan guarantees would flow with little scrutiny and oversight.
- **Reality:** The standard designs have proven not to be so standard, with dozens of revisions forwarded to the Nuclear Regulatory Commission for evaluation. Site-specific issues cannot be standardized and they remain the object of important contentions.

Execution:

- **Assumption:** Standardized design and accelerated certification would enable utilities to quickly move into the construction phase. Low estimates of the cost of nuclear reactors would lead to rapid regulatory approval and support at the state level.
- **Reality:** Standardized designs have gone through numerous revisions. Site approvals remain contentious. Approval of loans has required more time and information than anticipated. Technological uncertainty raises prospects of cost overruns. First of a kind costs and lack of standard design raises construction risk and construction has not begun in the U.S., while projects abroad have encountered difficulties. Operating risks of new designs are unknown and foreign activities to not resolve these concerns.

Marketplace:

- **Assumption:** Demand growth and commodity prices for fossil fuels would remain high.
- **Reality:** Declining demand as a result of the "Great Recession" reduces need for large quantity of new generation. Falling price of natural gas makes natural gas more attractive. Growing confidence in lower cost alternatives makes them more attractive.

Finance

- **Assumption:** Financing would be readily available.
- **Reality:** Tight Financial markets make finance more difficult generally. The large size of the project relative to the balance sheets of utilities and the increasing concern about nuclear reactors makes capital market finance more expensive and difficult, if not impossible.

Source: Mark Cooper, *All Risk, No Reward* (Institute for Energy and the Environment, December 20009)

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-3
Page 1 of 1

INCREASING RISKS FACING NUCLEAR REACTOR CONSTRUCTION PROJECTS

Cooper Category	Areas of concern (p. 11)	Negative impact on nuclear build
Regulatory:	Federal licensing and permitting	NRC slippage (pp. 8-11)
	State: DSM	Lower demand (p. 24)
Policy:	Federal	Failure to decide environmental policy (p. 31) Yucca Mtn. waste (p.37) EPA under Clean Air Act (p. 32)
	State	Legislative opposition to nuclear (p. 27) RPS standards (p. 30)
Technology	Capital intensity	Fixed, sunk costs (p. 15)
Marketplace:	Load growth,	Recession slowdown (p. 13
	Consumer pocketbooks	Inability to pay (p.12)
Financial:	Capital market reactions	Fewer internal funds (p. 13)
		Negative ratings (pp. 15-19)

Source: Page References to Direct **Testimony of Jeff Lyash, Docket No. 100009, April 30, 2010**

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-4
Page 1 of 4

NEGATIVE EVENTS IN THE NUCLEAR RENAISSANCE

Month	**Event**
Jan-08	MidAmerican cancels proposed Idaho reactor (1)
Feb-08	NRC suspends application for *South Texas Project* reactors because application is incomplete (NRG has since reapplied) (2)
Feb-08	Florida Power and Light revises cost estimates for *Turkey Point* reactors from around $8 billion to $24 billion (3)
Mar-08	Progress Energy triples cost estimates for *Levy County* reactors to $17 billion (4)
Aug-08	Constellation increases cost estimates for *Calvert Cliffs* reactors from $2 billion to $9.6 billion (5)
Oct-08	Progress Energy increases cost estimates for *Shearon Harris* reactors from $4.4 billion to $9.3 billion (6)
Nov-08	Duke Energy increases cost estimates for *William States Lee* reactors from $5 billion to around $11 billion (7)
Dec-08	TVA increases cost estimates for *Bellefonte* reactors from $6.4 billion to $10.4 billion (8)
Mar-09	Entergy suspends application for *River Bend* reactor in Louisiana (9)
Mar-09	Entergy suspends application for *Grand Gulf* reactor in Mississippi (10)
Apr-09	AmerenUE cancels proposed *Callaway* reactor (11)
May-09	Exelon cancels two proposed *Victoria County* reactors (Has since reapplied for an Early Site Permit) (12)
May-09	Progress Energy in Florida announces at least a 20-month delay on planned reactors at *Levy County* (13)
May-09	PPL's cost estimates for one reactor at *Bell Bend* skyrockets from $4 billion to $13-15 billion (14)
May-09	Moody's downgrades PPL to negative outlook over proposed reactor at *Bell Bend* (15)
Jul-09	Moody's and Fitch downgrade SCE&G due to proposed *VC Summer* reactors (16)
Aug-09	TVA cancels three proposed reactors at *Bellefonte* site (17)
Aug-09	Constellation delays NRC's review of *Nine Mile Point* application to September 2010, a one-year delay (18)
Aug-09	NRC delays the scheduled publication of the final environmental review for Constellation's *Calvert Cliffs* in Maryland to February 2011, a delay of 13 months (19)
Aug-09	TVA delays proposed *Bellefonte* reactor from 2016 to 2020-2022 (20)
Sep-09	AP-1000 design in 17th revision; NRC announces more problems that will likely delay AP-1000 designs like *Shearon-Harris, Lee,* and *Vogtle* reactors
Sep-09	Duke delays *William States Lee* reactors from 2016 to 2021 (21)
Sep-09	Moody's gives negative credit rating to Oglethorpe over planned investment in *Vogtle* reactors (22)

EXHIBIT 30

Oct-09	NRC identifies significant safety issues with AP-1000 shield design, potentially signaling delays with over half of the proposed reactors in the US (23)
Oct-09	New cost estimates for *South Texas Project* reactors go up $4 billion, a 30% increase (24)
Nov-09	Fitch downgrades SCANA over risks posed by SCE&G’s two nuclear reactors at *VC Summer* (25)
Nov-09	Areva announces plans to modify EPR reactor design at the request of safety bodies in the UK, France, and Finland (26)
Dec-09	Unistar asks NRC to suspend application for *Nine Mile Point 3* reactor (27)
Jan-10	FP&L announces that they’ll suspend plans for *Turkey Point* reactors based on decision of Florida PSC to reduce proposed rate hike from $1.26 billion to $75.5 million (28)
Jan-10	Progress Energy announces that they’ll slow the *Levy County* process based on the same Florida PSC decision, in which they got none of a $500 million rate hike request (29)
Jan-10	Fitch puts FP&L (*Turkey Point* reactors) on ratings watch ‘Negative’ after decision by Florida PSC to not provide CWIP (30)
Feb-10	Progress Energy extends delay on L*evy County* reactors to at least 36 months. (31)
Feb-10	Toshiba/Westinghouse indicate that regulatory problems will in Florida (*Turkey Point* and *Levy County*) for up to 3 years. (32)
Mar-10	FP&L announces delay of *Turkey Point* reactors past 2018, signals interest in federal loan guarantees. (33)
Apr-10	Moody’s downgrades FP&L from low to moderate risk over *Turkey Point* reactors. (34)
Apr-10	NRC states that design-review certification of US-APWR will take at least an additional six months, shifting deadlines well into 2011. (35)
May-10	Cost estimates move from $17.2 billion for the two reactors to $22.5 billion for *Levy County* reactors. (36)
May-10	Fitch downgrades Progress Energy (*Levy County* and *Shearon Harris* reactors) to just above junk bond status. (37)
May-10	TVA opts to go with old Babcock and Wilcox design for single reactor at *Bellefonte*, citing untested status of new designs. (38)
May-10	The timeline for the two *Levy County* reactors has been pushed back again, with the first due in 2021, the second some 18 months later. The original timeline had the reactors set to come online in 2016 and 2018 respectively. (39)

Sources

1- http://www.boiseweekly.com/boise/nuclear-dropout/Content?oid=935457
2- http://www.austinchronicle.com/gyrobase/News/Blogs/?oid=oid:592344
3- http://www.nukefree.org/node/154

EXHIBIT 30

4- http://www.tampabay.com/news/business/energy/article414393.ece
5- http://www.nirs.org/factsheets/mdatwhatcostfactsheet.pdf
6- http://www.wral.com/news/news_briefs/story/3759561/
7- http://www.world-nuclear-news.org/NN-Duke_raises_cost_estimate_for_Lee_plant-0711084.html
8- http://timesfreepress.com/news/2008/dec/12/tennessee-estimates-rise-nuclear-plant/?local
9- http://www.bloomberg.com/apps/news?pid=21072065&refer=conews&tkr=ETR%3AUS&sid=aQcR4U.m.9ic10- Ibid
11- http://www.komu.com/satellite/SatelliteRender/KOMU.com/ba8a4513-c0a8-2f11-0063-12-bd94c70b769/d7e98869-80ce-0971-01b0-5ba68260a7c2
12- http://blogs.wsj.com/environmentalcapital/2009/06/30/no-nukes-of-exelon-and-rising-government-influence/
13- http://www2.tbo.com/content/2009/may/01/011253/progress-energy-delays-nuclear-plant/news-money/
14- http://www.nonukesyall.org/pdfs/taxpayers_for_common_sense.pdf
15- http://www.thestreet.com/story/10499503/moodys-changes-ppl-outlook-to-negative.html
16- http://www.southernstudies.org/2009/07/nuclear-plans-hurting-power-companies-credit-ratings.html
17-` http://www.tva.gov/environment/reports/blnp/index.htm
18- http://www.valleynewsonline.com/viewnews.php?newsid=86590&id=1
19- http://adamswebsearch2.nrc.gov/idmws/doccontent.dll?library=PU_ADAMS^PBNTAD01&ID=092400026
20- http://www.timesfreepress.com/news/2009/aug/07/bellefonte-construction-pushed-back-again/
21- http://www.nrc.gov/reactors/new-reactors/design-cert/amended-ap1000.html
22- http://www.opc.com/oracle_cons/groups/public/@opc-web/documents/webcontent/ct_000404.pdf
23- http://charlotte.bizjournals.com/charlotte/blog/power_city/2009/10/nrc_rejects_westinghouse_reactors_shield_design.html
24- http://www.mysanantonio.com/opinion/67038032.html
25- http://www.earthtimes.org/articles/press/fitch-rates-scanas-junior-subordinated-notes-bbb,1050101.html
26- http://www.nuclearpowerdaily.com/reports/Nuclear_safety_bodies_call_for_redesign_of_EPR_reactor_999.html
27- http://www.syracuse.com/news/index.ssf/2009/12/application_reivew_for_buildin.html
28- http://www.salem-news.com/articles/january182010/fla_nukes.php
29- http://triangle.bizjournals.com/triangle/stories/2010/01/18/daily14.html
30- http://www.earthtimes.org/articles/press/fitch-places-florida-power-amp,1117524.html
31- http://www.istockanalyst.com/article/viewiStockNews/articleid/3880743
32- http://www.reuters.com/article/idUSSGE6120H420100203
33- http://www.istockanalyst.com/article/viewiStockNews/articleid/3880743
34- http://www.streetinsider.com/Downgrades/Moodys+Downgrades+FPL+Group+%28FPL%29+Credit+Ratings+from+A2+to+Baa1%3B+Outlook+Stable/5517661.html
35- http://www.nrc.gov/reactors/new-reactors/design-cert/apwr/review-schedule.html

EXHIBIT 30

36- http://www.gainesville.com/article/20100506/ARTICLES/5061056

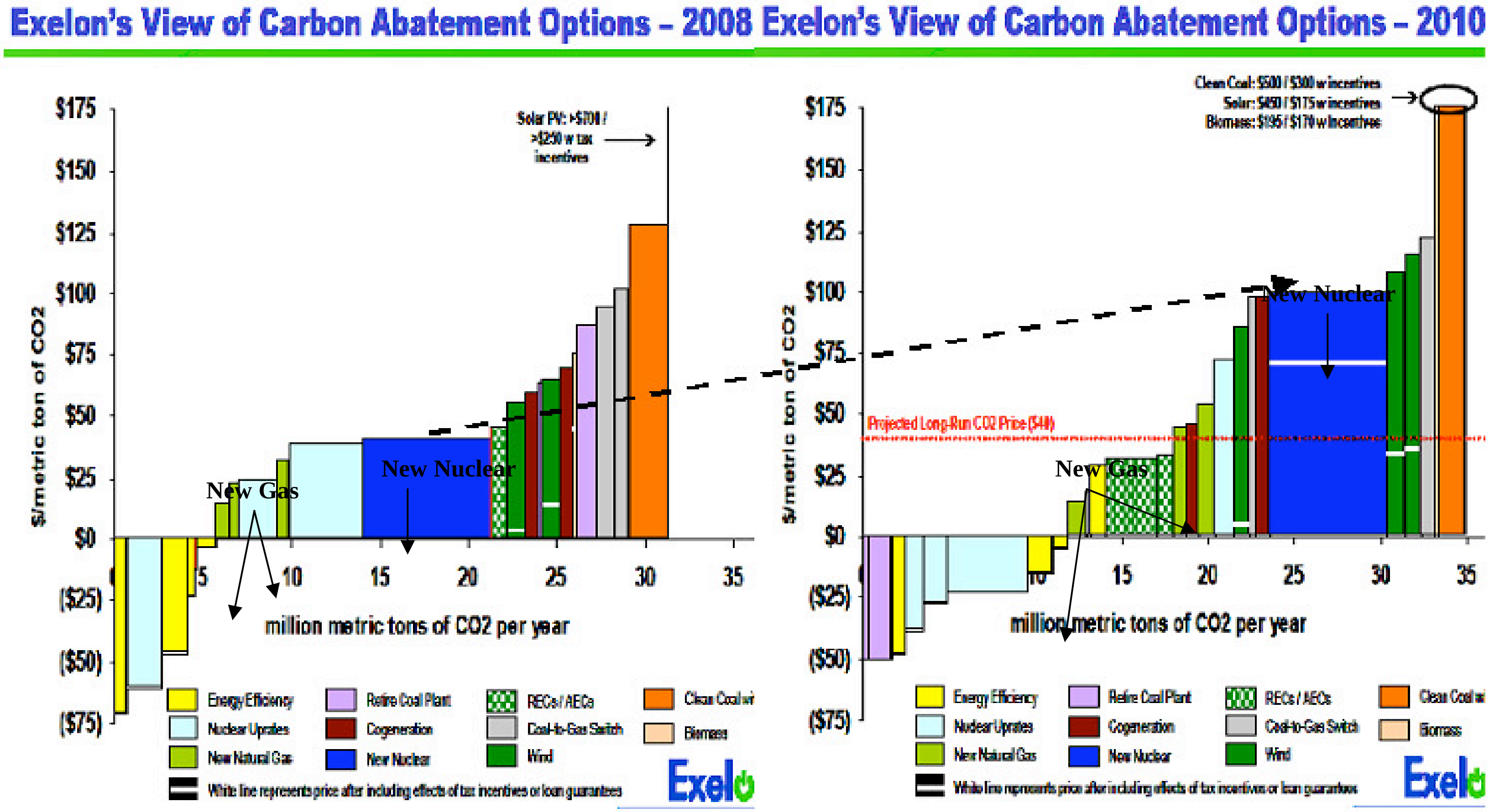
Docket No. 100009-EI
Exhibit MNC-4
Page 4 of 4

37- http://www.bizjournals.com/tampabay/stories/2010/04/26/daily39.html?ana=from_rss&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+bizj_tampabay+%28Tampa+Bay+Business+Journal%29
38- http://blog.al.com/breaking/2010/05/tva_recommending_conventional.html
39- http://www.gainesville.com/article/20100506/ARTICLES/5061056

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-5
Page 1 of 1

EXELON'S VIEW OF THE DETERIORATING NUCLEAR AS A CARBON ABATEMENT OPTION

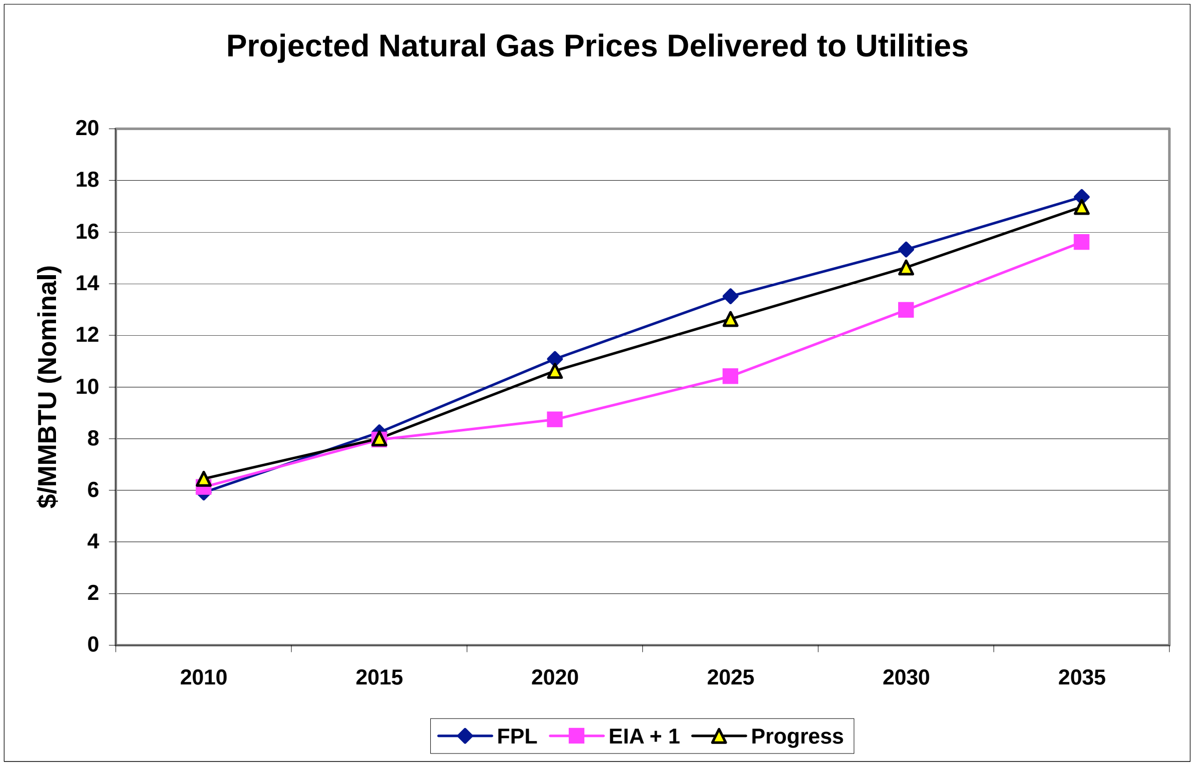


Source: John W. Rowe, *Fixing the Carbon Problem without Breaking the Economy,* Resources for the Future Leadership Forum Lunch, May 12, 2010

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-6
Page 1 of 1

PROJECTED NATURAL GAS PRICES COMPARED TO EIA PROJECTIONS

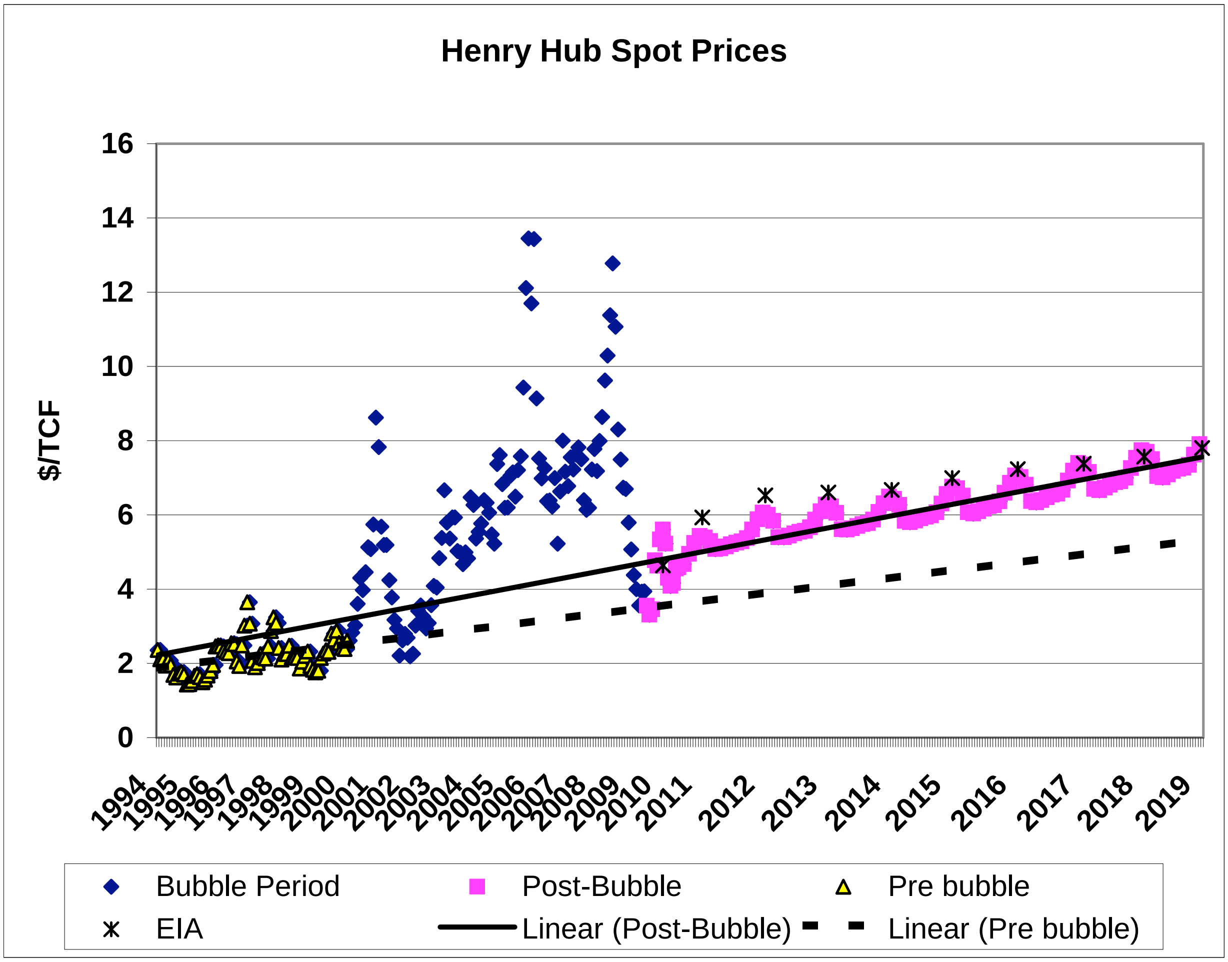


Source: FPL, Sims SRS-2, p. 1-of-1; PEF: Lyash, JL-3, p. 4 of 12. EIA, Annual Energy Outlook, Table 13. *http://www.eia.gov/oiaf/forecasting.html*

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-7
Page 1 of 1

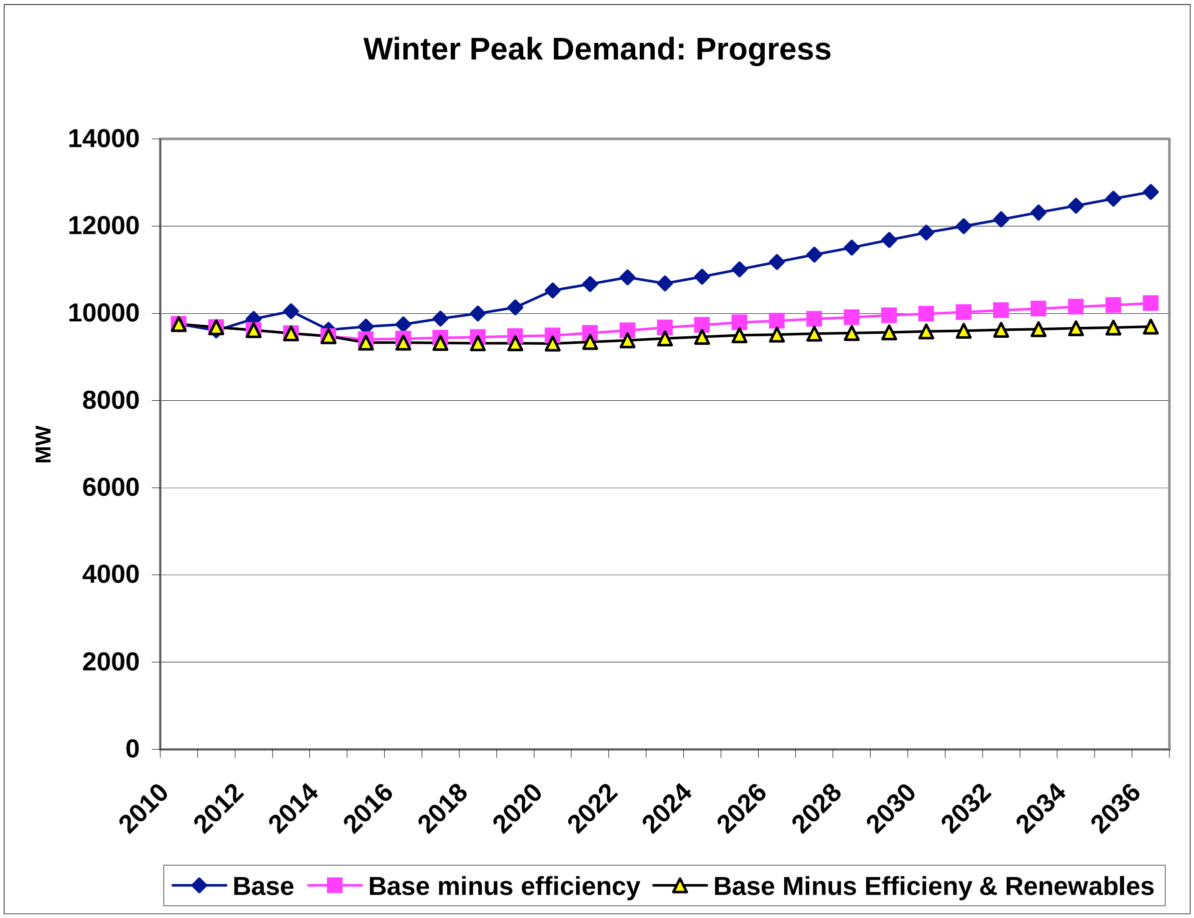
THE DECADE OF VOLATILE NATURAL GAS PRICES MAY HAVE BEEN THE EXCEPTION, NOT THE RULE



Source: Pre-bubble, Energy information Administration http://www.eia.gov/dnav/ng/ng_pri_fut_s1_d.htm; Post-bubble, NYMEX visited 6/30/10.

Docket No. 100009-EI
Exhibit MNC-8
Page 1 of 1

DECLINING PEAK LOAD PROJECTIONS

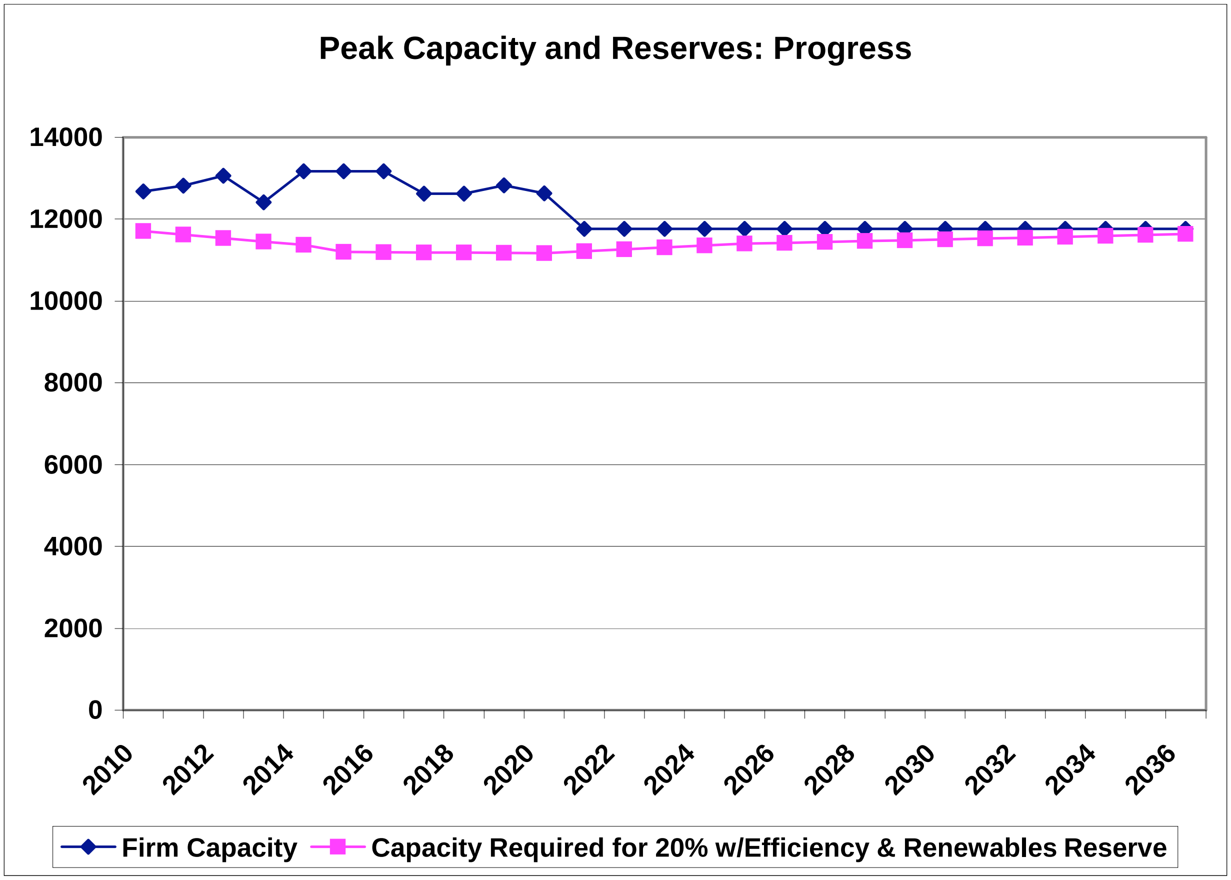


Source: Progress Energy Florida: Levy Nuclear Project NCRC, Updated Life-Cycle Net Present Worth (CPVRR) Assessment, p. 10; efficiency and renewables based on Environmental Protection Agency, *Supplemental EPA Analysis of the American Clean Energy and Security Act of 2009, January 29, 2010,* p. 38.

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-9
Page 1 of 1

DECLINING PEAK LOAD AND CAPACITY NEEDS

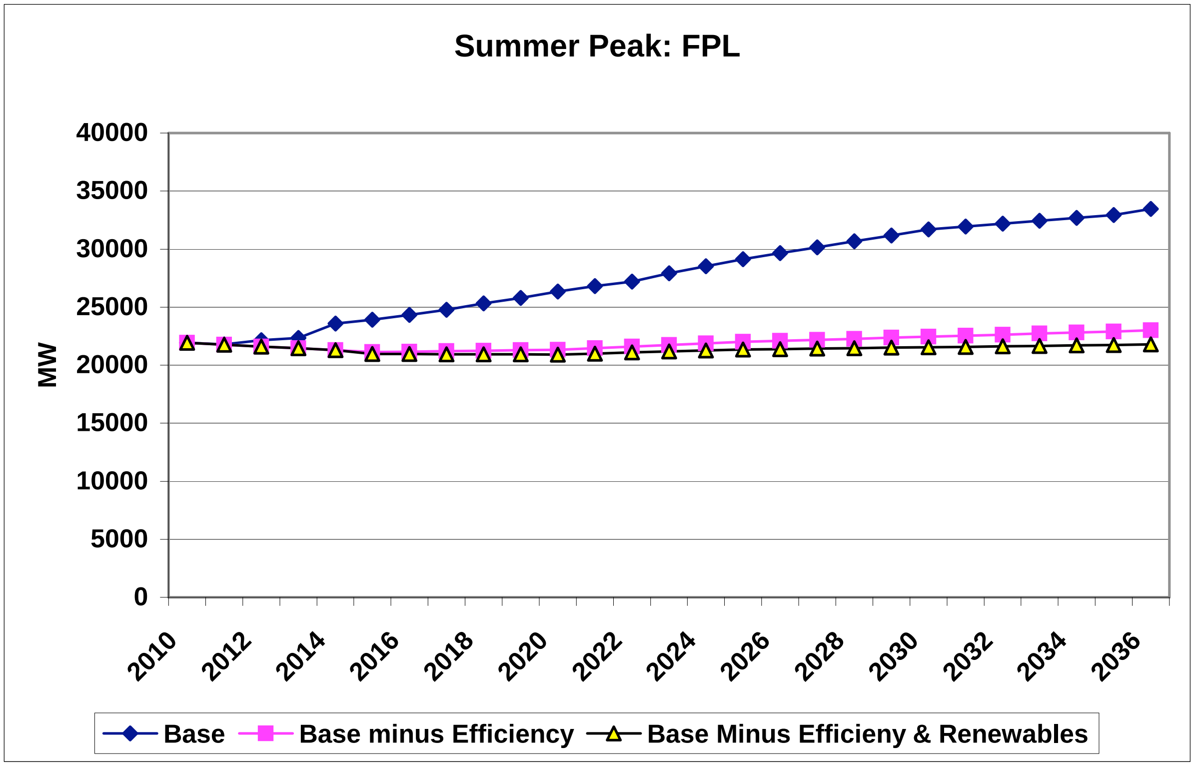


Source: Progress Energy Florida: Levy Nuclear Project NCRC, Updated Life-Cycle Net Present Worth (CPVRR) Assessment, p. 10; efficiency and renewables based on Environmental Protection Agency, *Supplemental EPA Analysis of the American Clean Energy and Security Act of 2009, January 29, 2010*, p. 38.

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-10
Page 1 of 1

DECLINING PEAK LOAD PROJECTIONS

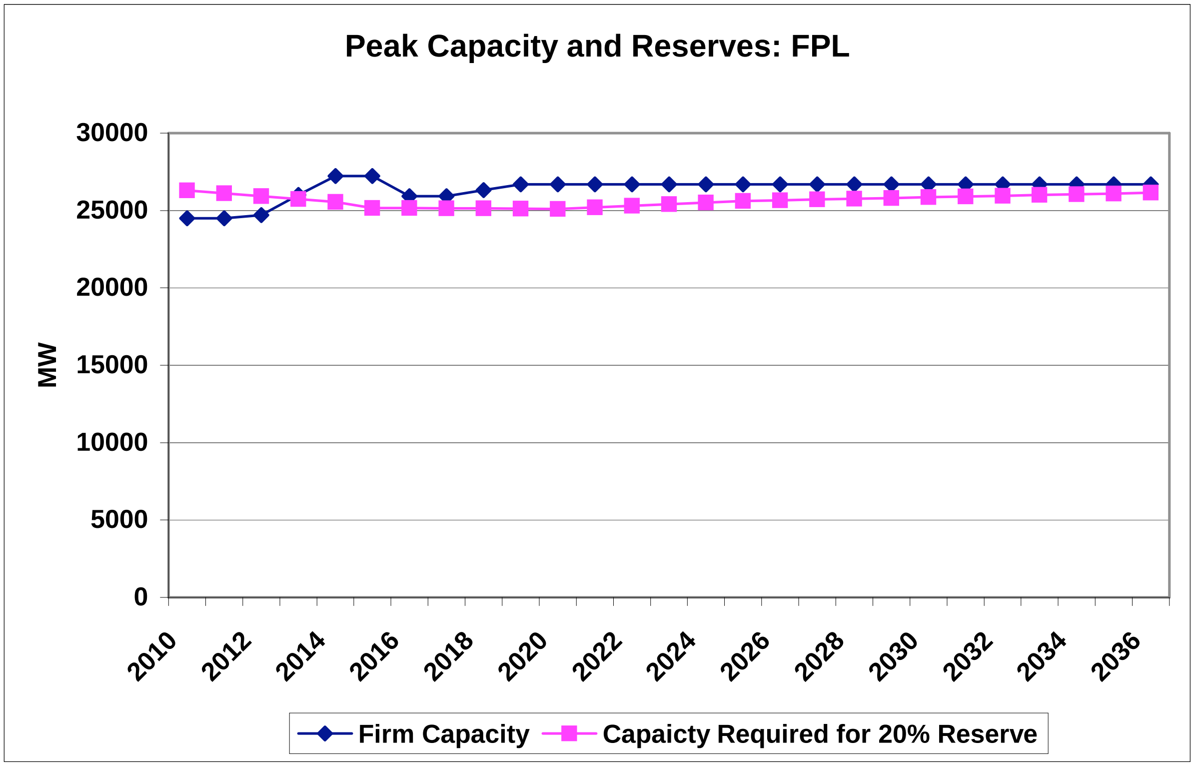


Source: Testimony of Steven R. Sim, Docket No. 100009-EI, SRS-4, efficiency and renewables based on Environmental Protection Agency, *Supplemental EPA Analysis of the American Clean Energy and Security Act of 2009, January 29, 2010*, p. 38.

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-11
Page 1 of 1

DECLINING PEAK LOAD AND CAPACITY REQUIREMENTS

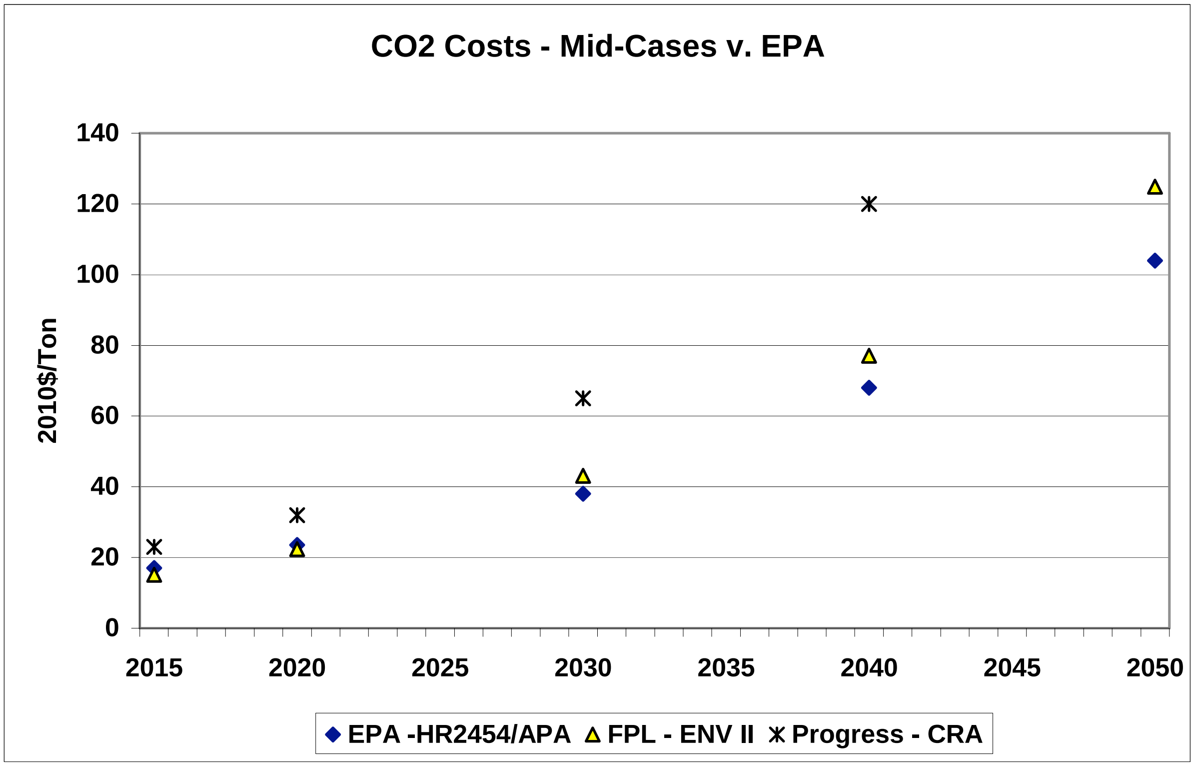


Source: Testimony of Steven R. Sim, Docket No. 100009-EI, SRS-4, efficiency and renewables based on Environmental Protection Agency, *Supplemental EPA Analysis of the American Clean Energy and Security Act of 2009, January 29, 2010,* p. 38.

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-12
Page 1 of 1

PROJECTIONS OF CARBON COMPLIANCE COSTS



Source: Progress Energy Florida: Levy Nuclear Project NCRC, Updated Life-Cycle Net Present Worth (CPVRR) Assessment, p. 2;Testimony of Steven R. Sim, Docket No. 100009-EI, SRS-3, efficiency and renewables based on Environmental Protection Agency, *Supplemental EPA Analysis of the American Clean Energy and Security Act of 2009, January 29, 2010,* p. 18.

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-13
Page 1 of 2

PROJECTIONS OF OVERNIGHT CONSTRUCTION COSTS

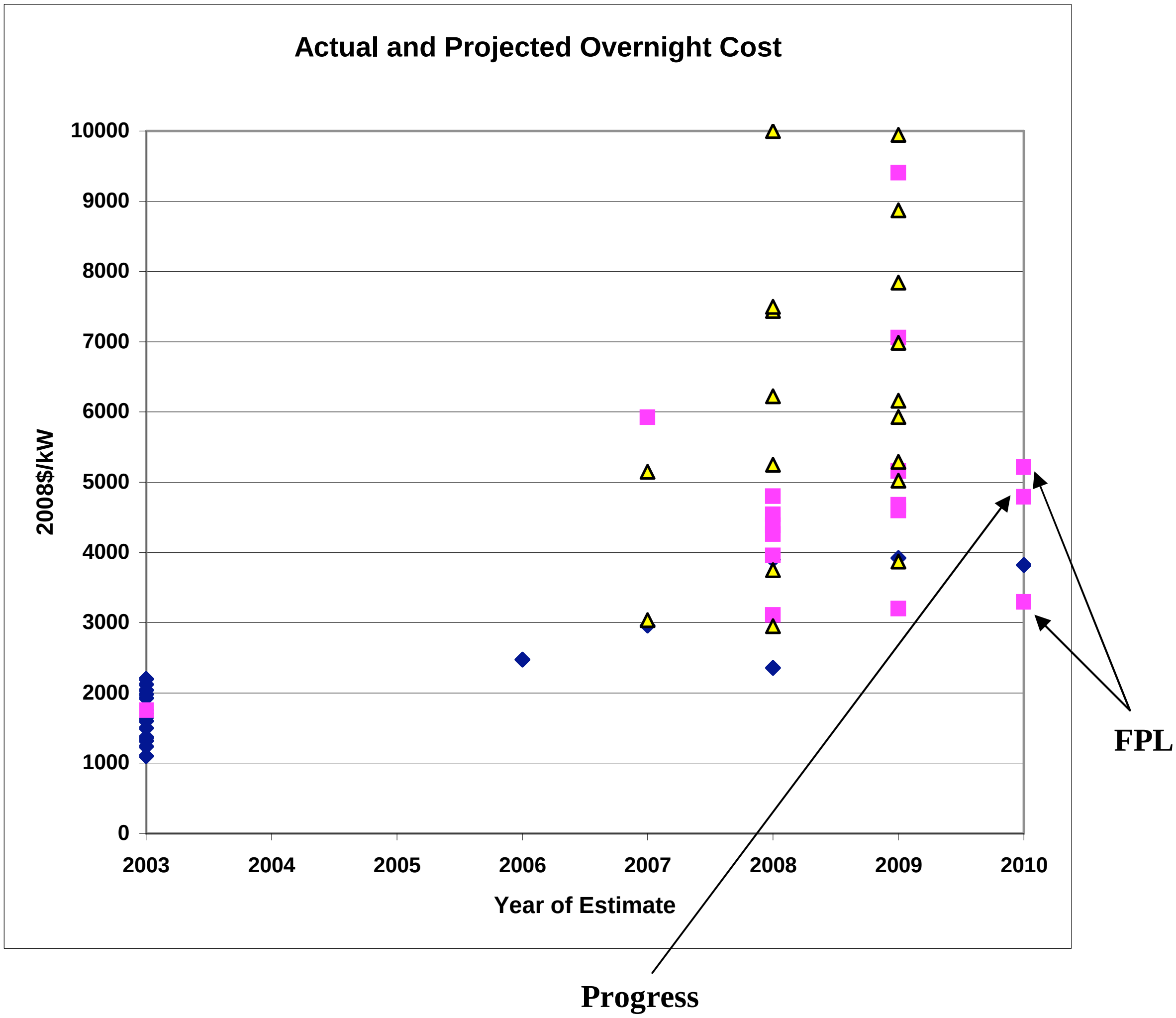


EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-13
Page 2 of 2

Source: Mark Cooper, The Economics of Nuclear Reactors: Database, updated

CEC 2008: California Energy Commission, 2008, *Comparative Costs of California Central Station Electricity Generation,*

CEC 2009: California Energy Commission, 2009, Staff Draft, *Comparative Costs of California Central Station Electricity Generation Technologies Cost of Generation Model*, August

CBO: Congressional Budget Office, 2008, *Nuclear Power's Role in Generating Electricity*, May 2008.

Constellation: http://www.foxbusiness.com/story/markets/industries/utilities/new-maryland-nuclear-reactor-depends-loan-guarantee--constellation/
http://www.nonukesyall.org/pdfs/taxpayers_for_common_sense.pdf

CRS: Kaplan, Stan, 2008, *Power Plants: Characteristics and Costs,* Congressional Research Service, November 13, 2008.

Energy Information Administration, 2009, "Electricity Market Module," *Annual Energy Outlook*, various years

Harding 2008: Harding, Jim, 2008, "Climate Change and Nuclear Power," California Science Center Debate, February

Harding 2009: Harding, Jim, 2009, Economics of Nuclear Reactors and Alternatives, February 2009.

Johnson, Clarance, *Cost of Current and Planned Nuclear Power Plants in Texas: A Consumer Perspective,* CJE Consulting, N.D.

Keystone Center, 2007, *Nuclear Power Joint Fact-Finding*, June 2007.

Lazard, 2008, *Levelized Cost of Energy Analysis—Version 2.0*, June 2008, p. 10

Lazard, 2009, *Levelized Cost of Energy Analysis – Version 3.0*, February

MIT, 2003 *The Future of Nuclear Power*, 2003.

MIT, 2009, Deutsch, John, M. et al., 2009, *Update of the MIT 2003 Future of Nuclear Power*, MIT Energy Initiative, 2009.

Moody's, 2008, New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities, May 2008.

Severance, Craig A. 2009, *Business Risks and Costs of New Nuclear Power*, January 2, 2009.

Standard and Poor's, 2008, *The Race for the Green: How Renewable Portfolio Standards Could Affect U.S. Utility Credit Quality*, March 10, 2008,

University of Chicago, 2004, *The Economic Future of Nuclear Power: A Study Conducted* at the University of Chicago, August 2004

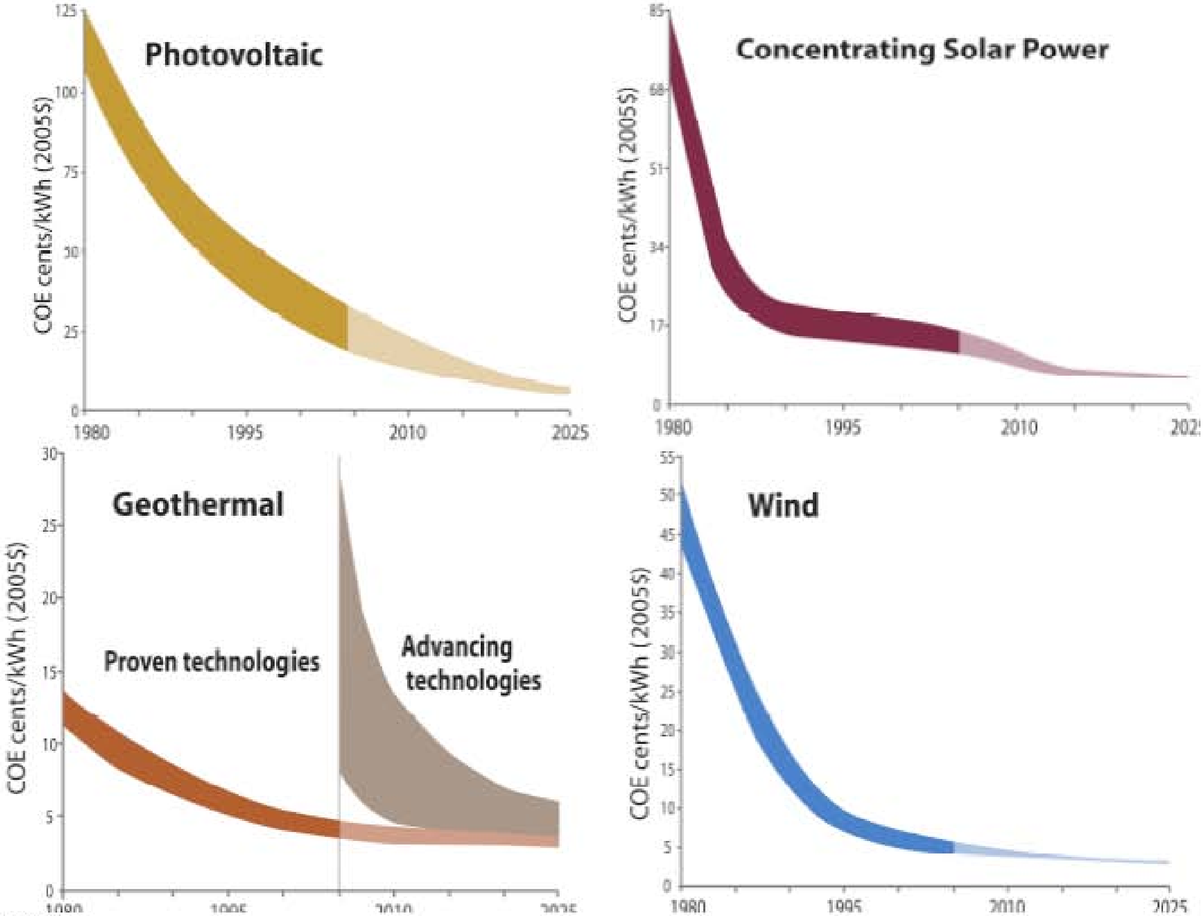
Westinghouse/BNFL, 2003, *The AP1000 Reactor Nuclear Renaissance Option* (Tulane Engineering Forum, September 26), presentation by Senior Vice President and Chief Technology Officer, Dr. Regis A. Matzie

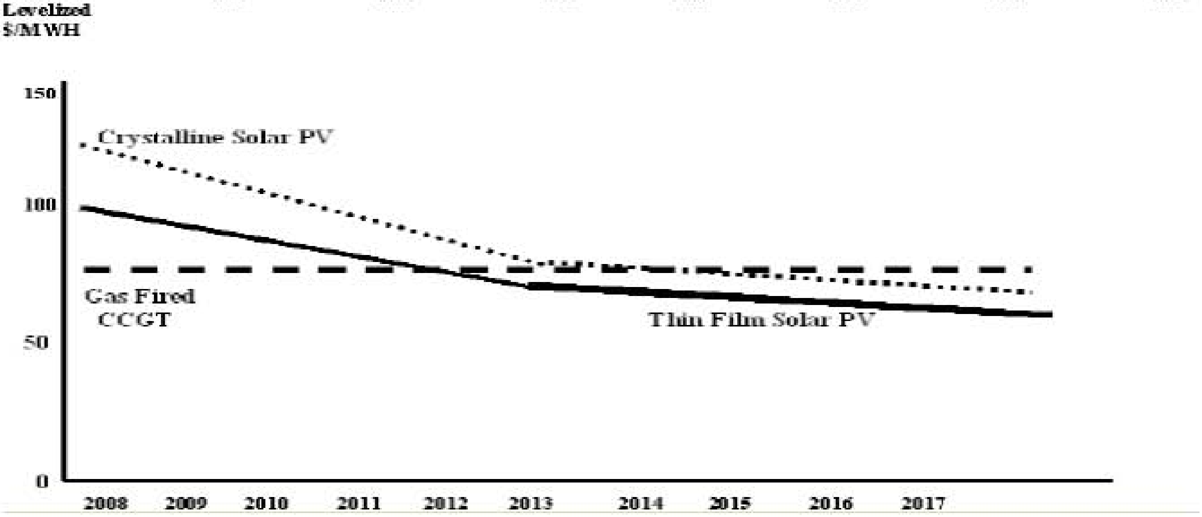
Progress Energy Florida: Levy Nuclear Project NCRC, Updated Life-Cycle Net Present Worth (CPVRR) Assessment, p. 3

Testimony of Steven R. Sim, Docket No. 100009-EI, SRS-5

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-14
Page 1 of 1
DECLINING COST OF RENEWABLES





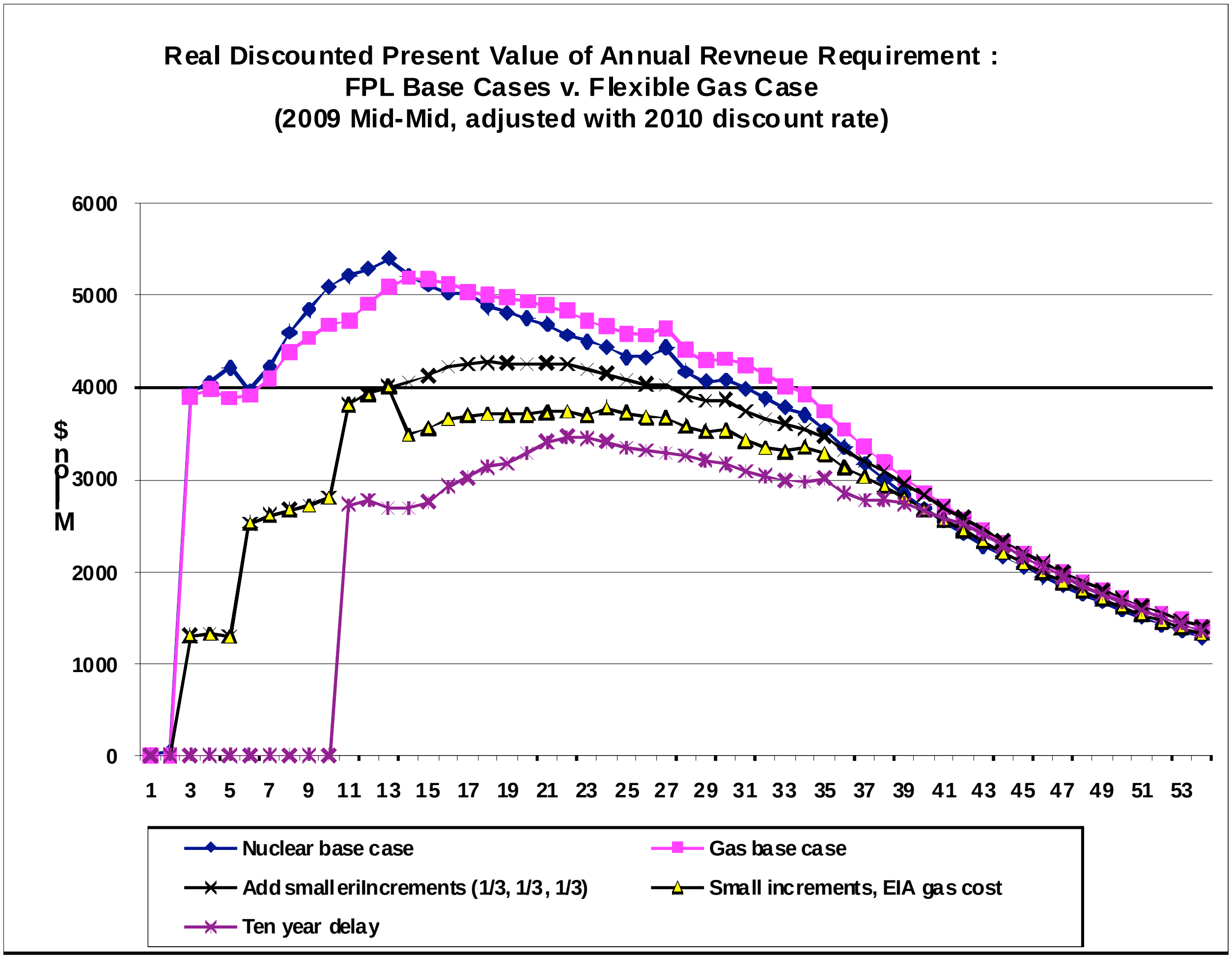
Source: National Renewable Energy Laboratory, *Renewable Energy Cost Curves*, 2005; Lazard, 2008, *Levelized Cost of Energy Analysis—Version 2.0*, June 2008.`

EXHIBIT 30

Docket No. 100009-EI

Exhibit MNC-15
Page 1 of 1

FLEXIBLE GAS ADDITIONS LOWER REVENUE REQUIREMENTS

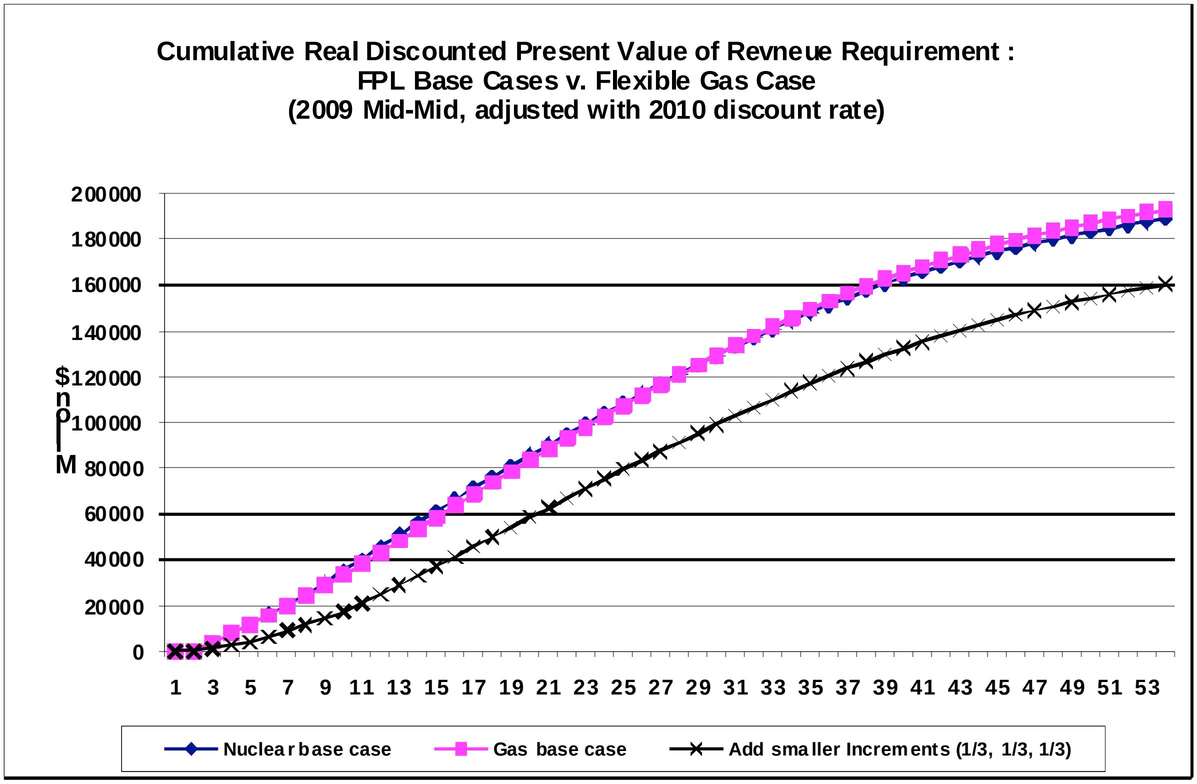


Source: Florida Power & Light, ***Response to Staff's Second Set of Interrogatories, Interrogatory No. 64, p. 7.***

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-16
Page 1 of 1

CUMULATIVE COST DIFFERENCE: FLEXIBLE V. LUMPY TREATMENT OF NATURAL GAS GENERATION ADDITIONS

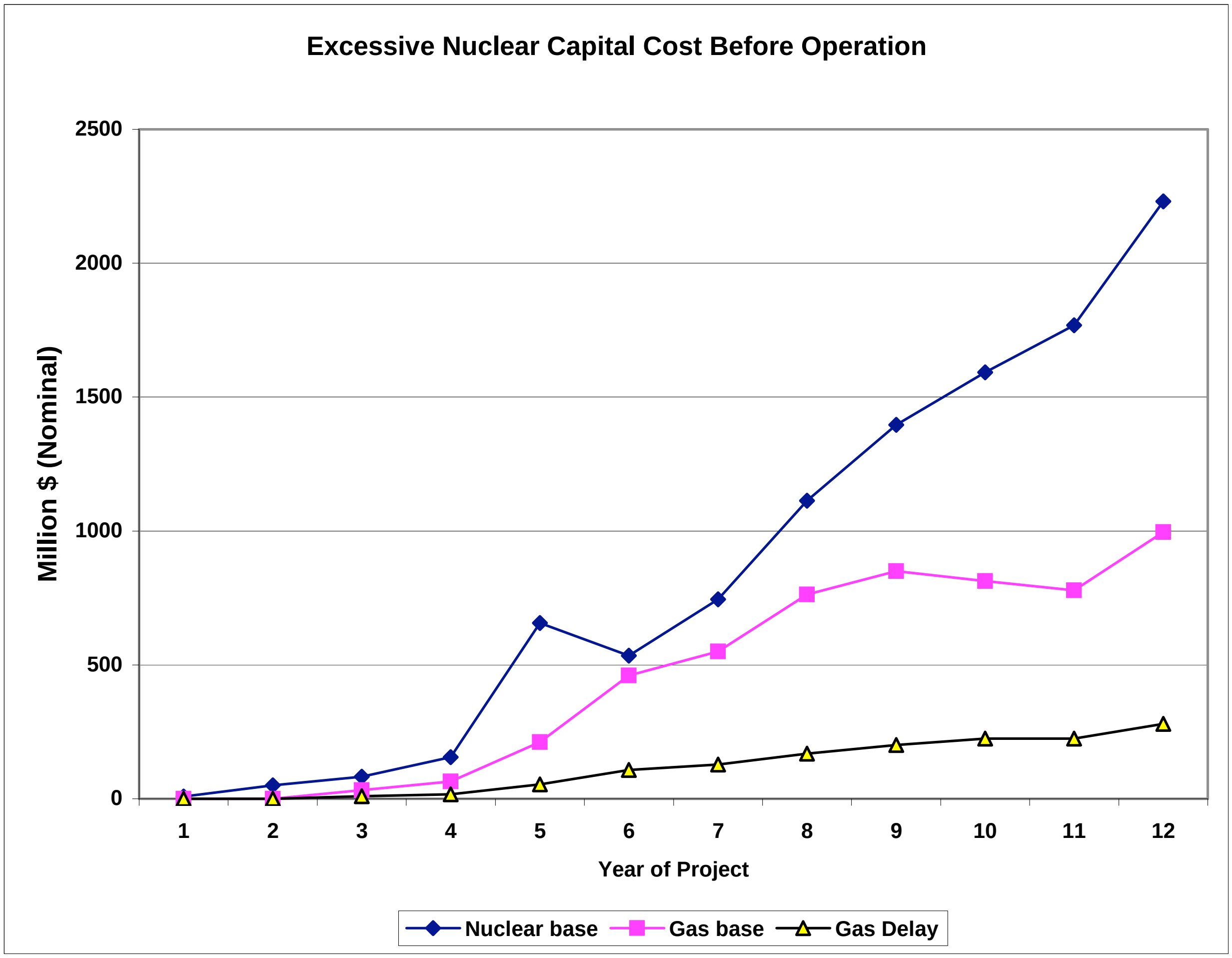


Source: Florida Power & Light, *Response to Staff's Second Set of Interrogatories, Interrogatory No. 64, p. 7*

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-17
Page 1 of 1

NUCLEAR CONSTRUCTION PRESSURES CAPITAL REQUIREMENTS

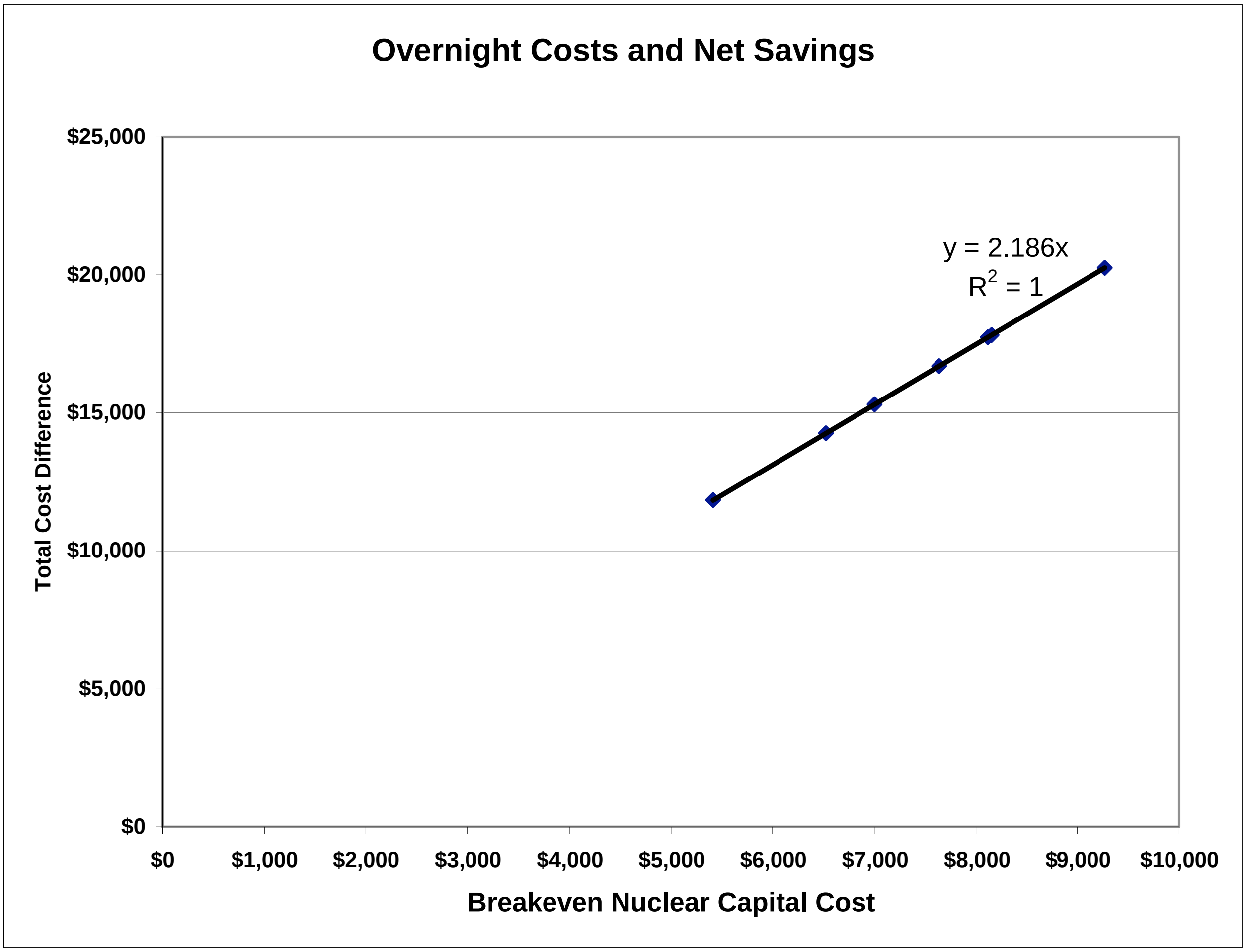


Source: Florida Power & Light, ***Response to Staff's Second Set of Interrogatories, Interrogatory No. 64, p. 7***

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-18
Page 1 of 1

OVERNIGHT COSTS AS A RPPREDICTOR OF NET SAVINGS: FPL



Source: Testimony of Steven R. Sim, Docket No. 100009-EI, SRS-10.

EXHIBIT 30

THE RISK OF NUCLEAR REACTORS IN THE EYES OF INDSUTRY ANALYSTS

EXCERPTED FROM

ALL RISK, NO REWARD FOR TAXPAYERS AND RATEPAYERS

THE ECONOMICS OF SUBSIDIZING THE 'NUCLEAR RENAISSANCE' WITH LOAN GUARANTEES AND CONSTRUCTION WORK IN PROGRESS

Mark Cooper
Senior Fellow for Economic Analysis
Institute for Energy and the Environment
Vermont Law School

November 2009

III. THE RISK OF NUCLEAR REACTORS IN THE EYES OF INDUSTRY ANALYSTS

The following discussion demonstrates the basis of the framework for risk analysis laid out in the previous section by reviewing recent analyses of the challenge of constructing new nuclear reactors conducted by Wall Street firms[15] and industry consultants.[16]

A. MOODY'S

Moody's has issued two special comments on new nuclear generating capacity that underscore the challenges that these huge projects face. In the initial comment in May 2008, after discussing the many challenges to building nuclear reactors, Moody's expressed the hope that utilities contemplating building reactors would take steps to prepare their balance sheets for the impact of these large projects.

> Given these long-term risks, a utility's approach to its overall corporate finance policies becomes a critical factor in the overall credit profile assessment during the construction period. In general, Moody's incorporates a view that a utility company would prepare for the higher risk profile associated with construction by maintaining, or strengthening further, its strong balance sheet as well as maintaining robust levels of available liquidity capacity. This is a critical assumption since our preliminary analysis leads us to conclude that financial credit metrics will deteriorate meaningfully without the introduction of significant mitigating factors and/or other structural provisions.[17]

A year later, in June 2009, Moody's took a much dimmer view of the prospects for building nuclear reactors. While Moody's identifies the developments in the project and regulatory areas that are positives for nuclear reactor construction, it still concludes that the

---

[15] Moody's *Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities,* May 2008; Moody's June 2009; Dimitri Mikas, "Financing New Nuclear Construction & Implications for Credit Quality," *Is there a Nuclear Renaissance,* p. 20; Standard & Poor's, May 28, 2009; Standard & Poor's, *Utilities Make Some Progress on New Nuclear Power, But Hurdles Still Linger,* March 9, 2009; Standard & Poor's, *For New U.S. Nuclear Power Plants, Liquidity Requirement Could be Substantial,* October 21, 2008; Standard & Poor's, *As Nuclear Power Renaissance Gains a Foothold in U.S., A Host of Details Needs Sorting Out,* March 7, 2008.

[16] Stephen Maloney, *Financial Issues Confronting Nuclear Construction,* Carnegie Endowment for International Peace, November 13, 2008; Stephen Maloney, *Nuclear Power Economics and Risk,* Council on Foreign Relations, July 10, 2009; Edward Kee, *First Wave or Second Wave? It is time for US nuclear power plant projects with a first wave build strategy to consider moving to the second wave,* NERA, July 24, 2009.

[17] Moody's, May 2008, p. 3.

negatives are a great concern and declares that it "is considering taking a more negative view for those issuers seeking to build new nuclear power plants"[18] because "we view nuclear

generation plans as a "bet the farm" endeavor for most companies, due to the size of the investment and length of time needed to build a nuclear power facility."[19] The change in attitude stemmed in part from deteriorating financial market conditions and the failure of the utilities contemplating building reactors to strengthen their financial positions.

> Credit conditions are yet another question. Few, if any of the issuers aspiring to build new nuclear power have meaningfully strengthened their balance sheets, and for several companies, key financial credit ratios have actually declined. Moreover, recent broad market turmoil calls into question whether new liquidity is even available to support such capital-intensive projects.[20]

In both documents, Moody's identifies the cause and implications of these risks. The May 2008 document identified several sources of risk. The financial risks of the project are sharply increased by the execution risk, which is compounded by technology, marketplace and regulatory risks.

> The complexity and long-term construction horizon associated with building new nuclear plant expose a utility to "material adverse change" conditions related to political, regulatory, economic and commodity price environments, as well as technology developments associated with supply and demand alternatives. These long-term risks expose a utility to back-end regulatory disallowance risk or other potential market intervention or restructuring initiatives by elected officials.[21]

The June 2009 Moody's document reiterated these concerns.[22] The inherent nature of these projects continues to be a challenge and creates marketplace and technological risk. Notwithstanding the fact that public policy has created favorable conditions for reactor construction in some aspects of regulation, there are other aspects that pose continued risk in

---

[18] Moody's, June 2009, p. 1.
[19] Moody's, June 2009, p. 4.
[20] Moody's June 2009, p. 2.
[21] Moody's May 2008, p. 5.
[22] Moody's June 2009, p. 5.

both execution risk and regulatory risk.[23] Policy risk has increased due to the orientation of climate change policy toward promoting alternatives.

> Less clear today is the effect that energy efficiency programs and national renewable standards might have on the demand for new nuclear generation. National energy policy has also begun eyeing lower carbon emissions as a key desire for energy production—theoretically a huge benefit for new nuclear generation—but the price tags associated with these development efforts are daunting, especially in light of today's economic turmoil. It isn't clear what effect such shifts, or changes in technology, will have for new nuclear power facilities.[24]

Moody's continues to see execution risk in these projects and points to the history of the financial difficulties that utilities building reactors had in the 1970s and 1980s as instructive for evaluating current projects.

> Moody's is considering applying a more negative view for issuers that are actively pursuing new nuclear generation. History gives us reason to be concerned about possible significant balance-sheet challenges, the lack of tangible efforts today to defend the existing ratings, and the substantial execution risk involved in building new nuclear power facilities.[25]

One of the sources of this concern about the execution risk is the failure of those proposing to build new reactors to provide the detailed information that would be associated with a well-thought out investment of this size.

> We remain concerned over the absence of details regarding key elements associated with the decision process to proceed with a project of this scale.

---

[23] Moody's June 2009, p. 7.

> The sheer size, cost and complexity of new nuclear construction projects will increase a utility's or power company's business and operating risk profile, leading to downward rating pressure. The length of a nuclear construction effort also entails lengthy regulatory reviews and potential delays in recovering investments, changing market conditions, shifting political and policy agendas, and technological developments on both the supply and demand side.

[24] Moody's June 2009, p. 2.

> While a constructive regulatory relationship will help mitigate near-term credit pressures, we will remain on guard for potential construction delays and cost overruns that could lead to future rate shock and/or disallowances of cost recovery. Given the lengthy construction time needed for nuclear projects, there is no guarantee that tomorrow's regulatory, political, or fuel environments will be as supportive to nuclear power as today's.

[25] Moody's June 2009, p. 2.

> Information is needed regarding the all-in construction costs and break-down of those costs; the construction timeline and schedule; the Engineering, Procurement and Construction (EPC) contractual arrangements and the allocation of fixed versus variable costs within those arrangements; the financing structure, expected sources of financing and pro-forma capitalization; and, the ultimate impact on consumer rates.[26]

The result of these market, regulatory and technological uncertainties and risks is to create financial pressure on projects, pressures that are reflected by project specific concerns and the general turmoil in the credit markets.

> Given these long-term risks, a company's financial policy becomes especially critical to its overall credit profile during construction. In general, we believe a company should prepare for the higher risk associated with construction by maintaining, if not strengthening, its balance sheet, and by maintaining robust levels of available liquidity capacity.[27]

B. STANDARD & POOR'S

Moody's is not the only credit rating agency to recognize the challenges facing nuclear reactors. Even at a promotional conference, a Standard & Poor's executive noted that "challenges for the industry participants abound."[28] While recognizing that there are positive aspects of the current environment, as Moody's did, Standard & Poor's identifies more aspects of the current situation that are negative. Interestingly, even with a loan guarantee, Standard & Poor's sees significant financial issues as described in Figure III-1.

---

[26] Moody's May 2008, p. 2.

[27] Moody's June 2009, p. 5.

[28] Dimitri Mikas, "Financing New Nuclear Construction & Implications for Credit Quality," *Is there a Nuclear Renaissance,* p. 20, Standard & Poor's, May 28, 2009.

EXHIBIT 30

Figure III-1: Standard & Poor's Credit Profile Considerations

Business risk profile	
New Technology Risk	⇧
Construction Risk	⇧
How much risk is mitigated by EPC contract?	⇧⇩
Nuclear operating exposure will increase	⇧
Regulatory framework for recovery of investment	⇧
Financial risk Profile	
Debt imputation: 25% for projects vs. 50% for regulated utilities	⇧
Even with DOE guarantee, debt loads can increase significantly	⇧
80/20 vs. 60/40 capital structure	⇧
Despite DOE guarantee, debt service will be fully accounted for	⇧
Ability to recover cash return on work in progress	⇩

Source: Dimitri Mikas, "Financing New Nuclear Construction & Implications for Credit Quality," *Is there a Nuclear Renaissance*, p. 20, Standard & Poor's, May 28, 2009. Arrows point in the direction of the impact on risk.

Standard & Poor's remains more positive on nuclear reactors than Moody's, although it is quite clear that the subsidies from taxpayers and ratepayers are the key to the financing of these projects. In a March 2009 analysis entitled *Utilities Make Some Progress on New Nuclear Power, But Hurdles Still Linger*, the table of contents tells the story:

Support for New Construction Varies from State to State

The Licensing Process and Framework Remain Untested

The DOE's Loan Guarantees Figure in Several Financing Approaches

For Credit Risk, Balance-Sheet Size is Important

Recession and Falling Energy Prices Can Alter Perspectives

EXHIBIT 30

The Need for Construction Contracts that Can Help Limit Exposure[29]

This list includes two positive factors, which relate to the taxpayer (Department of Energy loan guarantees) and ratepayer (construction work in progress) funding of the reactors. Four of the six factors listed are sources of concern: regulatory risk (uncertain licensing), financial risk (credit and balance sheet), marketplace risk (recession and energy prices) and execution risk (construction contracts).

Standard & Poor's points out that the approach taken to support projects in the southeastern U.S. goes well beyond turning ratepayers into investors; it takes all of the risk off of the utilities by

- Allowing utilities to receive pre-approval for construction costs and schedules;
- Providing for periodic review to ensure compliance with schedules and budgets;
- Allowing for recovery of a cash return on "construction work in progress" costs for both equity and debt components;
- Preventing future regulatory commissions from reviewing the prudence of previously approved capital spending; and
- Allowing for recovery of abandoned investment and providing for inclusion of the completed plant in the "rate base" (the value of property on which a utility can earn a regulatory-specified rate of return) without a major rate case filing with the regulator.[30]

Ironically, the efforts of the Department of Energy (DOE) to impose conditions on guaranteed loans that would help to mitigate the risk to the Treasury and protect the taxpayer in the event of defaults on the loan – i.e. a first lien for the Treasury and cross collateralization – are seen as creating "complications" and "challenges" for the financing of nuclear projects. That these conditions were imposed by the Bush administration, which had been very supportive of and helped to invent the term "nuclear renaissance," and the fact that the nuclear industry has lobbied hard to eliminate them underscore the risk that the loan guarantee program poses to taxpayers.

From a purely technical perspective, the loan guarantee program would work naturally with a transaction that is project-financed in the traditional sense. In

---

[29] Standard & Poor's, Hurdles Remain, p. 1.
[30] Standard & Poor's, Hurdles Remain, pp. 2-3.

> such a case, if the project falters, the sponsor can walk away and lose its equity, while the DOE takes control of the project assets and makes the lenders whole. Because of the DOE's requirement to have a priority lien over the project assets, regulated electric utilities applying under the program that lack a first mortgage bond indenture can facilitate a loan guarantee request, while the existence of a first mortgage bond indenture can introduce complications. Therefore, regulated utilities with first mortgage bond indentures will likely have to implement funding structures that satisfy the DOE's need while at the same time preserving compliance with their mortgage indentures.
>
> Another challenge that has come up for companies pursuing new construction through a partnership arrangement under the DOE's program deals with the issue of how the department requires all participants to cross-collateralize each other's obligations. This essentially creates a situation where the project participants are jointly and severally liable. This arrangement differs from past projects that incorporated an undivided interest approach in which each participant was responsible only for its own portion of the project.[31]

The large size of the reactors figures into the loan guarantees. Utilities are attempting to find approaches that can fit into the loan guarantee program that let them share the reactors.

> The traditional framework in which regulated utilities use on-balance-sheet financing to build generation plants while merchant generation companies use a project finance approach still holds largely true. However, companies are experimenting with various structures, including partnerships, and they are trying to take advantage of the DOE's loan guarantee program, whether they are regulated or merchant. Partnerships can be very appealing because they not only moderate or spread the construction and financing risk, but they can also help tailor an investment's size to a company's projected load in the time frame in which the plant will enter commercial operation. The loan guarantee program appeals to all participants – whether regulated or merchant, public or investor owned – because it can lower borrowing costs.[32]

These highly technical financial discussions can be boiled down to a simple proposition. With the guaranteed loans equal to as much as 80 percent of the value of very risky projects, the DOE imposes two conditions on the loans that help to protect the

---

[31] Standard & Poor's, Hurdles Remain, pp. 4-5.
[32] Standard & Poor's, Hurdles Remain, p. 3.

taxpayer's investment should the project falter. The DOE holds the first lien and all of the partners are liable for the entire project. Private sector lenders also want the first lien, which creates a conflict. The nuclear industry is pressing hard to eliminate these taxpayer protections.

The problem that the large size of these projects poses to their financing is a major component of the Standard & Poor's analysis.

> Given the new plant's large projected cost, how big the companies' balance sheets are can be a significant factor in terms of how much credit risk we recognize. A new project that materially affects a company's size can introduce significantly more risk and necessitate that every other aspect of the company's business perform flawlessly to provide the necessary support to its credit profile, especially during the period when capital spending peaks and the financial profile becomes stressed. For a company whose nuclear project investment is small compared with its balance sheet, these same concerns apply but, in our view, are moderated to some extent. Balance-sheet size is also an important consideration in adjusting rates during the construction period (assuming regulators allow the company to get a cash return on its construction work in progress during construction), as well as in the final rate adjustment necessary to include the plant in rate base.
>
> Finally, balance–sheet size relative to the size of the investment in the nuclear project can become an important factor if the company needs to abandon the project. While many regulated jurisdictions provide for recovery of the prudently incurred investment, the time for recovery of the investment remains fairly open. Thus for a company with a small asset base, recovering its abandoned investment in a nuclear plant over a long period of time can adversely affects it financial risk profile.[33]

The Standard & Poor's analyst pointed out that "even with DOE guarantee debt loads can increase significantly."[34] The Standard and Poor's analysis provided estimates of the balance-sheet impact for three companies, showing that the nuclear project equaled 28 percent of total assets for Georgia Power, 76 percent for South Carolina Gas and Electric and 146 percent of Progress Energy.[35] Interestingly, Moody's has downgraded South Carolina Electric and Gas and issued negative advice on the Southern Company, the parent of Georgia Power.[36]

---

[33] Standard & Poor's, Hurdles Remain, p. 4.
[34] Mikas, *Financing*, p. 20.
[35] Standard & Poor's, Hurdles Remain, p. 5.
[36] Moody's, *Changes Outlook of Southern and Three Subs to Negative,* September 1, 2009.

C. CONSULTING FIRMS

A November 2008 presentation by an analyst at Towers Perrin provided an early warning about the risk of nuclear reactor projects in the emerging economic environment.[37] An updated version of that analysis from July 2009 reinforces the initial observations.[38] The two areas where the analyst was well ahead of the curve in raising concerns were in the recognition of marketplace and financial risk.

The slowing of load growth and the decline of the cost of alternatives, particularly natural gas, were identified as undermining the case for nuclear reactor projects. The decline in demand reduces the need for new reactors. "With falling demand for power, current market conditions generally provide no compelling need or reason for many utilities to immediately take on any more risk than they already face…. The recession is showing no signs of the Government-promised abatement or any response to "stimulus" – demand is low."[39] Weakened balance sheets resulting from declining sales reduce the ability of the utilities to undertake large projects. "In fact, utilities have very significant balance sheet and liquidity challenges in this market with no immediate or obvious resolution…. Therefore, many utilities have no basis [at this time] to count on organic growth to strengthen cash flows, balance sheets, or [offset] pension losses."[40]

The analysis identifies two forms of regulatory risk – uncertainty about project approval by an inexperienced, understaffed Nuclear Regulatory Commission and uncertainties about the allowance of cost recovery by state regulators. Specifically, the untested Combined Construction and Operation License process does not address issues not submitted for review, nor does it preclude subsequent ratchets arising from rulemakings. The gap from the former leaves open restatement of standards applied to such things as field engineering, which typically represent more than half of the overrun potential in any project.

Even with set regulatory requirements, projects face a host of execution risk problems, including the lack of current utility experience constructing reactors, the ability of management to oversee these projects, and the likelihood of the need to rework projects. Particularly notable here is the concern about the vendors and contracts to which many turn to look for help to reduce risk exposure.

The Towers Perrin analysis devotes the greatest attention to the worsening financial conditions, both in the broader financial market in general and for the utility sector in

---

[37] Stephen Maloney, *Financial Issues Confronting Nuclear Construction,* Carnegie Endowment for International Peace, November 13, 2008.

[38] Stephen Maloney, *Nuclear Power Economics and Risk*, Council on Foreign Relations, July 10, 2009.

[39] Maloney, *Economics and Risk,* 2009, pp. 4-5.

[40] Maloney, *Economics and Risk*, 2009, pp. 4-5.

particular. Tightening credit and high-risk premiums, as well as federal credit policies are seen as raising the cost of long-term capital. At the same time, market dynamics lower the market capitalization of utilities, limiting their ability to invest. The balance sheets of utilities are weak and becoming weaker, a trend that caused Moody's to change its view in 2009. The analysis offers "some energy sector planning thumb rules":

- Always hedge your risk within your risk capital limits.
- Don't invest in projects claiming more than 10% of your assets.
- Risky issues call for higher returns… indicated returns for nuclear projects should be ~ 18-25% or more.[41]
- Uncertainty (i.e., risk) in initial estimates will grow over the course of a project at rates proportional to the square root of time.
- Since DCF [discounted cash flow] systematically underestimates compound risk and new construction faces significant irreversibilities, never base a risky or uncertain project's success solely on the NPV [net present value] or a DCF calculation.[42]

The analysis focuses on the situation in which construction work in progress is not available and concludes that the long construction period creates a heavy burden on the financial risk profile of the utility. Finally, the analysis expressed concern about federal loan guarantees. It argues that the federal government is not a reliable counterparty and that credit conditions should raise concern about its ability to perform as counterparty.

> Federal loan "guarantees" are risky. Remember: the Federal Government is not a reliable business partner. It is a serial breacher of agreements and its policies systematically fail to perform to forecast while always costing more than promised.
>
> If a utility proceeds with the Federal Government as a guarantor, it would be prudent and responsible to apply risk management protocols normally reserved for high-risk counterparties.[43]
>
> Bottom line: Federal Government has proven itself an unreliable counterparty:
>
> - Policies systematically fail to fulfill promises or hit their forecasts,
> - A serial breacher of agreements,
> -

---

[41] Maloney, *Economics and Risk*, 2009, p. 10.
[42] Maloney, *Economics and Risk*, 2009, pp. 10-11, 12, 24.
[43] Maloney, Economics and Risk, pp. 5, 23.

- Paper thin Balance Sheets: Federal Government and FRB [Federal Reserve Board] both fail to meet IMF standards,
- Bond auctions show diminishing enthusiasm for more UST [U.S. Treasury] paper,
- Growing international sentiment to diversify off USD [U.S. Dollar] as reserve currency,
- Market concerns over UST "credit card balance."[44]

The weight of these risks and uncertainties led a Vice President of NERA Economic Consulting, a leading utility consulting firm, to recommend that utilities consider pushing off the decision to build nuclear reactors because

> a first-wave project may face higher risks and costs, including scarce nuclear industry resources; uncertainties about carbon control and electricity demand; organized anti-nuclear efforts; some degree of first-of-a-kind (FOAK) risks and higher costs; and difficult markets for nuclear financing and funding.[45]

Appendix B summarizes the reasons given in the NERA analysis, organized according to the framework used in this analysis. Those concerns parallel the discussion in this section.

---

[44] Maloney, Economics and Risk, p. 5… 23.

[45] Kee, p. 2.

APPENDIX B:

NERA Reasons to Consider Waiting to Construction Until the Second Wave of Reactors

Technology Risk:

A second-wave project that can avoid commitment to a reactor design (or that can switch reactor designs without large costs) should be able to choose from several standard reactor designs that will have been approved by 2014. As these approved reactor designs start construction, the degree of detailed engineering will be much higher than today and the approach to construction (i.e., modular construction) will be better known. Second-wave projects may also be able to learn from the outcomes of first-wave EPC contracts.

While the timing remains uncertain, there is a possibility that one or more alternate reactor designs (e.g., micro-reactors and Generation IV reactors) now in the research and development phase will be commercially available as an option for a second-wave project.

A first-wave project may face higher risks and costs, including scarce nuclear industry resources… some degree of first-of-a-kind (FOAK) risks and higher costs.

Policy Risk:

It is possible that the US approach to control carbon emissions will be in place by 2014, allowing a second-wave project sponsor to better understand the financial implications for new nuclear power plants.

New nuclear plants may benefit from programs or taxes that are targeted at controlling carbon emissions. A year ago, there was hope that a change of administration would result in quick and clear action on controlling carbon. This has not happened and any real action on carbon control may be delayed or watered down or both as a result of the economic recession.

DOE loan guarantees are a critical item, so the current limits suggest that only 2 or 3 plants will be built in the first wave. DOE Loan guarantees for nuclear remain limited to $18.5 billion... Given the high cost estimates for new nuclear power plants, this will only cover a few nuclear units. Also, the terms, conditions, and costs of the DOE nuclear loan guarantees may not be attractive. DOE is reported to be negotiating with a short list of loan guarantee hopefuls; projects not in this short list may not have much chance of a loan guarantee.

Regulation Risk:

To the extent that a second-wave project has delayed the NRC COL process (i.e., the project has the ability to modify the COL application or other details), the lessons from the first-wave projects should provide a clearer view of the timing, issues, and potential for legal challenges to the COL process up to the COL approval point.

One or more new US nuclear power plants may have been built, approved, and placed into commercial operation, providing a much better view of how the NRC COL ITAAC process will work.

Regulated first-wave projects will have placed nuclear plant investments into rate base (and into rates), providing some lessons and guidance for second-wave project sponsors, state regulators, and others.

Execution Risk:

New nuclear power projects outside the US may be close to completion and some may have started commercial operation, reducing uncertainty about total project cost, construction times, reactor design operating performance, modular construction approaches, market success of reactor designs and vendors, and other issues.

Second-wave project sponsors as well as investors, regulators, and others will have a clearer view of the costs of new nuclear power plants and the time required to build them. The differences in cost, time to construct, and operating performance across reactor designs and vendors will also be much clearer.

The learning during construction of the first-wave nuclear plants may allow second-wave buyers to obtain lower costs, less risk, and shorter and more certain schedules from EPC vendors. Modifications to detailed designs and construction approaches to improve quality, lower cost, and shorten time in construction may also be available.

There will be even more experience with new nuclear plants outside the US. Reactor vendors that are not now in the US market may have entered the US market based on the success of build programs outside the US, giving second-wave buyers more options.

Nuclear build experience so far is mixed. There was some hope that nuclear project development experience outside the US would resolve uncertainties to the benefit of the US projects that would follow, but this has not yet happened. The Olkiluoto EPR project has experienced significant cost overruns and delays and is now in arbitration proceedings and the Chinese have just started construction on the first AP1000 unit.

The nuclear fuel cycle, including the used fuel disposition issue and approach to re-processing used nuclear fuel, may be more settled. Several new uranium enrichment facilities may be operational in the US and uranium market prices may be more stable.

Marketplace Risk:

The impact on electricity demand and the need for new baseload generation due to the current economic recession, the building of renewable generation, and other factors will be better known.

Demand for electricity is growing at a slower rate in many parts of the US as a result of the current economic downturn, so that the projected need for baseload capacity may be less and later than the capacity need projected a year ago. For some utilities with industrial customers, this may be a significant change.

Current nuclear power plant cost estimates are high, even though these estimates are considered conservative and may mean fewer cost overruns when the projects are completed. However, the recent cost estimates are much higher than cost estimates from only a few years ago. As these higher nuclear cost estimates are incorporated into generation expansion planning models and policy analyses, new nuclear power plants may no longer be the least-cost generation expansion option.

EXHIBIT 30

Docket No. 100009-EI
Exhibit MNC-19
Page 15 of 15

Financial Risk:

World financial markets are tight and financing any large capital project is difficult. Financing a new nuclear power plant would have been very difficult even without the financial crisis; with this crisis, it may not be possible to finance a new nuclear project. Financial markets will recover, but this may not happen in time for a first-wave project.

Also, the construction funding arranged by first wave developers may provide lessons for developers and lenders that will mean easier access to construction funding for second-wave projects. The real response of the stock market to new nuclear plant investment decisions will be known and will allow a second-wave sponsor to better assess its own decision to invest.

First-wave projects will have arranged and closed permanent financing, providing lessons and guidance for investors, lenders, and developers.

Source: Edward Kee, First Wave or Second Wave? It is time for US nuclear power plant projects with a first wave build strategy to consider moving to the second wave, NERA, July 24, 2009, pp. 4-6.

RESUME OF DR. MARK COOPER

MARK N. COOPER
504 HIGHGATE TERRACE
SILVER SPRING, MD 20904
(301) 384-2204
markcooper@aol.com

EDUCATION:

Yale University, Ph.D., 1979, Sociology

University of Maryland, M.A., 1973, Sociology

City College of New York, B.A., 1968, English

PROFESSIONAL EXPERIENCE:

President, Citizens Research, 1983 - present

Research Director, Consumer Federation of America, 1983-present

Fellow, Stanford Center on Internet and Society, 2000-present

Associated Fellow, Columbia Institute on Tele-Information, 2003-present

Fellow, Donald McGannon Communications Research Center, Fordham University, 2005-present

Senior Fellow for Economic Analysis, Institute for Energy and the Environment, Vermont Law School, 2009-present

Fellow, Silicon Flatirons, University of Colorado, 2009-present

Principle Investigator, Consumer Energy Council of America, Electricity Forum, 1985-1994

Director of Energy, Consumer Federation of America, 1984-1986

Director of Research, Consumer Energy Council of America, 1980-1983

Consultant, Office of Policy Planning and Evaluation, Food and Nutrition Service, United States Department of Agriculture, 1981-1984

Consultant, Advanced Technology, Inc., 1981

Technical Manager, Economic Analysis and Social Experimentation Division, Applied Management Sciences, 1979

EXHIBIT 30

Research Associate, American Research Center in Egypt, 1976-1977

Research Fellow, American University in Cairo, 1976

Staff Associate, Checchi and Company, Washington, D.C., 1974-1976

Consultant, Division of Architectural Research, National Bureau of Standards, 1974

Consultant, Voice of America, 1974

Research Assistant, University of Maryland, 1972-1974

TEACHING EXPERIENCE:

Lecturer, Washington College of Law, American University, Spring, 1984 - 1986, Seminar in Public Utility Regulation

Guest Lecturer, University of Maryland, 1981-82, Energy and the Consumer, American University, 1982, Energy Policy Analysis

Assistant Professor, Northeastern University, Department of Sociology, 1978-1979, Sociology of Business and Industry, Political Economy of Underdevelopment, Introductory Sociology, Contemporary Sociological Theory; College of Business Administration, 1979, Business and Society

Assistant Instructor, Yale University, Department of Sociology, 1977, Class, Status and Power

Teaching Assistant, Yale University, Department of Sociology, 1975-1976, Methods of Sociological Research, The Individual and Society

Instructor, University of Maryland, Department of Sociology, 1974, Social Change and Modernization, Ethnic Minorities

Instructor, U.S. Army Interrogator/Linguist Training School, Fort Hood, Texas, 1970-1971

PROFESSIONAL ACTIVITIES:

Member, Advisory Committee on Appliance Efficiency Standards, U.S. Department of Energy, 1996 - 1998

Member, Energy Conservation Advisory Panel, Office of Technology Assessment, 1990-1991

Fellow, Council on Economic Regulation, 1989-1990

Member, Increased Competition in the Electric Power Industry Advisory Panel, Office of Technology Assessment, 1989

Participant, National Regulatory Conference, The Duty to Serve in a Changing Regulatory Environment, William and Mary, May 26, 1988

EXHIBIT 30

Member, Subcommittee on Finance, Tennessee Valley Authority Advisory Panel of the Southern States Energy Board, 1986-1987

Member, Electric Utility Generation Technology Advisory Panel, Office of Technology Assessment, 1984 - 1985

Member, Natural Gas Availability Advisor Panel, Office of Technology Assessment, 1983-1984

Participant, Workshop on Energy and the Consumer, University of Virginia, November 1983

Participant, Workshop on Unconventional Natural Gas, Office of Technology Assessment, July 1983

Participant, Seminar on Alaskan Oil Exports, Congressional Research Service, June 1983

Member, Thermal Insulation Subcommittee, National Institute of Building Sciences, 1981-1982

Round Table Discussion Leader, The Energy Situation: An Open Field For Sociological Analysis, 51st Annual Meeting of the Eastern Sociological Society, New York, March, 1981

Member, Building Energy Performance Standards Project Committee, Implementation Regulations Subcommittee, National Institute of Building Sciences, 1980-1981

Participant, Summer Study on Energy Efficient Buildings, American Council for an Energy Efficient Economy, August 1980

Member, University Committee on International Student Policy, Northeastern University, 1978-1979

Chairman, Session on Dissent and Societal Reaction, 45th Annual Meeting of the Eastern Sociological Society, April, 1975

Member, Papers Committee, 45th Annual Meeting of the Eastern Sociological Society, 1975

Student Representative, Programs, Curricula and Courses Committee, Division of Behavioral and Social Sciences, University of Maryland, 1973-1974

President, Graduate Student Organization, Department of Sociology, University of Maryland, 1973-1974

HONORS AND AWARDS:

American Sociological Association, Travel Grant, Uppsala, Sweden, 1978

Fulbright-Hayes Doctoral Research Abroad Fellowship, Egypt, 1976-1977

Council on West European Studies Fellowship, University of Grenoble, France, 1975

Yale University Fellowship, 1974-1978

Alpha Kappa Delta, Sociological Honorary Society, 1973

Phi Delta Kappa, International Honorary Society, 1973

Graduate Student Paper Award, District of Columbia Sociological Society, 1973

Science Fiction Short Story Award, University of Maryland, 1973

Maxwell D. Taylor Award for Academic Excellence, Arabic, United States Defense Language Institute, 1971

Theodore Goodman Memorial Award for Creative Writing, City College of New York, 1968

New York State Regents Scholarship, 1963-1968

National Merit Scholarship, Honorable Mention, 1963

PUBLICATIONS:

ENERGY

Books and Chapters

"Recognizing the Limits of Markets, Rediscovering Public Interest in Utilities," in Robert E. Willett (ed), Electric and Natural Gas Business: Understanding It! (2003 and Beyond) (Houston: Financial Communications: 2003)

"Protecting the Public Interest in the Transition to Competition in New York Industries," The Electric Utility Industry in Transition (Public Utilities Reports, Inc. & the New York State Energy Research and Development Authority, 1994)

"The Seven Percent Solution: Energy Prices, Energy Policy and the Economic Collapse of the 1970s," in Energy Concerns and American Families in the 1980s (Washington, D.C.: The American Association of University Women Educational Foundation, 1983)

"Natural Gas Policy Analysis," in Edward Mitchell (Ed.), Natural Gas Pricing Policy (Washington, D.C.: American Enterprise Institute, 1983)

Equity and Energy: Rising Energy Prices and the Living Standard of Lower Income Americans (Boulder, Colorado: Westview Press, 1983)

Articles and Papers:

"The Economics of Nuclear Reactors: Renaissance or Relapse?," *Council on Foreign Relations*, July 10, 2009

"The Failure of Federal Authorities to Protect American Energy Consumers From Market Power and Other Abusive Practices," *Loyola Consumer Law Review*, 19:4 (2007)

"Too Much Deregulation or Not Enough," *Natural Gas and Electricity*, June 2005

"Real Energy Crisis is $200 Billion Natural Gas Price Increase," Natural Gas and Electricity, August 2004

"Regulators Should Regain Control to Prevent Abuses During Scarcity," Natural Gas, August 2003

"Economics of Power: Heading for the Exits, Deregulated Electricity Markets Not Working Well," *Natural Gas*, 19:5, December 2002

"Let's Go Back," Public Power, November-December 2002

"Conceptualizing and Measuring the Burden of High Energy Prices," in Hans Landsberg (Ed.), High Energy Costs: Assessing the Burden (Washington, D.C.: Resources For the Future, 1982)

"Energy Efficiency Investments in Single Family Residences: A Conceptualization of Market Inhibitors," in Jeffrey Harris and Jack Hollander (Eds.), Improving Energy Efficiency in Buildings: Progress and Problems (American Council for An Energy Efficient Economy, 1982)

"Policy Packaging for Energy Conservation: Creating and Assessing Policy Packages," in Jeffrey Harris and Jack Hollander (Eds.), Improving Energy Efficiency in Buildings: Progress and Problems (American Council for An Energy Efficient Economy, 1982)

"The Role of Consumer Assurance in the Adoption of Solar Technologies," International Conference on Consumer Behavior and Energy Policy, August, 1982

"Energy and the Poor," Third International Forum on the Human Side of Energy, August, 1982

"Energy Price Policy and the Elderly," Annual Conference, National Council on the Aging, April, 1982

"Energy and Jobs: The Conservation Path to Fuller Employment," Conference on Energy and Jobs conducted by the Industrial Union Department of the AFL-CIO, May 1980

Research Reports

U.S. Oil Market Fundamentals and Public Opinion, Consumer Federation of America, May 2010

Building on the Success of Energy Efficiency Programs to Ensure an Affordable Energy Future, Consumer Federation of America, February 2010

The Impact of Maximizing Energy Efficiency on Residential Electricity and Natural Gas Utility Bills in a Carbon-Constrained Environment: Estimates of National and

State-By-State Consumer Savings, Consumer Federation of America November 2009

Shifting Fuel Economy Standards into High Gear, Consumer Federation of America, November 24, 2009

A Consumer Analysis of Energy Efficiency and Renewable Energy Standards: The Cornerstone of Consumer-Friendly Energy/Environmental Policy, Consumer Federation of America, May 2009

All Risk; No Reward, Institute for Energy and the Environment, Vermont Law School, Dec 2009.

The Economics of Nuclear Reactors: Renaissance of Relapse, Institute for Energy and the Environment, Vermont Law School, June 2009.

A Consumer Analysis of the Adoption of the California Clean Cars Program in Other States: Florida, Consumer Federation of America, November 2008

A Boom for Big Oil – A Bust for Consumers: Ana analysis of Policies to Meet American Energy Needs, Consumer Federation of America, September 2008

Climate Change and the Electricity Consumer: Background Analysis to Support a Policy Dialogue, Consumer Federation of America, June 2008

Ending America's Oil Addiction: A Quarterly Report on Consumption, Prices and Imports, Consumer Federation of America, April 2008

A Consumer Analysis of the Adoption of the California Clean Cars Program in Other States: Arizona, Consumer Federation of America, March 2008

A Step Toward A Brighter Energy Future, Consumer Federation of America, December 2007

A Consumer Analysis of the Adoption of the California Clean Cars Program in Other States: New Mexico, Consumer Federation of America, November 2007

Not Time to Waste: America's Energy Situation Is Dangerous, But Congress Can Adopt New Policies to Secure Our Future, Consumer Federation of America, October 2007

Technology, Cost and Timing, Consumer Federation of America, July 2007

Florida's Stake in the Fuel Economy Battle, July 2007

Big Oil v. Ethanol, Consumer Federation of America, July 2007

Too Little, Too Late: Why the Auto Industry Proposal To Go Low and Slow on Fuel Economy Improvements Is Not in the Consumer or National Interest, Consumer Federation of America, July 2007

The Senate Commerce Committee Bill Is Much Better For Consumers and The Nation Than the Automobile Industry Proposal, Consumer Federation of America, June 2007

Rural Households Benefit More From Increases In Fuel Economy, Consumer Federation of America, June 207

A Consumer Pocketbook And National Cost-Benefit Analysis of “10 in10”, Consumer Federation of America, June 2007

Time to Change the Record on Oil Policy, Consumer Federation of America, August 2006

50 by 2030: Why $3.00 Gasoline Makes the 50-Miles Per Gallon Car Feasible, Affordable and Economic, Consumer Federation of America, (May 2006)

The Role of Supply, Demand, Industry Behavior and Financial Markets in the Gasoline Price Spiral (Prepared for Wisconsin Attorney General Peggy A. Lautenslager, May 2006)

Debunking Oil Industry Myths and Deception: The $100 Billion Consumer Rip-Off (Consumer Federation of America and Consumers Union, May 3, 2006)

The Role of Supply, Demand and Financial Markets in the Natural Gas Price Spiral (prepared for the Midwest Attorneys General Natural Gas Working Group: Illinois, Iowa, Missouri, Wisconsin, March 2006)

The Impact of Rising Prices on Household Gasoline Expenditures (Consumer Federation of America, September 2005)

Responding to Turmoil in Natural Gas Markets: The Consumer Case for Aggressive Policies to Balance Supply and Demand (consumer Federation of America, December 2004)

Record Prices, Record Oil Company Profits: The Failure Of Antitrust Enforcement To Protect American Energy Consumers (Consumer Federation of America, Consumers Union, September 2004)

Fueling Profits: Industry Consolidation, Excess Profits, & Federal Neglect: Domestic Causes of Recent Gasoline and Natural Gas Price Shocks (Consumer Federation of America and Consumers Union, May 2004)

Spring Break in the U.S. Oil Industry: Price Spikes, Excess Profits and Excuses (Consumer Federation of America, October 2003)

How Electricity Deregulation Puts Pressure On The Transmission Network And Increases It’s Cost (Consumer Federation of America, Consumers Union and U.S. PIRG, August 2003)

A Discouraging Word (or Two, or Three, or Four) About Electricity Restructuring in Texas, Pennsylvania, New England and Elsewhere Consumer Federation of America, U.S. Public Interest Research Group and Consumers Union, March 2003)

All Pain, No Gain: Restructuring and Deregulation in the Interstate Electricity Market (Consumer Federation of America, September 2002)

U.S. Capitalism and the Public Interest: Restoring the Balance in Electricity and Telecommunications Markets (Consumer Federation of America, August 2002)

Electricity Deregulation and Consumers: Lesson from a Hot Spring and a Cool Summer (Consumer Federation of America, August 30, 2001)

Ending the Gasoline Price Spiral: Market Fundamentals for Consumer-Friendly Policies to Stop the Wild Ride (Consumer Federation of America, July 2001)

Analysis of Economic Justifications and Implications of Taxing Windfall Profits in the California Wholesale Electricity Market (Consumer Federation of America and Consumers Union, June 13, 2001)

Behind The Headlines Of Electricity Restructuring A Story Of Greed, Irresponsibility And Mismanagement Of A Vital Service In A Vulnerable Market (Consumer Federation of America, March 20, 2001)

Reconsidering Electricity Restructuring: Do Market Problems Indicate a Short Circuit or a Total Blackout? (Consumer Federation of America, November 30. 2000)

Mergers and Open Access to Transmission in the Restructuring Electric Industry (Consumer Federation of America, April 2000)

Electricity Restructuring and the Price Spikes of 1998 (Consumer Federation of America and Consumers Union, June 1999)

The Residential Ratepayer Economics of Electric Utility Restructuring (Consumer Federation of America, July 1998)

Consumer Issues in Electric Utility Restructuring (Consumer Federation of America, February 12, 1998)

A Consumer Issue Paper on Electric Utility Restructuring (American Association of Retired Persons and the Consumer Federation of America, January, 1997)

Transportation, Energy, and the Environment: Balancing Goals and Identifying Policies, August 1995

A Residential Consumer View of Bypass of Natural Gas Local Distribution Companies, February 1988

The National Energy Security Policy Debate After the Collapse of Cartel Pricing: A Consumer Perspective, January 1987

The Energy, Economic and Tax Effects of Oil Import Fees, October 25, 1985

The Bigger the Better: The Public Interest in Building a Larger Strategic Petroleum Reserve, June 12, 1984

The Consumer Economics of CWIP: A Short Circuit for American Pocketbooks, April, 1984

Public Preference in Hydro Power Relicensing: The Consumer Interest in Competition, April 1984

Concept Paper for a Non-profit, Community-based, Energy Services Company, November 1983

The Consumer and Energy Impacts of Oil Exports, April 1983

Up Against the Consumption Wall: The Impact of Rising Energy Prices on Lower Income Consumers, March 1983

A Decade of Despair: Rising Energy Prices and the Living Standards of Lower Income Americans, September 1982

The Impact of Rising Energy Prices on the Delivery of Public Service by Local Governments, August 1982

The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South, and the Gulf Cost Region, July, 1982

A Comprehensive Analysis of the Impact of a Crude Oil Import Fee: Dismantling a Trojan Horse, April 1982

The Past as Prologue II: The Macroeconomic Impacts of Rising Energy prices, A Comparison of Crude Oil Decontrol and Natural Gas Deregulation, March, 1982

The Past as Prologue I: The Underestimation of Price Increases in the Decontrol Debate, A Comparison of Oil and Natural Gas, February 1982

Oil Price Decontrol and the Poor: A Social Policy Failure, February 1982

Natural Gas Decontrol: A Case of Trickle-Up Economics, January 1982

A Comprehensive Analysis of the Costs and Benefits of Low Income Weatherization and Its Potential Relationship to Low Income Energy Assistance, June 1981

Summary of Market Inhibitors, February 1981

Program Models and Program Management Procedures for the Department of Energy's Solar Consumer Assurance Network Project: A Rapid Feedback Evaluation, February 1981

An Analysis of the Economics of Fuel Switching Versus Conservation for the Residential Heating Oil Consumer, October 1980

Energy Conservation in New Buildings: A Critique and Alternative Approach to the Department of Energy's Building Energy Performance Standards, April, 1980

The Basics of BEPS: A Descriptive Summary of the Major Elements of the Department of Energy's Building Energy Performance Standards, February, 1980

COMMUNICATIONS AND MEDIA

Books and Chapters

"Broadband in America: A Policy of Neglect is not Benign," in Enrico Ferro, Yogesh K. Dwivedi, J. Ramon Gil-Garcia, and Michael D. Williams, Eds., *Overcoming Digital Divides: Constructing an Equitable and Competitive Information Society,"* IGI Global Press.

"Political Action And Internet Organization: An Internet-Based Engagement Model," in Todd Davies and Seeta Pena Gangaharian, Eds., *Online Deliberation: Design, Research and Practice,* CSLI press.

"When Counting Counts: Marrying Advocacy and Academics in the Media Ownership Research Wars at the FCC," forthcoming in Lynn M. Harter, Mohan J. Dutta, and Courtney Cole, Eds., *Communicating for Social Impact: Engaging Communication Theory, Research, and Pedagogy***,** Hampton Press.

The Case Against Media Consolidation (Donald McGannon Communications Research Center, 2007)

Open Architecture as Communications Policy (Stanford Law School, Center for Internet and Society: 2004)

Media Ownership and Democracy in the Digital Information Age: Promoting Diversity with First Amendment Principles and Rigorous Market Structure Analysis (Stanford Law School, Center for Internet and Society: 2003)

Cable Mergers and Monopolies: Market Power In Digital Media and Communications Networks (Washington, D.C.: Economic Policy Institute, 2002)

"When Law and Social Science Go Hand in Glove: Usage and Importance of Local and National News Sources, Critical Questions and Answers for Media Market Analysis," forthcoming in, Philip Napoli, Ed. *Media Diversity and Localism: Meaning and Metrics, (*Lawrence Erlbaum, 2007)

"The Importance of Open Networks in Sustaining the Digital Revolution," in Thomas M. Lenard and Randolph J. May (Eds.) Net Neutrality or Net Neutering (New York, Springer, 2006)

"Reclaiming The First Amendment: Legal, Factual And Analytic Support For Limits On Media Ownership," Robert McChesney and Benn Scott (Eds), The Future of Media (Seven Stories Press, 2005)

"Building A Progressive Media And Communications Sector," Elliot Cohen (Ed.), News Incorporated: Corporate Media Ownership And Its Threat To Democracy (Prometheus Books, 2005)

"Hyper-Commercialism In The Media: The Threat To Journalism And Democratic Discourse," Snyder-Gasher-Compton-(Eds), Converging Media, Diverging Politics: A Political Economy Of News In The United States And Canada (Lexington Books, 2005)

"The Digital Divide Confronts the Telecommunications Act of 1996: Economic Reality versus Public Policy," in Benjamin M. Compaine (Ed.), The Digital Divide: Facing a Crisis or Creating a Myth? (Cambridge: MIT Press, 2001)

Articles and Papers:

"Round #1 in the Digital Intellectual Property Wars: Economic Fundamentals, Not Piracy, Explain How Consumers and Artists Won in the Music Sector," Telecommunications Policy Research Conference, September 2008.

"When The Market Does Not Reign Supreme: Localism And Diversity In U.S. Media Policy," *International Communications Association*, forthcoming, May 2008

"Minority Programming: Still at The Back of the Bus," *International Communications Association*, forthcoming, May 2008, with Adam Lynn

"Traditional Content Is Still King as the Source of Local News and Information," *International Communications Association,* forthcoming, May 2008

"Junk Science And Administrative Abuse In The Effort Of The FCC To Eliminate Limits On Media Concentration," *International Communications Association*, forthcoming, May 2008.

"Contentless Content Analysis: Flaws In The Methodology For Analyzing The Relationship Between Media Bias And Media Ownership," forthcoming, *International Communications Association,* May 2008.

"Network Neutrality," *Toll Roads? The Legal and Political Debate Over Network Neutrality,* University of San Francisco Law School, January 26, 2008

"The Lack of Racial and Gender Diversity in Broadcast Ownership and The Effects of FCC Policy: An Empirical Analysis," *Telecommunications Research Policy Conference*, September 2007, with Derek Turner

"New Media and Localism: Are Local Cable Channels and Locally Focused Websites Significant New and Diverse Sources of Local News and Information? An Empirical Analysis," *Telecommunications Research Policy Conference*, September 2007, with Adam Lynn

"A Case Study of Why Local Reporting Matters: Photojournalism Framing of the Response to Hurricane Katrina in Local and National Newspapers," International Communications Association, May 2007.

"Will the FCC Let Local Media Rise from the Ashes of Conglomerate Failure," International Communications Association, May 2007.

"The Failure of Federal Authorities to Protect American Energy Consumers From Market Power and Other Abusive Practices," *Loyola Consumer Law Review*, 19:4 (2007)

"The Central Role of Network Neutrality in the Internet Revolution," Public Interest Advocacy Center, Ottawa Canada, November 24, 2006

"Governing the Spectrum Commons," September 2006. Telecommunications Policy Research Conference, October 2006

"Accessing the Knowledge Commons in the Digital Information Age," Consumer Policy Review, May/June 2006

"Independent, Non-Commercial Video," Beyond Broadcast, Berkman Center, Harvard University, May 12, 2006

"Defining Appropriation Right in the Knowledge Commons of the Digital Information Age: Rebalancing the Role of Private Incentives and Public Circulation in Granting Intellectual Monopoly Privileges," Legal Battle Over Fair Use, Copyright, and Intellectual Property, March 25, 2006

"The Economics of Collaborative Production: A Framework for Analyzing the Emerging Mode of Digital Production," The Economics of Open Content: A Commercial Noncommercial Forum, MIT January 23, 2006

"From Wifi to Wikis and Open Source: The Political Economy of Collaborative Production in the Digital Information Age," Journal on Telecommunications and High Technology Law, 5:1, 2006

"Information is a Public Good," Extending the Information Society to All: Enabling Environments, Investment and Innovation, World Summit on the Information Society, Tunis, November 2005

"The Importance of Collateral Communications and Deliberative Discourse in Building Internet-Based Media Reform Movements," Online Deliberation: Design, Research and Practice/DIAC, November, 2005

"Collaborative Production in Group-Forming Networks: The 21st Century Mode of Information Production and the Telecommunications Policies Necessary to Promote It," The State of Telecom: Taking Stock and Looking Ahead, Columbia Institute on Tele-Information, October 2005

"The Economics of Collaborative Production in the Spectrum Commons," IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks, November 2005

"Independent Noncommercial Television: Technological, Economic and Social Bases of A New Model of Video Production," Telecommunications Policy Research Conference, October 2005

"Spectrum as Speech in the 21st Century," The Public Airwaves as a Common Asset and a Public Good: Implications for the Future of Broadcasting and Community Development in the U.S., Ford foundation, March 11, 2005

"When Law and Social Science Go Hand in Glove: Usage and Importance of Local and National News Sources, Critical Questions and Answers for Media Market Analysis, Telecommunications Policy Research Conference, October 2004

"Dividing the Nation, Digitally: When a Policy Of Neglect is Not Benign," The Impact of the Digital Divide on Management and Policy: Determinants and Implications of Unequal Access to Information Technology, Carlson School of Management, University of Minnesota, August 28, 2004.

"Limits on Media Ownership are Essential," Television Quarterly, Spring Summer 2004

"Applying the Structure, Conduct Performance Paradigm of Industrial Organization to the Forum for Democratic Discourse," Media Diversity and Localism, Meaning, Metrics and Public Interest, Donald McGannon Communications Research Center, Fordham University, December 2003

"Cable Market Power, Pricing And Bundling After The Telecommunications Act Of 1996: Explorations Of Anti-Consumer, Anticompetitive Practices," Cable TV Rates: Has Deregulation Failed?, Manhattan Institute, November 2003

"Hope And Hype Vs. Reality: The Role Of The Commercial Internet In Democratic Discourse And Prospects For Institutional Change," Telecommunication Policy Research Conference, September 21, 2003

"Ten Principles For Managing The Transition To Competition In Local Telecommunications Markets, Triennial Review Technical Workshop National Association of Regulatory Utility Commissioners, Denver CO, July 27, 2003

"Universal Service: A Constantly Expanding Goal," Consumer Perspectives on Universal Service: Do Americans Lose Under a Connection-based Approach? (Washington, D.C.: New Millennium Research Council, June 2003)

"The Evidence Is Overwhelming: Diversity, Localism And The Public Interest Are The Victims Of Concentration, Conglomeration And Consolidation Of The Commercial Mass Media Concentration And Local Markets," The Information Policy Institute and The Columbia Institute On Tele-Information The National Press Club, Washington, DC, March 11, 2003

"Loss Of Diversity, Localism And Independent Voices Harms The Public Interest: Some Recent Examples," The Information Policy Institute and The Columbia Institute On Tele-Information The National Press Club, Washington, DC, March 11, 2003

"Open Communications in Open Economies and Open Societies: Public Interest Obligations are Vital in the Digital Information Age," Convergence: Broadband Policy and Regulation Issues for New Media Businesses in the New Millennium Georgetown University Law Center, Advanced Computer and Internet Law Institute March 5, 2003.

"The Political Economy Of Spectrum Policy: Unlicensed Use Wins Both The Political (Freedom Of Speech) And Economic (Efficiency) Arguments," Spectrum Policy: Property Or Commons? Stanford Law School, March 1, 2003

EXHIBIT 30

“What’s ‘New” About Telecommunications in the 21st Century Economy: Not Enough to Abandon Traditional 20th century Public Interest Values” Models of Regulation For the New Economy, University of Colorado School of Law, February 1, 2003

“Comments on *Broadband: Bringing Home the Bits*, Columbia Institute for Tele-Information, March 18, 2002

“Fair Use and Innovation First, Litigation Later: Why digitally Retarding Media (DRM) Will slow the Transition to the Digital Information Age,” Online Committee, Federal Communications Bar Association, January 29, 2003 “Open Communications Platforms: Cornerstone of Innovation and Democratic Discourse In the Internet Age,” Journal on Telecommunications, Technology and Intellectual Property, 2:1, 2003, first presented at The Regulation of Information Platforms, University of Colorado School of Law, January 27, 2002

“Foundations And Principles Of Local Activism In The Global, New Economy,” The Role of Localities and States in Telecommunications Regulation: Understanding the Jurisdictional Challenges in an Internet Era, University of Colorado Law School, `April 16, 2001

“The Role Of Technology And Public Policy In Preserving An Open Broadband Internet,” The Policy Implications Of End-To-End, Stanford Law School, December 1, 2000

“Inequality In The Digital Society: Why The Digital Divide Deserves All The Attention It Gets,” Cardozo Arts and Entertainment Law Journal, 2002, first presented at Bridging The Digital Divide: Equality In The Information Age, Cardozo School Of Law, November 15, 2000

“Picking Up The Public Policy Pieces Of Failed Business And Regulatory Models,” Setting The Telecommunications Agenda, Columbia Institute For Tele-Information November 3, 2000

“Progressive, Democratic Capitalism In The Digital Age,” 21st Century Technology and 20th Century Law: Where Do We Go from Here? The Fund for Constitutional Government, Conference on Media, Democracy and the Constitution, September 27, 2000

“Open Access To The Broadband Internet: Technical And Economic Discrimination In Closed, Proprietary Networks,” University of Colorado Law Review, Vol. 69, Fall 2000

“Antitrust As Consumer Protection In The New Economy: Lessons From The Microsoft Case, Hastings Law Journal, 52: 4, April 2001, first presented at Conference On Antitrust Law In The 21st Century Hasting Law School, February 10, 2000

“Evolving Concepts of Universal Service,” The Federalist Society, October 18, 1996

"Delivering the Information Age Now," Telecom Infrastructure: 1993, Telecommunications Reports, 1993

"Divestiture Plus Four: Take the Money and Run," Telematics, January 1988

"Regulatory Reform in Telecommunications: A Solution in Search of a Problem," Telematics, 4:11, November 1987.

"The Line of Business Restriction on the Regional Bell Operating Companies: A Plain Old Anti-trust Remedy for a Plain Old Monopoly," Executive Leadership Seminar on Critical Policy Developments in Federal Telecommunications Policy, The Brookings Institution, October 7, 1987

"The Downside of Deregulation: A Consumer Perspective After A Decade of Regulatory Reform," Plenary Session, Consumer Assembly, February 12, 1987

"Regulatory Reform for Electric Utilities, Plenary Session, Consumer Federation of American, Electric Utility Conference, April 4, 1987

"Round Two in the Post-Divestiture Era: A Platform for Consumer Political Action," Conference on Telephone Issues for the States -- 1984: Implementing Divestiture, May, 1984

Research Reports

The Impact of the Vertically Integrated, Television-Movie Studio Oligopoly on Source Diversity and Independent Production, Independent Film and Television Association, October 2006

How Bigger Media Will Hurt Alaska, Arkansas, California, Florida, Maine, Michigan, Montana, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Virginia, Washington, Media and Democracy Coalition, October 2006

Mapping the Terrain in the Battle Over Access to Knowledge in the Digital Information Age (June 2006)

Online Deliberation: Mapping The Field; Tapping The Potential From The Perspective Of A Media/Internet Activist (August 2005)

Broken Promises and Strangled Competition: The Record of Baby Bell Merger and Market Opening Behavior (Consumer Federation of America, June 2005)

Over a Barrel: Why Aren't Oil Companies Using Ethanol to Lower Gasoline Prices? (Consumer Federation of America, May 2005)

Reflections Of A Media Activist On New Strategies For Justice: Linking Corporate Law With Progressive Social Movements (May 2005)

Time for the Recording Industry to Face the Music: The Political, Social and Economic Benefits of Peer-to-Peer Communications Networks (Consumer Federation of America, Consumers Union, Free press, U.S. Public Interest Research Group, March 2005)

Expanding the Digital Divide and Falling Behind in Broadband (Consumer Federation of America and Consumers Union, October 2004)

EXHIBIT 30

Time to Give Consumers Real Cable Choices: After Two Decades of Anti-consumer Bundling and Anti-Competitive Gate keeping (Consumer Federation of America and Consumers Union, July 2004)

The Public Interest in Open Communications Networks (Consumer Federation of America, July 2004)

Caution Flag in the FCC's Race to Eliminate the Unbundled Network Element Platform (consumer Federation of America, June 2003)

New Survey Finds Americans Rely on Newspapers Much More than Other Media for Local News and Information: FCC Media Ownership Rules Based on Flawed Data (Consumer Federation of America, Consumers Unions, January 2004)

Cable Market Power, Pricing And Bundling After The Telecommunications Act Of 1996: Explorations Of Anti-Consumer, Anticompetitive Practices (Consumer Federation of America and Consumers Union, November 2003)

Competition At The Crossroads: Can Public Utility Commissions Save Local Phone Competition? (Consumer Federation of America, October 7, 2003)

Free TV Swallowed by Media Giants: The Way It Really Is, September 15, 2003 (Consumer Federation of America, Consumers Union and Center for Digital Democracy, September 15, 2003)

Abracadabra! Hocus-Pocus! Making Media Market Power Disappear With The FCC's Diversity Index (Consumer Federation of America and Consumers Union, July 2003)

Promoting The Public Interest Through Media Ownership Limits: A Critique Of The FCC's Draft Order Based On Rigorous Market Structure Analysis And High Competitive Standards (Consumer Federation of America and Consumers Union, May 2003)

Public Opinion Opposes The FCC's March Toward Concentrated Media Markets (Consumer Federation of America, April 2003)

Democratic Discourse in the Digital Information Age: Legal Principles and Economic Challenge (Consumer Federation of America, February 2003)

Cable Mergers, Monopoly Power and Price Increases (Consumer Federation of America and Consumers Union, January 2003)

Public Support for a Citizen-Friendly Media and Communications Industry in the Digital Age: A Review of Recent Survey Evidence (Consumer Federation of America, October 2002)

The Battle for Democratic Discourse: Recapturing a Bold Aspiration for the First amendment (Consumer Federation of America, October 2002)

Does the Digital Divide Still Exist? Bush Administration Shrugs, But Evidence Says "Yes" (Consumer Federation of America, Consumers Union, Civil Rights Forum, May 30, 2002)

EXHIBIT 30

The Failure of 'Intermodal Competition in Cable and Communications Markets (Consumer Federation of America and Consumers Union, April, 2002).

Competitive Processes, Anticompetitive Practices and Consumer Harm in the Software Industry: An Analysis of the Inadequacies of the Microsoft-Department of Justice Proposed Final Judgment (Jan. 25, 2002)

A Roadblock On The Information Superhighway: Anticompetitive Restrictions On Automotive Markets (Consumer Federation of America, February 2001)

Lessons From 1996 Telecommunications Act: Deregulation Before Meaningful Competition Spells Consumer Disaster (Consumer Federation of America, February 2000)

Florida Consumers Need Real Local Phone Competition: Access To Monopoly Wires Is The Key (Consumer Federation of America, January 2001)

The Real Deal: The Comparative Value of Verizon's Local Telephone Rates (New Jersey Citizen Action, December 2000)

Maryland Consumers Need Real Local Phone Competition: Fair Access to Monopoly Wires Is the Key (Consumer Federation of America, December 7, 2000)

Bailing Out Of A Bad Business Strategy: Policymakers Should Not Sacrifice Important Public Policies To Save AT&T's Failed Business Plans (Consumer Federation of America, October 2000)

Setting The Record Straight From A Consumer Perspective On Verizon's Radical Rate Restructuring Proposal (Citizen Action, October 2000)

Disconnected, Disadvantaged and Disenfranchised (Consumer Federation of America and Consumers Union, October 11, 2000)

Open Access Phase II (Consumer Federation of America, July 13, 2000)

Who Do You Trust? AOL And AT&T … When They *Challenge* The Cable Monopoly Or AOL And AT&T. When They *Become* The Cable Monopoly?, (Consumer Federation of America, Consumers Union and Media Access Project, February 2000)

Monopoly Power, Anticompetitive Business Practices and Consumer Harm in the Microsoft Case (Consumer Federation of America, December 1999)

Keeping the Information Superhighway Open for the 21st Century (Consumer Federation of America, December 1999)

Creating Open Access to the Broadband Internet: Overcoming Technical and Economic Discrimination in Closed, Proprietary Network (Consumer Federation of America, December 1999)

The Consumer Harm Caused By The Microsoft Monopoly: The Facts Speak For Themselves And They Call For A Stern Remedy (Consumer Federation of America, November 1999)

A Consumer Perspective On Economic, Social And Public Policy Issues In The Transition To Digital Television: Report Of The Consumer Federation Of America To People For Better TV (Consumer Federation of America, October 29, 1999)

Transforming the Information Superhighway into a Private Toll Road: Ma Cable and Baby Bell Efforts to Control the High-Speed Internet (Consumer Federation of America, October 1999)

Transforming the Information Superhighway into a Private Toll Road: The Case Against Closed Access Broadband Internet Systems (Consumer Federation of America and Consumer Action, Sept. 20, 1999)

Breaking the Rules: AT&T's Attempt to Buy a National Monopoly in Cable TV and Broadband Internet Services (Consumer Federation of America, Consumers Union and Media Access Project, Aug. 17, 1999)

Economic Evidence in the Antitrust Trial: The Microsoft Defense Stumbles Over the Facts (Consumer Federation of America, March 18, 1999)

The Consumer Cost of the Microsoft Monopoly: $10 Billion of Overcharges and Counting (Consumer Federation of America, Media Access Project and U.S. PIRG, January 1999)

The Digital Divide (Consumer Federation of America and Consumers Union, February 1999)

The Consumer Case Against the SBC-Ameritech Merger (Consumer Federation, et. al, January 20, 1999)

The Consumer Case Against Microsoft (Consumer Federation of America, October 1998)

The Need for Telephone Lifeline Programs in New Jersey: An Update (Center for Media Education and the Consumer Federation of America, July 1998)

Competition in Local Markets: Is the Glass 98 Percent Empty of 2 Percent Full (Consumer Federation of America, February 17, 1998)

Two Years After the Telecom Act: A Snapshot of Consumer Impact (Consumer Federation of America, January 21, 1998)

Stonewalling Local Competition: The Baby Bell Strategy to Subvert the Telecommunications Act of 1996 (Consumer Federation of America, January 1998)

The Need for Telephone Lifeline Programs in Kentucky (Kentucky Youth Advocates and Center for Media Education, October 1997)

Money for Nothing: The Case Against Revenue Replacement in the Transition to Local Exchange Competition: A Consumer View of the Gap Between Efficient Prices and Embedded Costs, American Association of Retired Persons, Consumer Federation of America, Consumers Union, January 1997

Low Income Children and the Information Superhighway: Policies for State Public Service Commissions After the Telecommunications Act of 1996, Prepared for the Alliance for South Carolina's Children, January 1997

Excess Profits and the Impact of Competition on the Baby Bells, Consumer Federation of America, September 1996

Universal Service: An Historical Perspective and Policies for the 21st. Century, Benton Foundation and the Consumer Federation of America, August 1996

A Consumer View of Missouri Telephone Legislation: House Bill 1363 Would Mandate Consumer Overcharges and Telephone Company Excess Profits, Consumer Federation of America, March 20, 1996

Evolving Notions of Universal Service (Consumer Federation of America, October 18, 1996)

Economic Concentration and Diversity in the Broadcast Media: Public Policy and Empirical Evidence, December 1995

Federal Deregulation and Local Telephone and Cable TV Rates: Rate Shock in the 1980s and Prospects in the 1990s, November 1995

Basic Service Rates and Financial Cross-Subsidy of Unregulated Baby Bell Activities: The Importance of Effective Competition for Local Service Before Deregulation of Profits and Cross-Ownership, October, 1995

Federal Policy and Local Telephone and Cable TV Rates: Rate Shock in the 1980s and Prospects for the 1990S, October 1995

Mergers and Deregulation on the Information Superhighway: The Public Takes a Dim View: Results of a National Opinion Poll, September 1995

Competition and Consumer Protection in the Florida Telecommunications Legislation, Prepared for the Florida Office of the People's Counsel, April 1995

The Meaning of the Word Infrastructure, June 30, 1994

Protecting the Public Interest in the Transition to Competition in Network Industries, June 14, 1994

Local Exchange Costs and the Need for A Universal Service Fund: A Consumer View, May 1994

Milking the Monopoly: Excess Earnings and Diversification of the Baby Bells Since Divestiture, February 1994

A Consumer Road Map to the Information Superhighway: Finding the Pot of Gold at the End of the Road and Avoiding the Potholes Along the Way, January 26, 1994

Consumers with Disabilities in the Information Age: Public Policy for a Technologically Dynamic Market Environment, 1993

Selling Information Services During 800 and 900 Number Calls: The Need for Greater Consumer Protection, October 2, 1992

The Economics of Deregulation and Reregulation in the Cable Industry: A Consumer View, September 1992

Developing the Information Age in the 1990s: A Pragmatic Consumer View, June 8, 1992

Divestiture Plus Eight: The Record of Bell Company Abuses Since the Break-up of AT&T, December 1991

Transmission Planning, Citing, and Certification in the 1990s: Problems, Prospects and Policies, August 1990

Expanding the Information Age for the 1990s: A Pragmatic Consumer Analysis, January 11, 1990

Divestiture Plus Five: Residential Telephone Service Five Years After the Breakup of AT&T, December 1988

Public Opinion About Deregulation and Regulation in the Transportation and Communications Industries, May 1988

Telecommunications Policy Regarding Deregulation, May 1988

Universal Telephone Service in Ohio: A Review of Recent Evidence, November 12, 1987

The Role of Natural Gas in Solving the Clean Air Problem: Reconciling Consumer and Environmental Interests, April 19, 1988

Divestiture Plus Four: Take the Money and Run, December 1987

The Telecommunications Needs of Older, Low Income and General Consumers in the Post-Divestiture Era, October 1987

Bulk Commodities and the Railroads After the Staggers Act: Freight Rates, Operating Costs and Market Power, October 1987

Divestiture Plus Three: Still Crazy After All These Years, December 1986

Low Income Households in the Post Divestiture Era: A study of Telephone Subscribership and Use in Michigan, October 1986

Sorry Wrong Numbers: Federal Agency Analyses of Telephone Subscribership in the Post-Divestiture Era, February 1986

Industrial Organization and Market Performance in the Transportation and Communications Industries, July 1985

Ringing Off the Wall: An Alarming Increase in Residential Phone Rates, 1984-986, May 12, 1985

Divestiture: One Year Later, December 19, 1984

OTHER

Books and Chapters

The Transformation of Egypt: State and State Capitalism in Crisis (Baltimore: Johns Hopkins University Press, 1982)

"Egyptian State Capitalism In Crisis: Economic Policies and Political Interests," in Talal Asad and Roger Owen (Eds.), Sociology of Developing Societies: The Middle East (London: Macmillan Press, 1983). First published in The International Journal of Middle Eastern Studies, X:4, 1979

"Revoluciones Semi-legales en el Mediterraneo," in Jesus De Miguel (Ed.), Cambio Social en La Europa Mediterranea (Barcelona: Ediciones Peninsula, 1979). First presented as "The Structure of Semi-legal Revolutions: Between Southern Mediterranean and Western European Patterns," 9th World Congress of the International Sociological Society, Uppsala, Sweden, August, 1978

Articles and Papers

"The Failure Of Market Fundamentalism: What Are The Issues In The ICT Sector?" The New Economics of ICT: Implications of Post-Neoclassical Economics for the Information Communications Technology Sector, Columbia University, March 20, 2009

"Restoring the Balance of Public Values and Private Incentives in American Capitalism," Too Much Deregulation or Not Enough, Cato Institution, November 1, 2002

"Freeing Public Policy From The Deregulation Debate: The Airline Industry Comes Of Age (And Should Be Held Accountable For Its Anticompetitive Behavior), American Bar Association, Forum On Air And Space Law, The Air and Space Lawyer, Spring 1999

"An Uninformed Purchase," Best's Review: Life/Health Insurance Edition, July 1987

"The Trouble with the ICC and the Staggers Act," Pacific Shipper, June 1, 1987

"The Leftist Opposition in Egypt," Conference on Sadat's Decade: An Assessment, conducted by the Middle Eastern Studies Program of the State University of New York at Binghamton, April, 1984

"The Crisis in the Rental Housing Market: Energy Prices, Institutional Factors and the Deterioration of the Lower Income Housing Stock," 53rd Annual Meeting of the Eastern Sociological Society, March, 1983

"State Capitalism and Class Structure in the Third World: The Case of Egypt," International Journal of Middle East Studies, XIV:4, 1983

"The Militarization and Demilitarization of the Egyptian Cabinet," International Journal of Middle East Studies, XIII: 2, 1982

"Sociological Theory and Economic History: The Collegial Organizational Form and the British World Economy," 51st Annual Meeting of the Eastern Sociological Society, March, 1981

"The Failure of Health Maintenance Organizations: A View from the Theory of Organizations and Social Structure," 50th Annual Meeting of the Eastern Sociological Society, March, 1980

"Impact of Incentive Payments and Training on Nursing Home Admissions, Discharges, Case Mix and Outcomes," Massachusetts Sociological Society, November, 1979

"The State as an Economic Environment," 7th Annual New England Conference on Business and Economics, November, 1979

"The Domestic Origins of Sadat's Peace Initiative," Yale Political Union, March, 1979

"State Capitalism and Class Structure: The Case of Egypt," 49th Annual Meeting of the Eastern Sociological Society March, 1979

"The Welfare State and Equality: A Critique and Alternative Formulation from a Conflict Perspective," 48th Annual Meeting of the Eastern Sociological Society, April, 1978

"A Comparative Evaluation of Operation Breakthrough," Annual Meeting of the Environmental Research Design Association, April, 1975

"Plural Societies and Conflict: Theoretical Considerations and Cross National Evidence," International Journal of Group Tensions, IV:4, 1974. First presented at the 44th Annual Meeting of the Eastern Sociological Society, March, 1974

"Racialism and Pluralism: A Further Dimensional Analysis," Race and Class, XV:3, 1974

“Personality Correlates of Technology and Modernization in Advanced Industrial Society (with Ed Dager), 8th Annual Meeting of the International Sociological Society, August, 1974

"Toward a Model of Conflict in Minority Group Relations," Annual Meeting of the District of Columbia Sociological Society, May, 1973

"A Re-evaluation of the Causes of Turmoil: The Effects of Culture and Modernity," in A Reader in Collective Behavior and Social Movements (F.E. Peacock: New York, 1978). First published in Comparative Political Studies, VII:3, 1974. First presented at the 43rd Annual Meeting of the Eastern Sociological Society, March, 1973

"The Occurrence of Mutiny in World War I: A Sociological View," International Behavioral Scientist, IV:3, 1972

I. Research Reports

II. with Barbara Roper, *Reform of Financial Markets: the Collapse Of Market Fundamentalism and the First Steps to Revitalize the Economy,* April 2009

Credit Unions In A 21st Century Financial Marketplace: Economic And Organizational Underpinnings Of Institutional Success (Consumer Federation of America, 2004)

Unconventional Wisdom: Ten New State Polls Offer a Chance to Rethink How Americans View the Assault Weapons Ban (Consumer Federation of America and the Educational Fund to Stop Gun Violence, July 13, 2004)

Public Opinion About quality, Self-Dealing and Billing for Ancillary Medical Tests, October 17, 1991

A Consumer Perspective on Direct Billing: The Next Step in Reforming the Market for Ancillary Medical Services, July 1991

Clearing the Air on Airline Deregulation, May 22, 1991

Airport Pricing of Access for Off-Premise Auto Rental Companies: The Growing Pattern of Abuse, April 24, 1990

Public Opinion About Health Care Purchases: Cost, Ease of Shopping and Availability, April 27, 1989

Bailing Out the Savings and Loans Who Bears the Burden Under Alternative Financing Approaches, March 9, 1989

Airport Fees for Auto Rental Companies: A Consumer Perspective, June 1988,

Reforming the Interstate Commerce Commission: Getting the Facts Straight, February 10, 1988

The Benefits of the Modernization of the Tort Law in the Context of the Social Movement for Improved Safety and Quality in the National Economy, September 1987

The Potential Costs and Benefits of Allowing Banks to Sell Insurance, February 10, 1987

Confusion and Excess Cost: Consumer Problems in Purchasing Life Insurance, January 21, 1987

The Costs and Benefits of Exclusive Franchising: The Case of Malt Beverages, September 17, 1986

Punitive Damages in Product Liability Cases: Setting the Record Straight, September 1986

Local Rate Increases in the Post-Divestiture Era, Excessive Returns to Telephone Company Capital, September 1986

Trends in Liability Awards: Have Juries Run Wild, May 1986

Farm worker Demographics, National and State Planning Packages, May 1986

The Great Train Robbery: Electric Utility Consumers and the Unregulated Rail Monopoly Over Coal Transportation, Overview, The Rail Monopoly Over Bulk Commodities, A Continuing Dilemma for Public Policy, August 1985

Deregulation of the Dairy Industry, November 1983

Meal Production Costs in School Food Kitchens: An Economic Analysis of Production Processes and Efficiencies, December 1981

A Study of Program Management Procedures in the Campus-based and Basic GRANTS Programs: Final Report, March 1980

A Study of Program Management Procedures in the Campus-based and Basic Grants Programs: Site Visit Report, December 1975

A Comparative Evaluation of Operation Breakthrough, Chapter 3, August 1975

Judging the Merits of Child Feeding Programs, 1975

A Comparative Evaluation of Ongoing Programs in Columbia, Kenya, and the Philippines, 1974

TESTIMONY:

FEDERAL AGENCIES AND COURTS

Comments of the Consumer Federation of America on the Proposed Horizontal Merger Guidelines, Before the Federal Trade Commission, FTC File No. PO92700, June 4, 2010

Reply Comments -- National Broadband Plan, Public Notice #30
Center for Media Justice, Consumer Federation of America, Consumers Union
Open Technology Initiative, Public Knowledge, on Broadband Adoption, Before the Federal Communications Commission, In the Matter of A National Broadband Plan for Our Future, GN Docket No. 09-47, 09-51, 09-137, January 27, 2010

"Comments of the Consumer Federation of America," before the Environmental Protection Agency and Department of Transportation, *Proposed Rulemaking to Establish Light-Duty Vehicles Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*, November 27, 2009

"Statement of Mark Cooper to the Joint SEC-CFTC Meeting on Harmonization of Regulation," September 2, 2009.

"Comments Of The Consumer Federation Of America On November 2008 Report Of L.R. Christensen Associates, Inc." United States Of America, Surface Transportation Board, Ex Parte No. 680, *Study Of Competition In The Freight Rail Industry*, December 22, 2008

"Comments on the Draft Environmental Impact Statement of Consumer Federation of America, et al.," *Notice of Proposed Rulemaking: Average Fuel Economy Standard; Passenger Cars and Light Trucks, Model Years 2011-2015,* August 18, 2008

"Comment and Technical Support Appendices of the Consumer Federation of America," *Average Fuel Economy Standards, Passenger Cars and Light Trucks, Model Years 2011-2015*, July 1, 2008

"Behavioral Marketing Principles," with Susan Grant, Federal Trade Commission, April 10, 2008

"Reply Comments of Consumer Federation of America and Consumers Union," *In the Matter of the Petition of Free Press, et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does not Met an Exception for "Reasonable Network Management," and Vuze, Inc. to Establish Rule Governing Network Management Practices by Broadband Network Operators, Broadband Industry Practices, Commercial Availability of Navigation Devices,* WC Docket No. 07-52, CS Docket No. 97-80, February 28, 2008

"Comments on Behavioral Tracking and Targeting," Federal Trade Commission, Town Hall Meeting on **Ehavioral Advertising: Tracking, Targeting and Technology**, November 16, 2007

"Comments of the Consumer Federation of America, Consumers Union and Free Press, *In the Matter of Broadband Industry Practices,* WC Docket No. 07-52, June 15, 2007

"Petition to Deny of Common Cause, Consumer Federation of America, Consumers Union and Free Press," *In the Matter of Consolidated Application for Authority to transfer Control of XM Sirius Radio Inc, and Sirius Satellite Radio Inc,* MB Docket No. 07-57, July 9, 2007

"Comment of the Texas Office of Public Utility Counsel, Consumer Federation of America and Consumers Union," In the Matter of Intercarrier Compensation, CC Docket No. 91-92, October 25, 2006

"Statement," Local Hearing, Federal Communications Commission, Los Angeles, October 2006

"Affidavit," with Trevor Roycroft, In the Matter of Review of AT&T Inc. and BellSouth Corporation, Application for Consent to Transfer of Control, WC Docket No. 06-74.

"Comments and Reply Comments of the Consumer Federation Of America and Consumers Union In Opposition To The Transfer Of Licenses," Applications of Adelphia Communications Corporation, Comcast Corporation and Time Warner Cable Inc., For Authority to Assign and/or Transfer Control of Various Licenses, Before the Federal Communications Commission, MM Docket No. 05-192

"Comments of Consumer Federation of America, Consumers Union and Free Press," *In the Matter of the Commission's Cable Horizontal and Vertical Ownership Limits and Attribution Rules,* MM Docket No. 92-264, August 8, 2005

"Petition to Deny of the Consumer Federation of America, Consumers Union, and USPIRG, In the Matter of Applications of SBC Communications Inc. and AT&T Corporation to

Transfer Control of Section 214 and 308 Licenses and Authorizations and Cable Landing Licenses, WC Docket No. 05-65, April 25, 2005

"Petition to Deny of the Consumer Federation of America, Consumers Union, and USPIRG, In the Matter of Applications of Verizon Communications Inc. and MCI Inc. Applications for Approval of Transfer of Control of Section, WC Docket No. 05-75, May 9, 2005

"Comments of the Consumer Federation of America and Consumers Union," before the Federal Communications Commission, In the Matter of Broadcast Localism MB Docket No. 04-233, November 1, 2004

"Comments and Reply Comments of Dr. Mark Cooper on Behalf of the Texas Office of Public Utility Counsel and the Consumer Federation of America," before the Federal Communications Commission, In the Matter of Final Unbundling Rules, Docket Nos. WC-04-313, CC-01-338, October 4, October 19, 2004.

"Comments and Reply Comments of Consumers Union and the Consumer Federation of America," In the Matter of Comments Requested on *a La Carte* and Themed Tier Programming and Pricing Options for Programming Distribution on Cable Television and Direct Broadcast Satellite Systems, before the Federal Communications Commission, MB Docket No. 04-207, July 13, 2004, August 13, 2004

"Affidavit of Mark Cooper," Prometheus Radio Project, et al. v. Federal Communications Commission and United States of America, No. 03-3388, et al., August 6, 2004

"Comments Of Consumer Federation Of America and Consumers Union," In The Matter Of IP-Enabled Services, Petition Of SBC Communications Inc. For Forbearance, Before The Federal Communications Commission, WC Docket No. 04-29, 04-36, July 14, 2004

"Testimony of Mark Cooper," before the Federal Energy Regulatory Commission, Solicitation Processes for Public Utilities, June 10, 2004

"Petition to Deny and Reply to Opposition of the Consumer Federation of America and Consumers Union," In the Matter of Applications for the Transfer of Control of Licenses and Authorization from AT&T Wireless Services, Inc., and its Subsidiaries to Cingular Wireless Corporation, before the Federal Communications Commission, WT Docket No. 04-70, May3, May 20, 2004

"Opposition to the Petitions for Reconsideration, Reply comments of the Consumer Federation of America," In the Matter of Digital Broadcast Content Protection, Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices, Compatibility Between Cable Systems and Consumer Electronic Equipment, before the Federal Communications Commission, Docket Nos. MB-02-230, CS-97-80, PP-00-67, March 15, 2004

"Petition for Reconsideration of the Consumer Federation of America and Consumers Union," In The Matter Of 2002 Biennial Regulatory Review – Review of the

Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996, Cross-Ownership of Broadcast Stations and Newspapers Rules and Policies Concerning Multiple Ownership of Radio Broadcast Stations in Local Market, Definition of Radio Markets, Federal Communications Commission, MB Docket No. 02-277, MM Docket Nos. 00-244, 01-235, 01-317, September 4, 2003

"Reply Comments Of Consumer Federation Of America," In the Matter of Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion To Digital Television, Public Interest Obligations of TV Broadcast Licensees, Children's Television Obligations Digital Television Broadcaster, Standardized and Enhanced Disclosure Requirements for Television Broadcast Licensee, Public Interest Obligations, Before the Federal Communications Commission, MB Docket No. 03-15,RM 9832, MM Docket Nos. 99-360, 00-167, 00-168, May 21, 2003

"Reply Comments of the Consumer Federation of America," In the Matter of Digital Broadcast Copy Protection, Federal Communications Commission, MB Docket NO. 02-230, February 18, 2003

"Comments of Consumer Federation of America, Consumers Union, Center for Digital Democracy, Media Access Project," In The Matter Of 2002 Biennial Regulatory Review – Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996, Cross-Ownership of Broadcast Stations and Newspapers Rules and Policies Concerning Multiple Ownership of Radio Broadcast Stations in Local Market, Definition of Radio Markets, Federal Communications Commission, MB Docket No. 02-277, MM Docket Nos. 00-244, 01-235, 01-317, Comments January 3, 2003, Reply Comments February 3, 2003

"Comments of the Texas Office of Public Utility Counsel, The Consumer Federation of America, Consumers Union," In the Matter of Petition for Declaratory Ruling that AT&T's Phone-to-Phone IP Telephony Services are Exempt from Access Charges, Federal communications Commission, WC Docket No. 02-361, January 18, 2003

"Comments of Arizona Consumers Council, California Public Interest Research Group, Colorado Public Interest Research Group, Columbia Consumer Education Council, Consumer Assistance Council (MA) Consumer Federation of America, Florida Consumer Action Network, Massachusetts Consumers' Council, North Carolina Public Interest Research Group, Oregon State Public Interest Research Group, Texas Consumers' Association, The Consumer's Voice, US Action, Virginia's Citizens' Consumer Council, In the Matter of Digital Broadcast Copy Protection, Federal Communications Commission, MB Docket NO. 02-230, December 6, 2002

"Initial Comments of the Consumer Federation of America," Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity market Design, Federal Energy Regulatory Commission, Docket No. RM-01-12-000, October 15, 2002

“An Economic Explanation of Why the West and South Want to Avoid Being Infected by FERC’s SMD and Why Market Monitoring is Not an Effective Cure for the Disease,” SMD Market Metrics Conference, Federal Energy Regulatory Commission, October 2, 2002

“Bringing New Auto Sales and Service Into the 21st Century: Eliminating Exclusive Territories and Restraints on Trade Will Free Consumers and Competition,” Workshop on Anticompetitive Efforts to Restrict Competition on the Internet, Federal Trade Commission, October 7, 2002

“Once Money Talks, Nobody Else Can: The Public’s first Amendment Assets Should Not Be Auctioned to Media Moguls and Communications Conglomerates,” In the Matter of Spectrum Policy Task Force Seeks Public Comment on Issues Related to Commission’s Spectrum Policy, Federal Communications Commission, DA 02-1221, ET Docket No. 02-135, July 8, 2002

“Comments Of The Texas Office Of Public Utility Counsel, Consumer Federation Of America, Consumers Union, Media Access Project, And The Center For Digital Democracy,” Federal Communications Commission, *In the Matter of Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities Universal Service Obligations of Broadband Providers Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review –Review of Computer III and ONA Safeguards And Requirements,* CC Dockets Nos. 02-3395-20, 98-10, July 1, 2002

“Comments of the Consumer Federation of America, Consumers Union, Center for Digital Democracy, The Office of Communications of the United Church of Christ, Inc., National Association of Telecommunications Officers and Advisors, Association for Independent Video Filmmakers, National Alliance for Media Arts and Culture, and the Alliance for Community Media.” Federal Communications Commission, In the Matter of Implementation of Section 11 of the Cable Television Consumer Protection and Competition Act of 1992 Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996 The Commission’s Cable Horizontal and Vertical Ownership Limits and Attribution Rules Review of the Commission’s Regulations Governing Attribution Of Broadcast and Cable/MDS Interests Review of the Commission’s Regulations and Policies Affecting Investment In the Broadcast Industry Reexamination of the Commission’s Cross-Interest Policy, CS Docket No. 98-82, CS Docket No. 96-85, MM Docket No. 92-264, MM Docket No. 94-150, MM Docket No. 92-51, MM Docket No. 87-154

“Reply Comments of the Consumer Federation of America, Consumers Union, Center for Digital Democracy, and Media Access Project,” in Federal Communications Commission, In the Matter of Implementation of Section 11 of the Cable Television Consumer Protection and Competition Act of 1992 Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996 The Commission’s Cable Horizontal and Vertical Ownership Limits and Attribution Rules Review of the

Commission's Regulations Governing Attribution Of Broadcast and Cable/MDS Interests Review of the Commission's Regulations and Policies Affecting Investment In the Broadcast Industry Reexamination of the Commission's Cross-Interest Policy, CS Docket No. 98-82, CS Docket No. 96-85, MM Docket No. 92-264, MM Docket No. 94-150, MM Docket No. 92-51, MM Docket No. 87-154.

"Petition to Deny of Arizona Consumers Council, Association Of Independent Video And Filmmakers, CalPIRG, Center For Digital Democracy, Center For Public Representation, Chicago Consumer Coalition, Civil Rights Forum On Communications Policy, Citizen Action Of Illinois, Consumer Action, Consumer Assistance Council, Consumer Federation Of America, Consumer Fraud Watch, Consumers United/Minnesotans For Safe Food, Consumers Union, Consumers' Voice, Democratic Process Center, Empire State Consumer Association, Florida Consumer Action Network, ILPIRG (Illinois), Massachusetts Consumers Coalition, MassPIRG, Media Access Project, Mercer County Community Action, National Alliance For Media Arts And Culture, MontPIRG, New York Citizens Utility Board, NC PIRG, North Carolina Justice And Community Development Center, OsPIRG(Oregon State), Oregon Citizens Utility Board, Texas Consumer Association, Texas Watch, United Church Of Christ, Office Of Communication, Inc., US PIRG, Virginia Citizens Consumer Council, WashPIRG, Wisconsin Consumers League, " In the Matter of Application for Consent to the Transfer of Control of Licenses Comcast Corporation and AT&T Corporation, Transferors, to AT&T Comcast Corporation, Transferee, April 29, 2002

"Tunney Act Comments of Consumer Federation of America, Connecticut Citizen Action Group, ConnPIRG, Consumer Federation of California, Consumers Union, Florida consumer Action Network, Florida PIRG, Iowa PIRG, Massachusetts Consumer's Coalition, MassPIRG, Media Access Project, U.S. PIRG", in the *United States v. Microsoft Corp*, Civil Action No. 98-1232, (Jan. 25, 2002)

"Comments of Consumer Federation of America, et al," In the Matter of Implementation of Section 11 of the Cable Television Consumer Protection and Competition Act of 1992, Implementation of Cable Act Reform Provisions of the 'Telecommunications Act of 1996, The Commission's Cable Horizontal and Vertical Ownership Limits and Attribution Rules, Review of the Commission's Regulations Governing Attribution of Broadcast and Cable MDS Interests, Review of the Commission's Regulations and Policies Affecting Investment in the Broadcast Industry, Reexamination of the Commission's Cross-Interest Policy, CS Docket Nos. 98-82, 96-85; MM Docket Nos. 92-264, 94-150, 92-51, 87-154, January 4, 2002.

"Comments of Consumers Union, Consumer Federation of America, Civil Rights Forum, Center for Digital Democracy, Leadership Conference on Civil Rights and Media Access Project, before the Federal Communications Commission, In the Matter of Cross Ownership of Broadcast Station and Newspaper/Radio Cross-Ownership Waiver Policy, MM Docket No. 01-235, 96-197; December 3, 2001)

"Motion To Intervene And Request For Rehearing Of The Consumer Federation Of America," before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Docket Nos. EL00-95-000 et al,

"Reply Comments of the Consumer Federation Of America," before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Docket Nos. EL00-95-000 et al,

"Reply Comments Of Texas Office Of Public Utility Counsel, Consumer Federation Of America, Consumers Union," Federal Communications Commission, In The Matter Of Inquiry Concerning High Speed Access To The Internet Over Cable And Other Facilities, GN Docket No. 00-185, January 11, 2001

"Comments Of Texas Office Of Public Utility Counsel, Consumer Federation Of America, Consumers Union," Federal Communications Commission, In The Matter Of Inquiry Concerning High Speed Access To The Internet Over Cable And Other Facilities, GN Docket No. 00-185, December 1, 2000

"Statement before the *en banc* Hearing in the Matter of the Application of America Online, Inc. and Time Warner, Inc. for Transfer of Control," Federal Communications Commission, July 27, 2000

"Petition to Deny of Consumers Union, the Consumer Federation of America, Media Access Project and Center for Media Education," In the Matter of Application of America Online, Inc. and Time Warner for Transfer of Control, CS 00-30, April 26, 2000

"Comments Of The Consumer Federation Of America, In the Matter of Application of SBC Communications Inc. and Southwestern Bell Telephone Company and Southwestern Bell Communications Services, Inc. D/B/A Southwestern Bell long Distance for Provision of In-Region, InterLATA Services in Texas, Before the Federal Communications Commission, CC Docket No. 00-4, February 28, 2000

"Consumer Federation Of America, Request For Reconsideration Regional Transmission Organizations," Federal Energy Regulatory Commission, Docket No. RM99-2-000; Order No. 2000, January 20, 2000

"Reply Comments Of Texas Office Of Public Utility Counsel Consumer Federation Of America Consumers Union (Joint Consumer Commentors), In the Matter of Access Charge Reform Price Cap Performance Review for Local Exchange Carriers Low Volume Long Distance Users Federal-State Joint Board On Universal Service, Before The Federal Communications Commission, CC Docket No. 96-262, CC Docket No. 94-1, CC Docket No. 99-249, CC Docket No. 96-45, December 3, 1999.

"Reply Comments Of The Consumer Federation Of America, Consumers Union, and AARP, Proposed Transfer Of Control SBC And Ameritech," Before the Federal Communications Commission, Cc Docket No. 98-141, November 16, 1999

"Comments Of Texas Office Of Public Utility Counsel Consumer Federation Of America Consumers Union (Joint Consumer Commentors), In the Matter of Access Charge Reform Price Cap Performance Review for Local Exchange Carriers Low Volume Long Distance Users Federal-State Joint Board On Universal Service, Before The Federal Communications Commission, CC Docket No. 96-262, CC Docket No. 94-1, CC Docket No. 99-249, CC Docket No. 96-45, November 12, 1999.

"Reply Comments Of Texas Office Of Public Utility Counsel Consumer Federation Of America Consumers Union (Joint Consumer Commentors), In the Matter of Low Volume Long Distance Users Federal-State Joint Board On Universal Service, Before The Federal Communications Commission, CC Docket No. 99-249, October 20, 1999.

"Comments Of The Consumer Federation Of America," In the Matter of Application of New York Telephone Company (d/b/a/ Bell Atlantic – New York, Bell Atlantic Communications, Inc. NYNEX Long Distance Company and Bell Atlantic Global Networks, Inc., for Authorization To Provide In-Region, InterLATA Services in New York, Before the Federal Communications Commission, CC Docket No. 99-295, October 20, 1999

"Comments Of Texas Office Of Public Utility Counsel Consumer Federation Of America Consumers Union (Joint Consumer Commentors), In the Matter of Low Volume Long Distance Users Federal-State Joint Board On Universal Service, Before The Federal Communications Commission, CC Docket No. 99-249, September 20, 1999

"Reply Comments of Consumer Federation of America on Joint Petition for Waiver," before the Federal Communications Commission, In the Matter of Implementation of the Subscriber Carrier Selection Changes Provision of the Telecommunications Act of 1996, Policies and Rule Concerning Unauthorized Changes of Consumers Long Distance Carriers, CC Docket NO. 94-129, FCC 98-334

"Joint Comments of Texas Office Of Public Utility Counsel Consumer Federation Of America National Association Of State Utility Consumer Advocates Consumers Union," In the Matter of Federal-State Joint Board On Universal Service Access Charge Reform Before The Federal Communications Commission, Before The Federal Communications Commission, CC Docket No. 96-45, CC Docket No. 96-262, July 23, 1999

"Affidavit of Dr. Mark N. Cooper on Behalf of Consumer Intervenors," RE: In the Matter of Applications for Consent to the Transfer Of Control of Licenses and Section 214 Authorizations from Ameritech Corporation, Transfer, to SBC Communications Inc., Transferee, Before The Federal Communications Commission, CC Dkt. No. 98-141, July 17, 1999.

“Reply comments of the Consumer Federation of America, Consumers Union and AARP, before the Federal communications Commission, before the Federal Communications Commission, Proposed Transfer of Control SBC and Ameritech, CC Docket” No. 98-141, November 16, 1998.

“Comments and Reply Comments of the Consumer Federation of America, International Communications Association and National Retail Federation Petition,” before the Federal Communications Commission, In the Matter of Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Consumer Federation of America, International Communications Association and National Retail Federation Petition Requesting Amendment of the Commission’s Rules Regarding Access Charge Reform and Price Cap Performance Review for Local Exchange Carriers, Federal Communications Commission, CC Docket Nos. 96-262, 94-1, RM9210, October 25, 1998, November 9, 1998.

Letter to William E. Kennard, on behalf of The Consumer Federation of America, in Reciprocal Compensation of Internet Traffic, November 5, 1998.

Preserving Affordable Basic Service Under the ’96 Telecom Act, to the Federal Communications Commission and the Federal-State Joint Board, October 29, 1998.

“Reply Comments Of The Consumer Federation Of America And Consumers Union,” before The Federal Communications Commission. In The Matter Of Deployment Of Wireline Services Offering Advanced Telecommunications Capability, Etc., CC Docket Nos. 98-147, 98-11 98-26, 98-32, 98-78, 98-91, CCB/CPD Docket N. 98-15 RM 9244, October 16, 1998

“The Impact of Telephone Company Megamergers on the Prospect for Competition in Local Markets, before the Federal communications Commission, before the Federal Communications Commission, Proposed Transfer of Control SBC and Ameritech, CC Docket” No. 98-141, October 15, 1998

The Impact of Telephone Company Megamergers on the Prospect for Competition in Local Markets, Comments of The Consumer Federation of America and Consumers Union, before the Federal communications Commission, before the Federal Communications Commission, Proposed Transfer of Control SBC and Ameritech, CC Docket” No. 98-141, October 15, 1998

Letter to William E. Kennard, on Behalf of the Consumer Federation of America, in Re: Pass through of Access Charge Reductions, August 13, 1998.

“Statement of Dr. Mark N. Cooper, on behalf of the Consumer Federation of America,” In the Matter of Federal-State Joint Board On Universal Service Forward Looking Mechanisms for High Cost Support for Non-Rural LECs, June 8, 1998.

“Reply Comments of Consumers Union and the Consumer Federation of America, before the Federal Communications Commission,” In the Matter of Consumer Federation of America, International Communications Association and National Retail Federation Petition Requesting Amendment of the Commission’s Rules Regarding Access

Charge Reform and Price Cap Performance Review for Local Exchange Carriers, Federal Communications Commission, Docket No. RM9210, February 17, 1998

"Statement of Dr. Mark N. Cooper, on Behalf of the Consumer Federation of America," Before the Federal Communications Commission, Re: Cable TV Rates, December 18, 1997.

Letter to William Kennard, on Behalf of The Consumer Federation of America, Re: Long Distance Basic Rates, November 26, 1997.

Letter to William E. Kennard, on behalf of the Consumer Federation of America, Re; Proposed Revision of Maximum Collection Amounts for Schools and Libraries and Rural Health Care Providers, Public Notice, CC Docket No. 96-45; DA 98-872, May 21, 1998.

"Reply Comments of Consumers Union and the Consumer Federation or America," In the Matter of Consumer Federation or America, International Communications Association and National Retail Federation Petition Requesting Amendment of the Commission's Rules Regarding Access Charge Reform and Price Cap Performance Review for Local Exchange Carriers, Federal Communications Commission, Docket No. RM9210, February 17, 1998.

"Reply Comments of the Consumer Federation of America," In the Matter of Application by BellSouth Corporation, BellSouth Telecommunications, Inc., and BellSouth Long Distance, Inc., for Provision of In-Region, InterLATA Services in Louisiana, Federal Communications Commission, CC Docket No. 97-231, December 19, 1997

Letter to Reed Hundt, on Behalf of the Consumer Federation of America, Re: CC Docket NO. 92-237: Carrier Identification Codes, October 15, 1997

"Statement of Dr. Mark N. Cooper, on Behalf of the Consumer Federation of America," before the Federal Communications Commission, In Re: Petition of Consumers Union and the Consumer Federation of America to Update Cable TV Regulation and Freeze Existing Cable Television Rates, MM Docket Nos. 92-264, 92-265, 92-266, September 22, 1997

"Reply Comments of Consumer Federation of America and Consumer Action on Remand Issues in the Pay Telephone Proceeding," Federal Communications Commission, In the Matter of Implementation of the Pay Telephone Reclassification and Compensation Provisions of the Telecommunications Act of 1996, CC Docket NO. 96-128, DA 97-1673 (Remand), September 9, 1997.

Letter to Reed Hundt, Consumer Federation of America, Re: Ameritech 271 Application for Michigan, CC Docket No. 97-137, August 11, 1997.

"Statement of Dr. Mark N. Cooper," Federal Communications Commission, Hearing on Cable Television Competition and Rates, December 18, 1997

"Reply Comments of the Consumer Federation of America," In the Matter of Application by BellSouth Corporation, et. al. For Provision of In-Region, InterLATA Services in

South Carolina, Federal Communications Commission, CC Docket No. 97-208, November 14, 1997

“Statement of Dr. Mark N. Cooper,” In Re: Petition of Consumers Union and the Consumer Federation of America to Update Cable TV Regulation and Freeze Existing Cable Television Rates, Federal Communications Commission, September 22, 1997.

“The Telecommunication Act of 1996: The Impact on Separations of Universal Service and Access Charge Reform,” before the Federal State Joint Board on Separations, February 27, 1997

“Comments of the Consumer Federation of America,” before the Federal Communications Commission In the Matter of Federal-State Joint Board on Universal Service, CC Docket No. 96-45, August 2, 1996

“In the Matter of Allocation of Costs Associated with Local Exchange Carrier Provision of Video Programming Services,” before the Federal Communications Commission, In the Matter of Allocation of Costs Associated with Local Exchange Carrier Provision of Video Programming Services, CC Docket No. 96-122, June 12, 1996

“Comments of Consumer Federation of America,” before the Federal Communications Commission, In the Matter of the Local Competition Provisions of the Telecommunications Act of 1996, 1996

"Statement of Dr. Mark N. Cooper," Before the Federal Communications Commission, In Re: Review of the Commission's Regulations Governing Television Broadcasting, MM Docket No. 91-221, July 10, 1995

"Cost Analysis and Cost Recovery on the Information Superhighway, Evidence of Dr. Mark N. Cooper on behalf of the National Anti-poverty Organization and Federation Nationale des Associations Consumateurs du Quebec," before the Canadian Radio-Television and Telecommunications Commission, Review of Regulatory Framework, Public Notice CRTC 92-78, April 13, 1995

"Affidavit in Support of the Petition for Relief of the Center for Media Education, Consumer Federation of America, the United Church of Christ, the National Association for the Advancement of Colored People, and the National Council of La Raza, May 24, 1994

"Response of the Consumer Federation of America and the Center for Media Education to Bell Atlantic's Request for an Expedited Waiver Relating to Out-of-Region Interexchange Services and Satellite Programming Transport," Department of Justice, In Re: United States of America v. Western Electric Company, Inc., and American Telephone and Telegraph Company, Civil No. 82-0192 (HHG), March 8, 1994

"Petition to Deny: Center For Media Education and Consumer Federation of America," before the Federal Communications Commission, In the Matter of the Application of U.S. West Communications Inc., for Authority Under Section 214 of the Communications Act of 1934, as Amended, to Construct, Operate Own and Maintain Facilities and

Equipment to Provide Video Dialtone Service in Portions of the Denver, Portland, Oregon, and Minneapolis -St. Paul Service Area, March 4, 1994

"Comments of the Consumer Federation of America," before the Federal Communications Commission, In the Matter of Implementation of Sections of the Cable Television Consumer Protection Act of 1992, MM Docket No. 92-266, January 27, 1993

"Evidence of Mark N. Cooper: Submission of the National Anti-poverty Organization," before the Canadian Radio-Television and Telecommunications Commission, Review of Regulatory Framework, Public Notice CRTC 92-78, April 13, 1992

"Comment of Mark N. Cooper on Behalf of the Center for Science in the Public Interest," before the Food and Drug Administration, In the Matter of Regulatory Impact Analysis of the Proposed Rule to Amend the food and Labeling Regulations, Docket No. 91N-0219, February 25, 1992

"Comment of Mark N. Cooper on Behalf of the Center for Science in the Public Interest," before the U.S. Department of Agriculture, In the Matter of Preliminary Regulatory Impact Analysis of the Proposed Regulations for Nutrition Labeling of Meat and Poultry, Docket No. 91-006, February 25, 1992

"Comment of the Consumer Federation," before the Federal Communications Commission, In the Matter of Rules and Policies Regarding Calling Number Identification Service, CC Docket No. 91-281, January 1992 "Comments of the Consumer Energy Council of America Research Foundation," before the Environmental Protection Agency, 40 CFR Part 73, December 12, 1991

"Comments of the Consumer Energy Council of America Research Foundation," before the Environmental Protection Agency, 40 CFR Part 73, July 5, 1991

"Affidavit of Dr. Mark N. Cooper on Abuse of the Monopoly Franchise by the Regional Bell Operating Companies in the Marketing of Optional Services," United States District Court for the District of Columbia, United States of America v. Western Electric Company and American Telephone and Telegraph Company, C.A. No. 82-0192, October 17, 1990

"Health Claims in Food Labeling and Advertising: Reexamining the Public Interest After Two Decades of Dispute," Food and Drug Administration, Food Labeling: Advanced Notice of Proposed Rule making, January 5, 1990

"Comments of the Consumer Federation of America, in the Matter of Medicare and Medicaid Programs: Fraud and Abuse OIG Anti-Kickback Provisions, 42 CFR Part 1001, Department of Health and Human Services, March 24, 1989

"Comments of the Consumer Federation of America in the Matter of Railroad Cost Recovery Procedures -- Productivity Adjustment, Ex Parte No. 290 (Sub-No. 4), Interstate Commerce Commission, December 16, 1988

EXHIBIT 30

"Answer of the Consumer Federation of America to the Petition of International Flight Attendants," U.S. Department of Transportation, Docket N. 45792, September 20, 1988

"Joint Comments of the Consumer Federation of America and the Environmental Action Foundation," Federal Energy Regulatory Commission, Dockets Nos. RM88-4, 5,6-000, July 18, 1988

"Comments of the Consumer Federation of America in Opposition to the Request to Reopen and Set Aside Consent Order," Federal Trade Commission, Docket No. 9033, July 5, 1988

"Comments of the Consumer Federation of America on the Initiation of National Security Investigations of Imports of Crude Oil and Refined Petroleum Products," Notice of Investigation Under Section 232 of the Trade Expansion Act of 1962, U.S. Department of Commerce, January 28, 1988

"Policies and Rules Concerning Dominant Carriers: The FCC's Price Cap Proposal," Federal Communications Commission, CC. Docket No. 87-313, October 19, 1987

"On Behalf of the Consumers' Association of Canada," Re: CRTC Telecomm Public Notice 187-15, Bell Canada and British Columbia Telephone Company: Rate Rebalancing and Revenue Settlement Issue, Before the Canadian Radio-Television Commission, August 21, 1987

"Comments of the Consumer Federation of America on the Department of Energy's Study of the Impact of Falling Oil Prices on Crude Oil Production and Refining Capacity in the United States, U.S. Department of Energy, November 30, 1986

"Comments of the Consumer Federation of America on the Notice of Proposed Rule making Issued May 30, 1985," before the Federal Energy Regulatory Commission, Docket

No. RM85-1-000 (Part A-D), July 15, 1985

"Comments of the Consumer Federation of America and U.S. Public Interest Research Group, in the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board" Before the Federal Communications Commission, CC Docket Nos. 78-72 and 80-286, April 26, 1985

"On Behalf of the California Human Development Corporation, et al., v. Raymond L. Donovan, Secretary, U.S. Department of Labor," United States District Court for the District of Columbia, Case No. 83-3008, March 20, 1984

"Utility Fuels, Inc. v. Burlington Northern Railroad Co., Fort Worth and Denver Ry. Co, and Atchison, Topeka and Santa Fe Ry. Co, before the Interstate Commerce Commission, Docket No. 39002, December 16. 1983, on Behalf of Utility Fuels, Inc.

"In the Matter of the Petition of the State of Michigan Concerning the Effects of Certain Federal Decisions on Local Telephone Service," before the Federal Communications Commission, CC Docket No. 83-788, September 26, 1983

"In the Matter of Coal Rate Guidelines -- Nationwide, ExParte No. 347 (Sub No. 1)," before the Interstate Commerce Commission, July 28, 1983

"Federal Energy Conservation Programs," before the United States Environmental Protection Agency, July 14, 1981

"Building Energy Performance Standards," before the Department of Energy, March 27, 1980

"Comment on the Incremental Pricing Provisions of the Natural Gas Policy Act," before the Federal Energy Regulatory Commission, Docket No. RM 80-10

FEDERAL CONGRESSIONAL

Testimony of Dr. Mark Cooper on Is There Life After *Trinko* and *Credit Suisse?* The Role of Antitrust in Regulated Industries, Subcommittee on Courts and Competition Policy Committee on the Judiciary, U.S. House of Representatives, June 15, 2010

Testimony of Dr. Mark Cooper, Senior Fellow for Economic Analysis Institute for Energy and the Environment, Vermont Law School, on 'Economic Advisability of Increasing Loan Guarantees for the Construction of Nuclear Power Plants," *Domestic Policy Subcommittee, Committee on Oversight and Government Reform, U.S. House of Representatives,* April 20, 2010

Testimony of Dr. Mark Cooper, on behalf of Consumer Federation of America, Free Press Consumers Union before the Commerce Committee, U.S. Senate regarding "Consumers, Competition and Consolidation in the Video Broadband Market," March 11, 2010

Dr. Mark Cooper on behalf of Consumer Federation of America, Free Press, Consumers Union before the, U.S. House of Representatives, Committee on the Judiciary, Subcommittee on Antitrust, Competition Policy and Consumer Rights Regarding "Competition in the Media and Entertainment Distribution Market," February 25, 2010

Dr. Mark Cooper, on behalf of Consumer Federation of America, Free Press, Consumers Union before the U.S. House of Representatives, Subcommittee on Communications, Technology, and the Internet of the Committee on Energy and Commerce regarding "An Examination of the Proposed Combination of Comcast and NBC Universal," February 4, 2010

Dr. Mark Cooper, on behalf of Consumer Federation of America, Free Press, Consumers Union before the Senate Subcommittee on Antitrust, Competition Policy and Consumer Rights Judiciary Committee on "The Comcast /NBC Universal Merger: What Does the Future Hold for Competition and Consumers?", February 4, 2010

Testimony of Dr. Mark Cooper "Too Big to Fail? The Role of Antitrust Law in Government-Funded Consolidation in the Banking Industry," Subcommittee on Courts and Competition Policy, Committee on the Judiciary, United States House of Representatives, March 17, 2009

"Excessive Speculation In Energy Commodities," Agriculture Committee, United States House of Representatives, July 10, 2008

"Oversight of Energy Markets and Oil Futures Contract," Joint Hearing of the Senate Appropriations Subcommittee on Financial Services and General Government and The and the Committee on Agriculture, Nutrition and Forestry United States Senate, June 17, 2008

"Energy Market Manipulation and Federal Enforcement Regimes," Committee On Commerce, Science And Transportation, United States Senate, June 3, 2008

"The Financial State of the Airline Industry and the Potential Impact of a Delta/Northwest Merger," Senate Committee on Commerce Science and Transportation, Aviation Subcommittee, May 7, 2008

"Consumer Effects of Retail Gas Prices," before the Judiciary Committee Antitrust Task Force, United States House of Representatives, May 7, 2008

"Pumping up Prices: The Strategic Petroleum Reserve and Record Gas Prices," Select Subcommittee on Energy Independence and Global Warming, United States House of Representative, April 24, 2008

"Federal Trade Commission Reauthorization," Senate Energy and Commerce Committee, September 12, 2007

"Prices at the Pump: Market Failure and the Oil Industry," House Judiciary Committee, May 16, 2007

"Competition and the Future of Digital Music," House Judiciary Committee, Antitrust Task Force, February 28, 2007

"The State of the Airline Industry: The Potential Impact of Airline Mergers and Industry Consolidation," Senate Committee on Commerce, Science and Technology, January 24, 2007

"Vertically Integrated Sports Networks and Cable Companies," Senate Judiciary Committee, December 7, 2006

"Universal Service," House Committee on Energy and Commerce, June 21, 2006

"Price Gouging," Senate Committee on Commerce, Science and Transportation, May 23, 2006

"Gasoline: Supply, Price and Specifications," House Committee on Energy and Commerce, May 10, 2006

"Competition and Convergence," Senate Committee on Commerce, Science and Transportation, March 30. 2006

"Antitrust Should Promote Competition on Top of Well Regulated Infrastructure Platforms," Antitrust Modernization Commission, December 5, 2005

"Video Competition in 2005 – More Competition or New Choices for Consumers," Subcommittee on Antitrust, Competition Policy and Consumer Rights, United States Senate, October 19, 2005

"An Oversight Hearing on Record High Gasoline Prices and Windfall Oil Company Profits," Senate Democratic Policy Committee, September 19, 2005

"Hurricane Katrina's Effect on Gasoline Supply and Prices," Committee on Energy and Commerce, U.S. House of Representative, September 7, 2005

""The Merger Tsunami is Drowning Competition in the Communications Marketplace," House Energy and Commerce Committee, March 2, 2005

"Testimony of Dr. Mark Cooper on Behalf of the Consumer Federation of America on The Digital Transition – What Can We Learn from Berlin, The Licensed-Gatekeeper Model of Spectrum Management is Kaput," Subcommittee on Telecommunications and the Internet, Committee on Energy and Commerce, U.S. House of Representatives, July 21, 2004.

"Testimony of Mark Cooper on behalf or The Consumer Federation of America and Consumers Union on the Status of the U.S. Refining Industry," Subcommittee on Energy and Air Quality, Committee on Energy, U.S. House of Representatives, July 15, 2004

"Testimony of Dr. Mark N. Cooper on Behalf of the consumer Federation of American and Consumers Union on Environment Regulation in Oil Refining," Environment and Public Works Committee, May 12, 2004

"Testimony Of Dr. Mark Cooper, On Behalf Of Consumer Federation Of America And Consumers Union On Crude Oil: The Source Of Higher Prices? Before The Senate Judiciary Committee, Antitrust, Competition Policy And Consumer Rights Subcommittee, April 7, 2004

"Testimony of Mark Cooper on Cable Market Power in Multichannel Video Program Distribution," Subcommittee on Antitrust, Senate Judiciary Committee, February 11, 2004

"Testimony Of Dr. Mark Cooper, Director Of Research On Gasoline Price Volatility," Senate Commerce Committee, October 9, 2003

"Testimony Of Dr. Mark N. Cooper Director Of Research On Media Ownership," Before The Senate Commerce Committee, Washington, D. C., October 2, 2003

"Statement of Dr. Mark Cooper on Behalf of the Consumer Federation of America and Consumers Union on The Federal Response to the 2003 Blackout: Time to Put the Public Interest First," Subcommittee on Oversight of Government Management, The Federal Workforce and the District of Columbia, Committee on Government Affairs, United States Senate, September 10, 2003

"From Cheap Seats To Expensive Products, Anticompetitive Practices From The Old Economy Can Rob Consumers Of The Benefits Of The Internet Statement of Dr. Mark Cooper on behalf of The Consumer Federation Of America," before The Subcommittee On Commerce, Trade And Consumer Protection, July 18, 2002

"The Financial Status of the Airline Industry," Committee on Commerce, Science and Transportation, United States Senate, September 20, 2001

"Statement Of Dr. Mark Cooper on Electricity Markets: California," Subcommittee On Energy And Air Quality House Energy And Commerce Committee's Subcommittee, March 22, 2001

"Statement of Dr. Mark N. Cooper on Mergers Between Major Airlines: The Anti-Competitive And Anti-Consumer Effects Of The Creation Of A Private Cartel," Subcommittee On Commerce, Trade And Consumer Protection Committee On Energy And Commerce United States House of Representatives, March 21, 2001

"Statement Of Dr. Mark N. Cooper On The Aviation Competition Restoration Act," Committee On Commerce, Science And Transportation, United States Senate March 13, 2001

"Statement Of Dr. Mark Cooper on Digital Television," Senate Commerce Committee, March 1, 2001

"The Proposed United Airlines-US Airways Merger," Antitrust Committee, United States Senate, June 14, 2000

"Testimony of Dr. Mark N. Cooper on behalf of the Consumer Federation of America and Consumers Union," Electricity Restructuring at the Federal Level, Subcommittee on Energy and Power, U.S. House of Representatives, October 6, 1999

"Testimony of Dr. Mark N. Cooper on Electricity Competition: Consumer Protection Issues," before the Subcommittee on Energy and Power, Energy and Commerce Committee, United States House of Representatives, May 26, 1999

"Testimony of Dr. Mark N. Cooper on The Regulation of Public Utility Holding Companies," Committee on Banking, Housing, and Urban Affairs, United States Senate, April 29, 1997

"Testimony of Dr. Mark N. Cooper on Behalf of the Consumer Federation of America and the Environmental Action Foundation on Exempting Registered Holding Companies from the Public Utility Holding Company Act for Diversification into Telecommunications," Committee on Energy and Commerce, United States House of Representatives, July 29, 1994

"Testimony of Dr. Mark N. Cooper on Universal Service and Local Competition and S. 1822," before the Commerce Committee, United States Senate, May 17, 1994

"Testimony of Dr. Mark N. Cooper Director of Research of the Consumer Federation of America on H.R. 3636, The National Communications Competition and Information Infrastructure Act of 1993, and H.R. 3626, The Antitrust Reform Act of 1993 and the Communications Reform Act of 1993" before the Subcommittee on Telecommunications and Finance, Committee on Energy and Commerce, United States House of Representatives, February 3, 1994

"Testimony of Dr. Mark N. Cooper on Major Mergers in the Telecommunications Industry," Subcommittee on Antitrust, Monopolies and Business Rights, November 16, 1993

"Testimony of Dr. Mark N. Cooper on Physician Ownership and Referral Arrangements," before the Subcommittee on Oversight, Committee on Ways and Means, October 17, 1991

"Testimony of Dr. Mark N. Cooper on Airline Competition and Consumer Protection," Subcommittee on Aviation, Committee on Public Works and Transportation, U. S. House of Representatives, May 22, 1991

"Testimony of Dr. Mark N. Cooper on Regulatory Reform in the Electric Utility Industry," Subcommittee on Energy and Power Energy and Commerce Committee, United States House of Representatives, May 2, 1991

"Testimony of Dr. Mark N. Cooper on Telephone Consumer Privacy and Advertising Rights," Subcommittee on Telecommunications and Finance, Energy and Commerce Committee, United States House of Representatives, April 24, 1991

"Testimony of Dr. Mark N. Cooper on Regulatory Reform in the Electric Utility Industry," before the Committee on Energy and Natural Resources, U.S. Senate, March 14, 1991

"Testimony of Mark Cooper and Scott Hempling on Electric Utility Policies of the Federal Energy Regulatory Commission," before the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, U.S. House of Representatives, October 11, 1990

"Testimony of Dr. Mark N. Cooper on Caller Identification," before the Subcommittee on Technology and the Law, Judiciary Committee, U.S. Senate, August 1, 1990

"Testimony of Dr. Mark N. Cooper on Airport Gross Receipts Fees," before the Subcommittee on Economic and Commercial Law, Judiciary Committee, U.S. House of Representatives, June 28, 1990

"Testimony of Dr. Mark N. Cooper on Airport Gross Receipts Fees," before the Subcommittee on Antitrust, Monopolies and Business Rights, Judiciary Committee, U.S. Senate, April 24, 1990

"Testimony of Dr. Mark N. Cooper on Independent Power Producers and the Public Utility Holding Company Act of 1935" Subcommittee on Energy and Power, Committee on Energy and Commerce, United States House of Representatives, September 14, 1989

"Testimony of Dr. Mark N. Cooper on Acid Rain Legislation, Subcommittee on Energy and Power, Committee on Energy and Commerce, United States House of Representatives, September 7, 1989

"Testimony of Gene Kimmelman and Dr. Mark N. Cooper on Competitive Issues in the Cable Television Industry, before the Subcommittee on Antitrust, Monopolies and Business Rights, Judiciary Committee, United States Senate, April 12, 1989

"Testimony of Peggy Miller and Dr. Mark N. Cooper, on the Savings and Loan Crisis," before the Ways and Means Committee, United States House of Representatives, March 9, 1989

"Testimony of Dr. Mark N. Cooper on The Ethics in Patient Referrals Act of 1989 and Physician Self-Referral," before the subcommittee on Health, Committee on Ways and Means, United States House of Representatives, March 2, 1989

"Joint Testimony of the Consumer Federation of American and the Citizen Labor Energy Coalition on Bypass of Natural Gas Local Distribution Companies," before the Subcommittee on Energy Regulation and Conservation, Committee, on Energy and Natural Resources, United States House of Representatives, September 29, 1988

"Independent Power Producers and the Public Utility Holding Company Act of 1935, Subcommittee on Energy and Power of the Energy and Commerce Committee, U.S. House of Representatives, September 14, 1988

"Physician Self-Dealing and Quality Control in Clinical Laboratory Testing," Energy and Commerce Committee, U.S. House of Representatives, July 6, 1988

"Joint Testimony of the Consumer Federation of American and the Citizen Labor Energy Coalition on Bypass of Natural Gas Local Distribution Companies," before the Subcommittee on Energy and Power, Energy and Commerce Committee, United States House of Representatives, May 25, 1988

"Administrative Modifications in the Implementation of the Public Utility Regulatory Act of 1978," before the Committee on Energy and Natural Resources, U.S. Senate, February 2, 1988

"Excess Deferred Taxes," before the Subcommittee on Select Revenue Measures, Ways and Means Committee, U.S. House of Representatives, December 14, 1987

"Electric Utility Regulation," Testimony before the Subcommittee on Energy and Power of the Energy and Commerce Committee, U.S. House of Representatives, September 23, 1987

"Bank Sale of Insurance," Banking Committee, U.S. Senate, July 30, 1987

"Consumer Impacts of Airline Bankruptcies," before the Subcommittee on Aviation, Committee on Public Works and Transportation, U.S. House of Representatives, June 10, 1987

"Oversight of the Rail Industry and the Staggers Act," before the Subcommittee on Surface Transportation, Committee on Commerce, Science and Transportation, June 9, 1987

"Oil Industry Taxes," before the Committee on Finance, U.S. Senate, June 5, 1987

"Comprehensive Natural Gas Legislation," before the Subcommittee on Regulation, Committee on Energy and Natural Resources, U.S. Senate, May 20, 1987

"Federal Policy Toward the Insurance Industry," before the Judiciary Committee, February 18, 1987.

"Railroad Antimonopoly Act of 1986," before the Subcommittee on Commerce, Transportation and Tourism of the Energy and Commerce Committee, U.S. House of Representatives, June 5, 1986

"Comprehensive Natural Gas Legislation," before the Subcommittee on Regulation, Energy and Natural Resources Committee, U.S. Senate, May 20, 1986

"Electric Utility Regulation," before the Subcommittee on Energy Conservation and Power, Energy and Commerce Committee, U.S. House of Representatives, March 20, 1986

"Oil Import Fees," Committee on Energy and Natural Resources, U.S. Senate, March 20, 1986

"Implementation of Staggers Rail Act or 1980," Subcommittee on Commerce, Transportation and Tourism, Energy and Commerce Committee, U.S. House of Representatives, March 13, 1986

"Implementation of the Staggers Rail Act of 1980," before the Subcommittee on Surface Transportation of the Committee on Commerce, Science and Transportation, U.S. Senate, November 4, 1985

"Recent Developments in the Natural Gas Industry," before the Subcommittee on Energy Regulation and Conservation of the Energy and Natural Resource Committee, U.S. Senate, July 11, 1985

"The Consumer Impact of the Proposed Norfolk Southern/Conrail Merger," before the Subcommittee on Commerce, Transportation and Tourism of the Energy and Commerce Committee, U.S. House of Representatives, July 10, 1985

"The Consumer Impact of the Unregulated Railroad Monopoly in Coal Transportation," before the Subcommittee on Monopolies and Commercial Law of the Judiciary Committee, U.S. House of Representatives, June 27, 1975

"The World Energy Outlook," before the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, United States House of Representatives, April 1, 1985

"Phantom Tax Reform," before the Subcommittee on Energy Conservation and Power of the Committee on Energy and Commerce, U.S. House of Representatives, June 12, 1984

"Legislative Proposals Governing Construction Work In Progress," before the Subcommittee on Energy Regulation of the Energy and Natural Resources Committee, United States Senate, April 12, 1984

"Legislation Affecting Oil Company Mergers," before the Subcommittee on Energy and Mineral Resources of the Committee on Energy and Natural Resources, United States Senate, April 10, 1984

"Legislative Proposals Governing Corporate Mergers and Takeovers," before the Subcommittee on Monopolies and Commercial Law of the Committee on Judiciary, United States House of Representatives, March 23, 1984

"Review of Federal Policies Affecting Energy Conservation and Housing," before the Subcommittee on Housing and Community Development of the Committee on Banking, Finance and Urban Affairs, United States House of Representatives, March 21, 1984

"The Staggers Rail Act of 1980," before the Subcommittee on Commerce, Transportation and Tourism of the Committee on Energy and Commerce, United States House of Representatives, July 27, 1983

"Oversight Hearings on the Staggers Rail Act of 1980," before the Subcommittee on Surface Transportation of the Committee on Commerce, Science and Transportation, United States Senate, July 26-27, 1983

"The Export of Alaskan Crude Oil," before the Subcommittee on East Asian and Pacific Affairs of the Committee on Foreign Relations, United States Senate, July 19, 1984

"Economics of Natural Gas Deregulation," before the Joint Economic Committee, United States Congress, April 15, 1983

"Bills to Amend the Export Administration Act," before the Subcommittee on International Finance and Monetary Policy of the Committee on Banking, Housing and Urban Affairs, United States Senate, April 14, 1983

"Reauthorization of the Export Administration Act," before the Subcommittee on International Economic Policy and Trade of the Committee on Foreign Affairs, United States House of Representatives, April 12, 1983

"Pending Natural Gas Legislation," before the Subcommittee on Fossil and Synthetic Fuels of the Committee on Energy and Commerce, United States House of Representatives, March 22, 1983

"Energy Conservation and Jobs," before the Subcommittee on Energy Conservation and Power of the Committee on Energy and Commerce, United States House of Representatives, March 15, 1983

"Natural Gas Hearings," before the Committee on Energy and Natural Resources, United States Senate, March 10, 1983

"The Impacts of Various Energy Tax Options," before the Subcommittee on Fossil and Synthetic Fuels of the Committee on Energy and Commerce, June 15, 1982

"Various Energy Tax Options," before the Subcommittee on Energy and Agricultural Taxation of the Committee on Finance, United States Senate, June 9, 1982

"Natural Gas Policy and Regulatory Issues," before the Committee on Energy and Natural Resources, United States Senate, March 23, 1982

"The Economic Implications of Natural Gas Deregulation," before the Subcommittee on International Trade, Finance and Security Economics of the Joint Economic Committee, United States Congress, February 18, 1982

"The Implementation of Title I of the Natural Gas Policy Act of 1978," before the Committee on Energy and Natural Resources, United States Senate, November 5, 1981

"State and Local Energy Block Grants," before the Committee on Energy and Natural Resources, United States Senate, October 16, 1981

"The National Home Weatherization Act of 1981," before the Subcommittee on Energy Conservation and Supply of the Committee on Energy and Natural Resources, United States Senate, July 15, 1981

"An Alternative Energy Budget," before the Subcommittee on Energy Conservation and Power of the Energy and Commerce Committee, United States House of Representatives, February 27, 1981

"Institutional Analysis of Policy Options to Promote Energy Conservation in New Buildings," before the Subcommittee on Energy Development and Applications of the Committee on Science and Technology, United States House of Representatives, September 25, 1980

"Building Energy Performance Standards," before the Subcommittee on Energy Regulation of the Committee on Energy and Natural Resources, United States Senate, June 26, 1980

"Analysis of No. 2 Distillate Prices and Margins with Special Focus on the Department of Energy's Methodology," before the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, United States House of Representatives, February 12, 1980

STATE AND PROVINCE

"Testimony on behalf of the Southern Alliance for Clean Energy," before the Florida Public Service Commission, Docket No. 090009-EI, July 15, 2009

"State Regulators, Commodity Markets, And The Collapse Of Market Fundamentalism, Joint Session of the Consumer Affairs and Gas Committees on "Excessive Speculation in Natural Gas Markets: How To Safeguard Consumers," National Association of Regulatory Utility Commissioners, February 17, 2009

"21st Century Policies to Achieve 21st Century Goals," prepared for Wisconsin Citizens Utility Board, Investigation into the Level of Regulation for Telecommunications Providers Updating Telecommunications Regulation in Wisconsin, PSC Docket 5-TI-1777, March 25, 2008

"Comments of the Consumer Federation of America, Consumers Union, and New York Public Interest Research Group Calling for Review and Denial of the Plan for Merger," In the Matter of Joint Petition of Verizon New York Inc. and MCI for a Declaratory Ruling Disclaiming Jurisdiction Over or in the Alternative, for Approval of Agreement and Plan of Merger, Public Service Commission, State of New York, Case No. 05-C-0237, April 29, 2005

"Rebuttal Testimony of Dr. Mark Cooper on Behalf of AARP," In re: Application of the National School Lunch Program and Income-Based Criterion at or Below 135% of the Federal Poverty Guidelines as Eligibility Criteria for the Lifeline and Link-up Programs, before the Florida Public Service Commission, Docket No. 040604-TL, December 17, 2004

"Direct and Rebuttal Testimony Of Dr Mark N. Cooper On Behalf Of Texas Office Of Public Utility Council," Impairment Analysis Of Local Circuit Switching For The Mass Market, Public Utility Commission Of Texas, Docket No. 28607, February 9, 2004**,** March 19, 2004

"Direct Testimony Of Dr Mark N. Cooper On Behalf Of AARP," Before The Florida Public Service Commission, Docket No. 030867-Tl, 030868-TL, Docket No. 030869-Tl, October 2, 2003

"Affidavit of Dr. Mark Cooper on Behalf of the Wisconsin Citizen Utility Board," Petition of Wisconsin Bell, Inc., for a Section 271 Checklist Proceeding, before the Public Service Commission of Wisconsin, 6720-TI-170, June 10, 2002

"Opposition of the Consumer Federation of America and TURN," In the Matter of the Application of Comcast Business Communications, Inc. (U-5380-C) for Approval of the Change of Control of Comcast Business Communications, Inc., That Will Occur Indirectly as a Result of the Placement of AT&T Broadband and Comcast Corporation Under a New Parent, AT&T Comcast Corporation, In the Matter of the Application of AT&T Broadband Phone of California, LLC (U-5698-C) for Approval of the Change of Control of AT&T Broadband Phone of California, LLC That Will Occur Indirectly as a Result of the Placement of AT&T Broadband and Comcast Corporation Under a New Parent, AT&T Comcast Corporation, Public Utilities Commission Of The State Of California, Application 02-05-010 02-05-011, June 7, 2002

"Protecting the Public Interest Against Monopoly Abuse by Cable Companies: Strategies for Local Franchising Authorities in the AT&T Comcast License Transfer Process, Statement to the City of Boston," May 14, 2002

"Prefiled Testimony Of Dr. Mark N. Cooper On Behalf Of The Virginia Citizen Consumers Council," In The Matter Of Application Of Virginia Electric And Power Company For Approval Of A Functional Separation Plan, Virginia State Corporation Commission, Case No. Pue000584, August 24, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Public Service Company of Oklahoma To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00096, May 18, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Oklahoma Gas and Electric Company To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00095, May 18, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G.

Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Arkla, A Division of Reliant Energy Resources Corporation To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00094, May 18, 2001

"Direct Testimony Of Dr. Mark N. Cooper On Behalf Of The Attorney General Of Oklahoma, Before The Oklahoma Corporation Commission Application Of Ernest G. Johnson, Director Of The Public Utility Division, Oklahoma Corporation Commission, To Require Oklahoma Natural Gas Company To Inform The Commission Regarding Planning Of Energy Procurement Practices And Risk Management Strategies And For A Determination As To Appropriate Methods To Lessen The Impact Of Energy Price Volatility Upon Consumers, Cause No. Pud 2001-00097, May 14, 2001

"Affidavit Of Mark N. Cooper On Behalf Of The Office Of Consumer Advocate," Before The Pennsylvania Public Utility Commission, Consultative Report On Application Of Verizon Pennsylvania Inc., For FCC Authorization To Provide In-Region Interlata Service In Pennsylvania Docket M-00001435, February 10, 2001

"Statement of Dr. Mark N. Cooper before the Governor's Task on Electricity Restructuring," Las Vegas Nevada, November 30, 2000

"Open Access," Committee on State Affairs of the Texas House of Representatives, August 16, 2000

"Prepared Statement Of Dr. Mark N. Cooper, Director Of Research Consumer Federation of America, on *Internet Consumers' Bill of Rights*,**"** Senate Finance Committee Annapolis, Maryland March 7, 2000

"Prepared Statement Of Dr. Mark N. Cooper, Director Of Research Consumer Federation of America, on *Internet Consumers' Bill of Rights*,**"** House Commerce and Governmental Matter Committee Annapolis, Maryland February 29, 2000

"Comments Of The Consumer Federation Of America On The Report Of The Expert Review Panel, To The Budget And Fiscal Management Committee, Metropolitan King County Council," October 25, 1999

"Testimony Of Dr. Mark N. Cooper On Behalf Of AARP," In The Matter Of The Commission Ordered Investigation Of Ameritech Ohio Relative To Its Compliance With Certain Provisions Of The Minimum Telephone Service Standards Set Forth In Chapter 4901:1-5, Ohio Administrative Code, October 20, 1999

"Testimony of Dr. Mark N. Cooper on behalf of Residential Customers, In the Matter of the Investigation on the Commission's Own Motion Into all Matters Relating to the Merger of Ameritech Corporation and SBC Communications Inc. before the Indiana Utility Regulatory Commission in Cause NO. 41255, June 22, 1999

EXHIBIT 30

"Testimony of Dr. Mark N. Cooper, on behalf of the Pennsylvania Office of Consumer Advocate," before the Pennsylvania Public Utility Commission, In the Matter of the Joint Petition for Global Resolution of Telecommunications Proceedings, Docket Nos. P-00991649, P-oo981648, June 1999

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Pennsylvania Office of Consumer Advocate," before the Pennsylvania Public Utility Commission, In the Matter of the Acquisition of GTE by Bell Atlantic, Docket Nos. A-310200F0002, A-311350F0002, A-310222F0002, A-310291F0003, March 23, 1999

"Testimony of Dr. Mark N. Cooper on Behalf of AARP," In the Matter of the SBC Ameritech Merger, Before The Public Utilities Commission Of Ohio, Case No. 99-938-TP-COI, December 1998

"Preserving Just, Reasonable and Affordable Basic Service Rates," on behalf of the American Association of Retired Persons, before the Florida Public Service Commission, Undocketed Special Project, 980000A-SP, November 13, 1998.

"Telecommunications Service Providers Should Fund Universal Service," Joint Meeting Communications Committee and Ad Hoc Committee on Consumer Affairs, NARUC 110th Annual Convention, November 8, 1998

"Testimony of Dr. Mark N. Cooper on behalf of AARP, In the Matter of the Joint Application for Approval of Reorganization of Illinois Bell Telephone Company d/b/a Ameritech Illinois and Ameritech Illinois Metro, Inc. Into SBC Communications Inc., in Accordance with Section 7-204 of the Public Utility Act, Illinois Commerce Commission, Docket NO. 98-055, October 1998

"Testimony and Supplemental Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General," before the Department of Public Utilities, State of Connecticut, Joint Application of SBC Communications Inc. and Southern New England Telecommunications Corporation for Approval of Change of Control, Docket No. 9802-20, May 7, 1998.

"Affidavit of Mark N. Cooper on Behalf of the Consumer Federation of America," before the Public Utilities Commission of the State of California, Rulemaking on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish a Framework for Network Architecture Development of Dominant Carrier Networks, Investigation on the Commission's Own Motion Into Open Access and Network Architecture Development of Dominant Carrier Networks, Order Instituting Rulemaking on the Commission's Own Motion Into Competition for Local Exchange Service, Order Instituting, R. 93-04-003, I.93-04-002, R. 95-04-043, R.85-04-044. June 1998.

"Stonewalling Local Competition, Consumer Federation of America," and Testimony of Dr. Mark N. Cooper on behalf of Citizen Action before the Board of Public Utilities, In the Matter of the Board's Investigation Regarding the Status of Local Exchange Competition in New Jersey (Docket No. TX98010010), March 23, 1998.

EXHIBIT 30

"Direct Testimony of Mark Cooper on Behalf of Residential Consumers," In the matter of the Investigation on the Commission's own motion into any and all matters relating to access charge reform including, but not limited to high cost or Universal Service funding mechanisms relative to telephone and telecommunications services within the state of Indiana pursuant to IC-8-1-2-51, 58, 59, 69; 8-1-2.6 Et Sec., and other related state statues, as well as the Federal Telecommunications Act of 1996 (47 U.S.C.) Sec. 151, Et. Sec., before the Indiana Utility Regulatory Commission, April 14, 1998

"Affidavit of Mark N. Cooper on Behalf of the Texas Office of Public Utility Counsel," In the matter of Application of SBC. Communications Inc., Southwestern Bell Telephone Company Service Inc., d/b/a Southwestern Bell Long Distance, for Provision of In-Region InterLATA Service Texas, Public Utility Commission of Texas, Project 16251, April 1, 1998

"Comments of The Consumer Federation of America," Re: Case 97-021 - In the Matter of Petition of New York Telephone Company for approve of its statement of generally accepted terms and conditions pursuant to Section 252 of the Telecommunications Act of 1996 and Draft Filing of Petition for InterLATA Entry pursuant to Section 271 of the Telecommunications Act of 1996, before the State of New York, Public Service Commission, March 23, 1998.

"Access Charge Reform and Universal Service: A Primer on Economics, Law and Public Policy," Open Session, before the Washington Transport and Utility Commission, March 17, 1998

"Responses of Dr Mark N. Cooper on behalf of the American Association of Retired persons and the Attorney General of Washington," Public Counsel Section, before the Washington Transport and Utility Commission, March 17, 1998,

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the North Carolina Justice and Community Devilment Center," In the Matter of Establishment of Intrastate Universal Service Support Mechanisms Pursuant to G.S.62-110 (f) and Section 254 of the Telecommunications Act of 1996, before the North Carolina Utilities Commission, Docket No. P-100, SUB 133g, February 16, 1998

Comments of The Consumer Federation of America," Re: Case 97-021 - In the Matter of Petition of New York Telephone Company for approve of its statement of generally accepted terms and conditions pursuant to Section 252 of the Telecommunications Act of 1996 and Draft Filing of Petition for InterLATA Entry pursuant to Section 271 of the Telecommunications Act of 1996, before the State of New York, Public Service Commission, January 6, 1998.

"Testimony of Dr. Mark N. Cooper on Behalf of the Arizona Consumers Council," In the Matter of the Competition in the Provision of Electric Services Throughout the State of Arizona, The Arizona Corporation Commission, January 21, 1998

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Virginia Citizens Consumers Council," Virginia Electric Power Company, Application of Approval of Alternative Regulatory Plan, State Corporation Commission of Virginia, December 15, 1997

"Electric Industry Restructuring: Who Wins? Who Loses? Who Cares?" Hearing on Electric Utility Deregulation, National Association of Attorneys General, November 18, 1997

"Direct Testimony of Dr. Mark N. Cooper in Response to the Petition of Enron Energy Services Power, Inc., for Approval of an Electric Competition and Customer Choice Plan and for Authority Pursuant to Section 2801 (E)(3) of the Public Utility Code to Service as the Provider of Last Resort in the Service Territory of PECO Energy Company on Behalf of the American Association of Retired Persons," Pennsylvania Public Utility Commission v. PECO, Docket No. R-00973953, November 7, 1997.

"Policies to Promote Universal Service and Consumer Protection in the Transition to Competition in the Electric Utility Industry," Regulatory Flexibility Committee, Indiana General Assembly, September 9, 1997

"Reply Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General of Arkansas," In the Matter of Rulemaking Proceeding to Establish Rules and Procedures Necessary to Implement the Arkansas Universal Service Fund, Arkansas Public Service Commission, Docket No. 97-041-R, July 21, 1997

"Statement of Dr. Mark N. Cooper," In the Matter of the Rulemaking by the Oklahoma Corporation Commission to Amend and Establish Certain Rules Regarding the Oklahoma Universal Service Fund, Cause No. RM 970000022.

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Alliance for South Carolina's Children," In Re: Intrastate Universal Service Fund, before the Public Service Commission of South Carolina, Docket NO. 97-239-C, July 21, 1997

"Direct Testimony of Dr. Mark N. Cooper on Behalf of Kentucky Youth Advocate, Inc.," In the Matter of Inquiry into Universal Service and Funding Issues, before the Public Service Commission Commonwealth of Kentucky, Administrative Case NO. 360, July 11, 1997

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Office of Public Utility Counsel, Application of Southwestern Bell Telephone Company for Non-Rate Affecting Changes in General Exchange Tariff, Section 23, Pursuant to PURA95 s.3.53 (D), before the Public Utility Commission of Texas, July 10, 1997

"Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," Application of Pennsylvania Power and Light Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code, Pennsylvania Public Utility Commission, Docket No. R-00973954, July 2, 1997

"Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," Application of PECO Company for Approval of its Restructuring Plan

Under Section 2806 of the Public Utility Code, Pennsylvania Public Utility Commission, June 20, 1997

"Initial Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General of Arkansas," In the Matter of Rulemaking Proceeding to Establish Rules and Procedures Necessary to Implement the Arkansas Universal Service Fund, Arkansas Public Service Commission, Docket No. 97-041-R, June 16, 1997

"A New Paradigm for Consumer Protection," National Association of Attorney's General, 1997 Spring Consumer Protection Seminar, April 18, 1997.

"Statement of Dr Mark N. Cooper," Project on Industry Restructuring, Public Utility Commission of Texas, Project No. 15000, May 28, 1996

"Direct Testimony of Dr. Mark N. Cooper Submitted on behalf of The American Association of Retired Persons, before the Public Service Commission, State of New York, In the Matter of Competitive Opportunities Case 94-E-0952 New York State Electric and Gas Co. 96-E-0891; Rochester Gas and Electric Corp. 96-E-0898 Consolidated Edison Company of New York, Inc. 96-E-0897

"Direct Testimony of Dr. Mark N. Cooper on Behalf of Office of Consumer Advocate," before the Pennsylvania Public Utility Commission, Pennsylvania Public Utility Commission Bureau of Consumer Services v. Operator Communications, Inc. D/b/a Oncor Communications, Docket No. C-00946417, May 2, 1997

"Direct Testimony of Dr. Mark N. Cooper, on Behalf of New York Citizens Utility Board, the Consumer Federation of America, the American Association of Retired Persons, Consumers Union, Mr. Mark Green, Ms. Catherine Abate, the Long Island Consumer Energy Project," before the Public Service Commission, State of New York, Proceeding on Motion of the Commission as the Rates, Charges, Rules and Regulations of New York Telephone Company, NYNEX Corporation and Bell Atlantic Corporation for a Declaratory Ruling that the Commission Lacks Jurisdiction to Investigate and Approve a Proposed Merger Between NYNEX and a Subsidiary of Bell Atlantic, or, in the Alternative, for Approval of the Merger, Case 96-c-603, November 25, 1996

"Consumer Protection Under Price Cap Regulation: A Comparison of U.S. Practices and Canadian Company Proposals," before the CRTC, Price Cap Regulation and Related Matters, Telecom Public Notice CRTC, 96-8, on behalf of Federation Nationale des Associations de Consommateurs du Quebec and the National Anti-Poverty Organization, August 19, 1996

"Responses of Dr. Mark N. Cooper on Behalf of the Attorney General of Oklahoma," In the Matter of the Rulemaking by the Oklahoma Corporation Commission to Establish Rules and Regulations Concerning Universal Service, Cause NO. RM 96000015, May 29, 1996

"Statement of Dr. Mark N. Cooper on Behalf of the Attorney General of Oklahoma," In the Matter of the Oklahoma Corporation Commission to Establish Rules and Regulations Concerning Pay Telephones, Cause NO. RM 96000013, May 1996

"Statement of Dr. Mark N. Cooper on Behalf of the Attorney General of Oklahoma," In the Matter of An Inquiry by the Oklahoma Corporation Commission into Alternative Forms of Regulation Concerning Telecommunications Service, Cause NO. RM 950000404

"Statement of Dr. Mark N. Cooper to the System Benefits Workshop," Project on Industry Restructuring, Project No. 15000, before the Public Utility Commission of Texas, May 28, 1996

"Remarks of Dr. Mark N. Cooper, Panel o n Service Quality from the Consumer Perspective," NARUC Winter Meetings, Washington, D.C., February 26, 1996

"Attorney General's Comments," Before the Arkansas Public Service Commission, In the Matter of the Non-Traffic Sensitive Elements of Intrastate Access Charges and Carrier Common Line and Universal Service Fund Tariffs of the Local Exchange Companies, Docket NO. 86-159-U, November 14, 1995

"Reply Comments and Proposed Rules of the Oklahoma Attorney General," Before the Corporation Commission of the State of Oklahoma, In the Matter of the Rulemaking of the Oklahoma Corporation Commission to Establish Rules and Regulations for Local Competition in the Telecommunications Market, Cause No. RM 950000019, October 25, 1995

"Remarks of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons to the Members of the Executive Committee," Indiana Utility Regulatory Commission, in the Matter of the Investigation on the Commission's Own Motion into Any and All Matters Relating to Local Telephone Exchange Competition Within the State of Indiana, Cause No. 39983, September 28, 1995

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Office of Public Utility Counsel," before the Public Utility Commission of Texas, Petition of MCI Telecommunications Corporation for an Investigation of the Practices of Southwestern Bell Telephone Company Regarding the 713 Numbering Plan Area and Request for a Cease and Desist Order Against Southwestern Bell Telephone Company, SOAH Docket No. 473-95-1003, September 22, 1995

"Rebuttal Testimony of Dr. Mark N. Cooper on Behalf of the Office of the Attorney General State of Arkansas," Before the Arkansas Public Service Commission, In the Matter of an Earnings Review of GTE Arkansas Incorporated, Docket NO. 94-301-U, August 29, 1995

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Office of Public Utility Counsel," before the Public Utility Commission of Texas, Petition of MCI Telecommunications Corporation for an Investigation of the Practices of Southwestern Bell Telephone Company Regarding the 214 Numbering Plan Area and Request for a Cease and

Desist Order Against Southwestern Bell Telephone Company, Docket NO. 14447, August 28, 1995

"Direct Testimony of Mark N. Cooper On Behalf of the Office of the People's Counsel of the District of Columbia," Before the Public Service Commission of the District of Columbia, In the Matter of Investigation Into the Impact of the AT&T Divestiture and Decisions of the Federal Communications Commission on the Chesapeake and Potomac Telephone Company's Jurisdictional Rates, July 14, 1995

"Comments of Consumer Action and the Consumer Federation of America," Before the Public Utilities Commission of California, Order Instituting Rulemaking on the Commission's Own Motion into competition for Local Exchange Service, Docket Nos. R. 95-04-043 and I. 95-04-044, May 23, 1995

"Testimony of Dr. Mark N. Cooper on Behalf of the Arkansas Attorney General," before the Arkansas Public Service Commission, In the Matter of an Earnings Review of Southwestern Bell Telephone Company, Docket NO. 92-260-U, April 21, 1995

"Promoting Competition and Ensuring Consumer Protection on the Information Superhighway, Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons and the Consumer Federation of America on Proposed Revisions of Chapter 364," Committee on Commerce and Economic Opportunities, Florida Senate, April 4, 1995

"Direct Testimony and Exhibits of Dr. Mark N. cooper on Behalf of the Division of consumer Advocacy," In the Matter of Public Utilities Commission Instituting a Proceeding on Communications, Including an Investigation of the Communications Infrastructure in Hawaii, docket No. 7701, March 24, 1995

"Promoting Competition and Ensuring Consumer Protection on the Information Superhighway, Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons and the Consumer Federation of America on Proposed Revisions of Chapter 364," Florida House of Representative, March 22, 1995

"Prepared Testimony of Dr. Mark N. Cooper on Behalf of the Office of the Attorney General State of Arkansas," Before the Arkansas Public Service Commission, In the Matter of an Earnings Review of GTE Arkansas Incorporated, Docket NO. 94-301-U, March 17, 1995

"Statement of Dr. Mark N. Cooper," DPUC Investigation into The Southern New England Cost of Providing Service, Docket No. 94-10-01, January 31, 1995

"Statement of Dr. Mark N. Cooper," DPUC Exploration of Universal Service Policy Options, Docket No. 94-07-08, November 30, 1994

"Statement of Dr. Mark N. Cooper," DPUC Investigation of Local Service Options, including Basic Telecommunications Service Policy Issues and the Definition of Basic Telecommunications Service, Docket No. 94-07-07, November 15, 1994

"Testimony of Dr. Mark N. Cooper on Behalf of Attorney General of the Commonwealth of Kentucky, Utility and Rate Intervention Division, before the Public Service Commission, Commonwealth of Kentucky, Case No. 94-121, August 29, 1994

"Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," before the Public Utilities Commission of Ohio, In the Matter of the Application of the Ohio Bell Telephone Company for Approval of an Alternative Form of Regulation and In the Matter of the Complaint of the Office of Consumers' Counsel, v. Ohio Bell Telephone Company, Relative to the Alleged Unjust and Unreasonable Rates and Charges, Case Nos. 93-487-TP-ALT, 93-576-TP-CSS, May 5, 1994

"Reply Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General of Arkansas," before the Arkansas Public Service Commission, in the Matter of the Consideration of Expanded Calling Scopes and the Appropriate NTS Allocation and Return on Investments for the Arkansas Carrier Common Line Pool, Docket No. 93125-U, May 4, 1994

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General of Arkansas," before the Arkansas Public Service Commission, in the Matter of the Consideration of Expanded Calling Scopes and the Appropriate NTS Allocation and Return on Investments for the Arkansas Carrier Common Line Pool, Docket No. 93125-U, April 22, 1994

"Comments of Dr. Mark N. Cooper on Behalf of Consumers Union, Southwest Regional Office, before the Public Utility Commission of Texas, Request for Comments on the Method by which Local Exchange Services are Priced, Project No. 12771, April 18, 1994

"Comments of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," Before the Tennessee Public Service Commission, Inquiry for Telecommunications Rule making Regarding Competition in the Local Exchange, Docket No. 94-00184, March 15, 1994

"Rebuttal Testimony of Dr. Mark N. Cooper on Behalf of the Virginia Citizens Consumer Council, Inc., before the State Corporation Commission at Richmond, Commonwealth of Virginia, In the Matter of Evaluating Investigating the Telephone Regulatory Case No. PUC930036 Methods Pursuant to Virginia Code S 56-235.5, March 15, 1994

"Testimony of Dr. Mark N. Cooper on Behalf of the Virginia Citizens Consumer Council, Inc., before the State Corporation Commission at Richmond, Commonwealth of Virginia, In the Matter of Evaluating Investigating the Telephone Regulatory Case No. PUC930036 Methods Pursuant to Virginia Code S 56-235.5, February 8, 1994

"Testimony of Dr. Mark N. Cooper on Behalf of The American Association of Retired Persons, Citizen Action Coalition, Indiana Retired Teachers Association, and United Senior Action, before the Indiana Utility Regulatory Commission, Cause No. 39705, December 17, 1993

"Testimony of Dr. Mark N. Cooper on Behalf of the Virginia Citizens Consumer Council, Inc.," before the State Corporation Commission at Richmond, Commonwealth of Virginia, In the Matter of Evaluating the Experimental Plan for Alternative Regulation of Virginia Telephone Companies, Case No. PUC920029, October 22, 1993

"Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General," before the Arkansas Public Service Commission, In the Matter of An Earnings Review of Southwestern Bell Telephone Company, Docket No. 92-260-U, 93-114-C, August 5, 1993

"Rebuttal Testimony of Dr. Mark N. Cooper on Behalf of the Attorney General," before the Public Service Commission of the State of Missouri, The Staff of the Missouri Public Service Commission vs. Southwestern Bell Telephone and Telegraph Company, Case No. TO-93-192, April 30, 1993

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the Office of Consumer Counsel," before the Public Utilities Commission of the State of Colorado, In the Matter of the Investigatory Docket Concerning Integrated Service Digital Network, Docket No. 92I-592T

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the People's Counsel," before the Florida Public Service Commission, Comprehensive Review of the Revenue Requirement and Rate Stabilization Plan of Southern Bell Telephone and Telegraph Company, Docket No. 900960-TL, November 16, 1992

"Direct Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons," before the Florida Public Service Commission, Comprehensive Review of the Revenue Requirement and Rate Stabilization Plan of Southern Bell Telephone and Telegraph Company, Docket No. 900960-TL, November 16, 1992

"Testimony of Dr. Mark N. Cooper" before the Regulatory Flexibility Committee, General Assembly, State of Indiana, August 17, 1992

"Testimony of Dr. Mark N. Cooper On Behalf of the Consumer Advocate," before the Public Service Commission of South Carolina, Petition of the Consumer Advocate for the State of South Carolina to Modify Southern Bell's Call Trace Offering, Docket No. 92-018-C, August 5, 1992

"Telecommunications Infrastructure Hoax," before the Public Service Commission of Colorado, Conference on ISDN for the Rest of Us, April 23, 1992

"Testimony of Dr. Mark N. Cooper on Behalf of the Consumer Federation of America," before the Corporation Commission of the State of Oklahoma, In the Matter of the Corporation Commission's Notice of Inquiry Regarding Telecommunications Standards in Oklahoma, Cause No. PUD 1185, February 28, 1992

"Testimony of Dr. Mark N. Cooper on Behalf of the Consumer Federation of America," before the Georgia Public Service Commission, In the Matter of A Southern Bell Telephone and Telegraph Company Cross-subsidy, Docket No. 3987-U, February 12, 1992

"Testimony of Dr. Mark N. Cooper on Behalf of the Consumer Federation of America," before the Arkansas Public Service Commission, in the Matter of an Inquiry into Alternative Rate of Return Regulation for Local Exchange Companies, Docket No. 91-204-U, February 10, 1992

"Statement on Behalf of the Consumer Federation of America on HB 1076," before the Missouri General Assembly, January 29, 1992

"Testimony on behalf of the American Association of Retired Persons and the Consumer Federation of America," before the Legislative P.C. 391 Study Committee of the Public Service Commission of Tennessee, January 13, 1992

"Direct Testimony on Behalf of the "Consumer Advocate," Public Service Commission State of South Carolina, In the Matter of the Application of Southern Bell Telephone and Telegraph Company for Approval of Revision to its General Subscribers Service Tariff (Caller ID), Docket No. 89-638-C, December 23, 1991

"Comments of the Consumer Federation of America on Proposed Telecommunications Regulation in New Jersey (S36-17/A-5063)," New Jersey State Senate, December 10, 1991

"Comments of the Consumer Federation of America," Before the Public Service Commission, State of Maryland, In the Matter of a Generic Inquiry by the Commission Into the Plans of the Chesapeake and Potomac Telephone Company of Maryland to Modernize the Telecommunications Infrastructure, Case No. 8388, November 7, 1991

"On Behalf of the Office of Consumers Counsel," before the Public Utilities Commission of Ohio, In the Matter of the Application of the Ohio Bell Telephone Company to Revise its Exchange and Network Services Tariff, P.U.C.O. No. 1, to Establish Regulations, Rates, and Charges for Advanced Customer Calling Services in Section 8. The New Feature Associated with the New Service is Caller ID, Case No. 90-467-TP-ATA; In the Matter of the Application of the Ohio Bell Telephone Company to Revise its Exchange and Network Service Tariff, P.U.C.O. No 1, to Establish Regulations, Rates and Charges for Advanced Customer Calling Services in Section 8., The New Feature Associated with the New Service is Automatic Callback, Case No. 90-471-TP-ATA, September 3, 1991

"On Behalf of the American Association of Retired Persons," Before the Senate Select Telecommunications Infrastructure and Technology Committee, 119th Ohio General Assembly, July 3, 1991

"On Behalf of the Cook County State's Attorney," before the Illinois Commerce Commission, In Re: Proposed Establishment of a Custom Calling Service Referred to as Caller ID and Related Custom Service, Docket Nos. 90-0465 and 90-0466, March 29, 1991

"On Behalf of the Vermont Public Interest Research Group," before the Public Service Board In Re: Investigation of New England Telephone and Telegraph Company's Phonesmart Call Management Services, Docket No. 54-04, December 13, 1990

"On Behalf of the Office of Consumer Advocate," before the State of Iowa, Department of Commerce, Utilities Division, In Re: Caller ID and Related Custom Service, Docket No. INU-90-2, December 3, 1990

"On Behalf of the Office of Public Counsel," before the Florida Public Service Commission, In Re: Proposed Tariff Filings by Southern Bell Telephone and Telegraph Company When a Nonpublished Number Can be Disclosed and Introducing Caller ID to Touchstar Service, Docket No. 891194-TI, September 26, 1990

"On Behalf of the Office of Public Advocate," before the Public Service Commission, State of Delaware, In the Matter of: The Application of the Diamond State Telephone Company for Approval of Rules and Rates for a New Service Known as Caller*ID, PSC Docket No. 90-6T, September 17, 1990

"On Behalf of the Maryland People's Counsel," before The Public Service Commission of Maryland, In the Matter of Provision of Caller Identification Service by the Chesapeake and Potomac Company of Maryland, Case No. 8283, August 31, 1990

"On Behalf of the Office of Attorney General," before the Commonwealth of Kentucky, Public Service Commission, In the Matter of the Tariff Filing of GTE South Incorporated to Establish Custom Local Area Signaling Service, Case No. 90-096, August 14, 1990

"On Behalf of the Consumers' Utility Counsel," before the Georgia Public Service Commission Re: Southern Bell Telephone Company's Proposed Tariff Revisions for Authority to Introduce Caller ID, Docket No. 3924-U, May 7, 1990

"Testimony of Dr. Mark N. Cooper on Caller Identification" before the Committee on Constitutional and Administrative Law, House of Delegates, Annapolis, Maryland, February 22, 1990

"On Behalf of the Office of People's Counsel of the District of Columbia," before the Public Service Commission of the District of Columbia in the Matter of the Application of the Chesapeake and Potomac Telephone Company to Offer Return Call and Caller ID within the District of Columbia, Case No. 891, February 9, 1990

"On Behalf of the Office of Consumer Advocate" before the Pennsylvania Public Utility Commission in the Matter of Pennsylvania Public Utility Commission v. The Bell Telephone Company of Pennsylvania, Docket NO. R-891200, May 1989.

"Statement of Dr. Mark N. Cooper, Joint Hearing on the Public Utility Holding Company Act of 1935," Committees on Finance and Technology and Electricity, National Association of Regulatory Utility Commissioners, February 28, 1989

"On Behalf of Manitoba Anti-poverty Organization, the Manitoba Society of Seniors and the Consumers Association of Canada (Manitoba)" before the Public Utilities Board in the Matter of the Request of Manitoba Telephone System for a General Rate Review, February 16, 1989

"On Behalf of the Ohio Consumers Counsel, In the Matter of the Application of GTE MTO Inc. for Authority to Increase and Adjust its Rates and Charges and to Change Regulations and Practices Affecting the Same, Case No. 87-1307-TP- Air," before the Public Utility Commission of Ohio, May 8, 1988

"On Behalf of the Evelyn Soloman, Proceeding on Motion of the Commission as to the Rates, Charges and Regulations of Niagara Mohawk Power Corporation, Case Nos. 29670 and 29671," before the State of New York Public Service Commission, February 16, 1988

"An Economic Perspective - The Status of Competition in the Telecommunications Industry and Its Impact on Taxation Policy," Before the Joint Subcommittee on the Taxation of The Telecommunications Industry, December 8, 1987

"On Behalf of the Office of Consumer Counsel, State of Washington," In the Matter of the Petition of AT&T Communications of Pacific Northwest, Inc. for Classification as a Competitive Telecommunications Company, March 24, 1987

"On Behalf of Manitoba Anti-poverty Organization and the Manitoba Society of Seniors," before the Public Utilities Board in the Matter of the Request of Manitoba Telephone System for a General Rate Review, March 16, 1987

"On Behalf of the Office of Consumers' Counsel, State of Ohio," In the Matter of the Application of the Ohio Bell Telephone Company for Authority to Amend Certain of its Intrastate Tariffs to Increase and Adjust the Rates and Charges and to Change its Regulations and Practices Affecting the Same, Case No. 84-1435-TP-AIR, April 6, 1986

“On Behalf of Manitoba Anti-poverty Organization and Manitoba Society of Seniors," before the Public Utilities Board in the Matter of the Request of Manitoba Telephone System for a General Rate Review, February 6, 1986

"On Behalf of Mississippi Legal Services Coalition, in the Matter of Notice by Mississippi Power and Light of Intent to Change Rates" Before the Mississippi Public Service Commission, April 15, 1985

"On Behalf of the Universal Service Alliance, in the Matter of the Application of New York Telephone Company for Changes in it Rates, Rules, and Regulations for Telephone Service, State of New York Public Service Commission, Case No. 28961, April 1, 1985

"On Behalf of North Carolina Legal Services, in the Matter of Application of Continental Telephone Company of North Carolina for an Adjustment of its Rates and Charges, Before the North Carolina Utilities Commission, Docket No. P-128, Sub 7, February 20, 1985

"On Behalf of the Consumer Advocate in re: Application of Southern Bell Telephone and Telegraph Company for Approval Increases in Certain of Its Intrastate Rates and

Charges," Before the South Carolina Public Service Commission, Docket No. 84-308-c, October 25, 1984

"On Behalf of the Office of the Consumers' Counsel in the Matter of the Commission Investigation into the Implementation of Lifeline Telephone Service by Local Exchange Companies," Before the Public Utilities Commission of Ohio, Case No. 84-734-TP-COI, September 10, 1984

"On Behalf of North Carolina Legal Services Resource Center in the Matter of Application Southern Bell Telephone and Telegraph Company for an Adjustment in its Rates and Charges Applicable to Intra-state Telephone Service in North Carolina," Before the North Carolina Utilities Commission, Docket No. P-55, Sub 834, September 4, 1984

"On Behalf of Mississippi Legal Services Coalition in the Matter of the Citation to Show Cause Why the Mississippi Power and Light Company and Middle South Energy Should not Adhere to the Representation Relied Upon by the Mississippi Public Service Commission in Determining the Need and Economic Justification for Additional Generating Capacity in the Form of A Rehearing on Certification of the Grand Gulf Nuclear Project," Before the Mississippi Public Service Commission, Docket No. U-4387, August 13, 1984

"On Behalf of the Mississippi Legal Services Corporation Re: Notice of Intent to Change Rates of South Central Bell Telephone Company for Its Intrastate Telephone Service in Mississippi Effective January 1, 1984," before the Mississippi Public Service Commission, Docket No. U-4415, January 24, 1984

"The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South, and the Gulf Coast Region," before the Mississippi Public Service Commission, Docket No. U4224, November 1982

"In the Matter of the Joint Investigation of the Public Service Commission and the Maryland Energy Office of the Implementation by Public Utility Companies Serving Maryland Residents of the Residential Conservation Service Plan," before the Public Service Commission of the State of Maryland, October 12, 1982

"The Impact of Rising Utility Rates on he Budgets of Low Income Households in the Region of the United States Served by the Mississippi Power Company and South Central Bell Telephone Company," before the Chancery Court of Forrest County, Mississippi, October 6, 1982

"The Impact of Rising Energy Prices on the Low Income Population of the Nation, the South and the Gulf Coast Region," before the Mississippi Public Service Commission, Docket No. U-4190, August 1982

EXHIBIT 31

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Nuclear Power Plant)
Cost Recovery Clause)

Docket No. 100009-EI
Filed: May 3, 2010

FLORIDA POWER & LIGHT COMPANY'S PETITION FOR APPROVAL OF NUCLEAR POWER PLANT COST RECOVERY AMOUNT FOR THE PERIOD JANUARY – DECEMBER 2011

Florida Power & Light Company ("FPL"), pursuant to Section 366.93, Florida Statutes, and Rule 25-6.0423, Florida Administrative Code, hereby petitions the Florida Public Service Commission (the "Commission") for approval to recover a Nuclear Power Plant Cost Recovery ("NPPCR") amount of $28,754,660 through the Capacity Cost Recovery Clause ("CCRC") during the period January – December 2011.

FPL's requested NPPCR amount is detailed in the accompanying Nuclear Filing Requirement ("NFR") schedules, and is supported by the testimony of witnesses including those employees responsible for FPL's nuclear power plant extended power uprate project at its existing St. Lucie and Turkey Point nuclear power plants (the "EPU" or "Uprate Project"), and for development of two additional nuclear-fueled generating units at FPL's Turkey Point electric generation site ("Turkey Point 6 & 7"). The NPPCR amount sought for recovery through the CCRC in 2011 equates to a monthly, 1,000 kilowatt hour residential bill impact of thirty-one cents ($0.31).

FPL's requested NPPCR amount consists of (i) carrying charges on construction costs, recoverable operations and maintenance ("O&M") costs, and base rate revenue requirements for in-service systems for the Uprate Project; and (ii) carrying charges on site selection costs, pre-construction costs, and carrying charges on preconstruction costs for the continued development

DOCUMENT NUMBER-DATE
03673 MAY -3 10
FPSC-COMMISSION CLERK

EXHIBIT 31

of Turkey Point 6 & 7, all as provided for in Section 366.93 and Rule 25-6.0423, Florida Administrative Code. FPL also requests that the Commission enter a finding that FPL's 2010 actual/estimated and 2011 projected costs for the Uprate Project and Turkey Point 6 & 7 are reasonable and that the Commission review and approve the feasibility analyses provided by FPL for both projects. In support of this Petition, FPL states as follows:

INTRODUCTION

1. FPL is a corporation with headquarters at 700 Universe Boulevard, Juno Beach, Florida 33408. FPL is an investor-owned utility operating under the jurisdiction of this Commission pursuant to the provisions of Chapter 366, Florida Statutes. FPL is a wholly-owned subsidiary of FPL Group, Inc., a registered holding company under the federal Public Utility Holding Company Act and related regulations. FPL provides generation, transmission, and distribution service to approximately 4.5 million retail customers.

2. Any pleading, motion, notice, order or other document required to be served upon FPL or filed by any party to this proceeding should be served upon the following individuals:

R. Wade Litchfield, Vice President of
Regulatory Affairs and Chief Regulatory Counsel
Wade.Litchfield@fpl.com
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
561-691-7101
561-691-7135 (fax)

Bryan S. Anderson
Managing Attorney
Bryan.Anderson@fpl.com
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
561-304-5253
561-691-7135 (fax)

3. This Petition is being filed consistent with Rule 28-106.201, Florida Administrative Code. The agency affected is the Florida Public Service Commission, located at 2540 Shumard Oak Blvd, Tallahassee, FL 32399. This case does not involve reversal or

EXHIBIT 31

FPL

Bryan S. Anderson
Managing Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408-0420
(561) 304-5253
(561) 691-7135 (Facsimile)

RECEIVED-FPSC
10 MAY -3 PM 4:28
COMMISSION
CLERK

May 3, 2010

-VIA HAND DELIVERY -

Ms. Ann Cole, Director
Division of the Commission Clerk and Administrative Services
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Re: Docket No. 100009-EI

Dear Ms. Cole:

Please find enclosed for filing in the above docket the original and seven (7) copies of Florida Power & Light Company's Petition for Approval of Nuclear Power Plant Cost Recovery Amount for the Period January – December 2011, with a diskette containing the electronic version of same. The enclosed diskette is HD density, the operating system is Windows XP, and the word processing software in which the documents appear is Word 2003.

Also enclosed for filing are the original and fifteen (15) copies of the prefiled testimony and documents of Florida Power & Light Company witnesses Steven Scroggs; Terry Jones; Steven Sim; Winnie Powers; Nils Diaz, The ND2 Group, LLC; and John Reed, Concentric Energy Advisors.

If there are any questions regarding this transmittal, please contact me at 561-304-5253.

DNs
03674-10 SCROGGS
PETITION 03675-10 JONES
03676-10 APENDICES I, II, III
1 APA 03677-10 SIM
1 GCL 03678-10 POWERS
1 RAD 03679-10 DIAZ
ECR 03680-10 REED

Sincerely,

R S. An

Bryan S. Anderson
FL Auth. House Counsel No. 219511

Enclosure
cc: Counsel for Parties of Record (w/encl.)

COM	5
APA	1
ECR	
GCL	1
RAD	1
SSC	
ADM	
OPC	
CLK	CTR

PETITION
DOCUMENT NUMBER-DATE
03673 MAY-3 ≌
FPSC-COMMISSION CLERK

EXHIBIT 31

modification of an agency decision or an agency's proposed action. Therefore, subparagraph (c) and portions of subparagraphs (e), (f) and (g) of subsection (2) of such rule are not applicable to this Petition. In compliance with subparagraph (d), FPL states that it is not known which, if any, of the issues of material fact set forth in the body of this Petition, or the supporting testimony, exhibits and NFR schedules filed herewith, may be disputed by others planning to participate in this proceeding.

BACKGROUND AND OVERVIEW

4. Section 366.93, Florida Statutes was adopted by the Legislature in 2006 to promote utility investment in nuclear power plants. Rule 25-6.0423, Florida Administrative Code ("the Rule"), implements this statute and provides for the annual review of expenditures and annual recovery of eligible costs through the CCRC. The Uprate Project and Turkey Point 6 & 7 qualify for cost recovery pursuant to Section 366.93, Florida Statutes, and the Rule. FPL's pursuit of this additional nuclear generation is made possible by the available cost recovery mechanism.

5. By Order No. PSC-08-0021-FOF-EI, issued January 7, 2008, the Commission made an affirmative determination of need for FPL's Uprate Project. By Order No. PSC-08-0237-FOF-EI, issued April 11, 2008, the Commission made an affirmative determination of need for Turkey Point 6 & 7. These projects were approved in large part because of the significant customer benefits they were – and still are – projected to provide. For example, assuming a Medium Fuel Cost and the "Environmental II" scenario as explained in FPL's testimony and exhibits, FPL expects that the EPU project will:

- Provide estimated fuel cost savings for FPL's customers of approximately $146 million in the first full year of operation;

EXHIBIT 31

- Provide estimated fuel cost savings for FPL's customers over the life of the project of approximately \$6 billion (nominal);
- Diversify FPL's fuel sources by decreasing reliance on natural gas by 3% beginning in the first full year of operation;
- Reduce annual fossil fuel usage by the equivalent of 5 million barrels of oil or 31 million mmBTU of natural gas; and
- Reduce CO_2 emissions by an estimated 33 million tons over the life of the project, which is the equivalent of operating FPL's entire generating system with zero CO_2 emissions for ten months.

Similarly, assuming the same Medium Fuel Cost, "Environmental II" scenario, FPL expects that Turkey Point 6 & 7 will:

- Provide estimated fuel cost savings for FPL's customers of approximately \$1.3 billion (nominal) in the first full year of operation;
- Provide estimated fuel cost savings for FPL's customers over the life of the project of approximately \$95 billion (nominal);
- Diversify FPL's fuel sources by decreasing reliance on natural gas by approximately 12% beginning in the first full year of operation;
- Reduce annual fossil fuel usage by the equivalent of 28 million barrels of oil or 177 million mmBTU of natural gas; and
- Reduce CO_2 emissions by an estimated 284 million tons over the life of the project, which is the equivalent of operating FPL's entire generating system with zero CO_2 emissions for 7 years.

EXHIBIT 31

The ultimate fuel cost savings and other benefits of each project will depend upon the actual fuel prices and other variables that exist in the future over the service life of the completed projects. FPL's testimony and exhibits provide estimated economic results over a variety of such scenarios.

6. The NPPCR amount sought for recovery through the CCRC of $28,754,660 (31 cents on a monthly, 1,000 kilowatt hour residential bill) is made up of: (i) the difference between FPL's 2009 actual costs and the 2009 actual/estimated costs presented last year in Docket No. 090009-EI; (ii) the difference between FPL's 2010 actual/estimated costs and the 2010 projected costs presented last year in Docket No. 090009-EI; and (iii) FPL's 2011 projected NPPCR recoverable costs. Approval of the true-up of FPL's 2009 actual costs was requested in the petition filed in this docket on March 1, 2010, and explained and supported in the direct testimony, exhibits, and NFRs filed therewith. FPL's 2010 actual/estimated and 2011 projected costs are the subject of this petition and supported by the accompanying testimony, exhibits, and NFRs.

7. The testimony and exhibits of FPL Witnesses Winnie Powers, Terry Jones, Steven Scroggs, John Reed, and Nils Diaz, filed with this Petition and incorporated herein by reference, explain the computation of the total NPPCR amount for recovery during 2011, describe FPL's 2010 actual/estimated and 2011 projected costs, and demonstrate that FPL's 2010 and 2011 costs are reasonable. Exhibit TOJ-14 to the testimony of FPL Witness Jones and Exhibits SDS-9 and SDS-10 to the testimony of FPL Witness Scroggs, both of which are co-sponsored by FPL Witness Powers, consist of Appendices I, II and III, containing schedules A/E-1 through A/E-7 and P-1 through P-8 of the NFRs as well as the True Up to Original ("TOR") Schedules. The form of these NFR schedules was developed by the Commission Staff

EXHIBIT 31

working with FPL, the Office of Public Counsel, Progress Energy Florida and others.[1] The "A/E Schedules" and the "P Schedules" support the 2010 actual/estimated and 2011 projected costs, respectively.

8. Additionally, the testimony of FPL Witness Sim demonstrates the continued feasibility of proceeding with the Uprate Project and the development of Turkey Point 6 & 7, and provides the annual long-term feasibility analyses required by Rule 25-6.0423(5)(c)5, Florida Administrative Code. Using updated inputs for capital costs, fuel costs, and environmental compliance costs, as well as an updated load forecast and other updated system assumptions, each project continues to be cost-effective when compared to the addition of the most economic non-nuclear base load generation option, a highly fuel-efficient combined cycle generating unit. As requested by the Staff of the Commission during a February 2010 workshop focused on further improving the Commission's NCRC process, FPL has also included in its filing additional information addressing specific, qualitative project feasibility topics in which Staff expressed an interest.

2010 ACTUAL/ESTIMATED COSTS

Uprate Project

9. FPL is working to deliver the substantial benefits of additional nuclear generating capacity to customers without expanding the footprint of its existing nuclear generating plants by performing an EPU of its existing nuclear units. In 2010, FPL expects to complete the Engineering Analysis Phase of the project. FPL has submitted the PSL 1 EPU License

---

[1] The NFRs consist of T, AE, P and TOR Schedules. The T Schedules are to be filed each March and provide the true-up for the prior year. In May, there are three sets of schedules to be filed: the AE Schedules provide the actual/estimated cost information for the current year, the P Schedules provide the projected expenditures for the subsequent year and the TOR schedules provide a summary of the actual and projected costs for the duration of the project.

EXHIBIT 31

Amendment Request ("LAR") and will submit the PSL 2 and PTN 3 & 4 LARs to the Nuclear Regulatory Commission ("NRC") for approval, while responding to Requests for Additional Information from the NRC as the project continues. FPL will also continue the Long Lead Procurement, Engineering Design Modification, and Implementation phases of the project, which work is explained in detail in the testimony of Mr. Jones, to support the planned unit outages in 2010 and 2011.

10. FPL has incurred or expects to incur during 2010 approximately $318,166,769 in construction costs ($302,009,710 jurisdictional, net of participant credits) and $3,210,753 in O&M costs ($3,139,397 jurisdictional, net of participant credits). All of FPL's uprate costs are separate and apart from other nuclear plant expenditures, would not be incurred but for the Uprate Project, and are reasonable. The carrying charges on the 2010 construction costs are estimated to total $42,352,262. Pursuant to the Rule, FPL requests recovery of the true-up of its carrying charges and O&M costs in the 2011 NPPCR amount.

11. FPL will be placing items associated with the Uprate Project into service in 2010. The estimated amount of $139,345,988 ($137,479,791 jurisdictional, net of participants) of associated costs will be transferred to plant in service at various times throughout the year as systems are placed into service, resulting in base rate revenue requirements of approximately $1,481,719 through the end of 2010. Additionally, there are carrying charges of ($462,651) on the over recovery of previously projected 2010 base rate revenue requirements of $15,877,677. Consistent with the applicable statute, Rule and the Commission's Order No. PSC-08-0749-FOF-EI in Docket No. 080009-EI, carrying charges on construction costs related to the plant being placed in service have been included in FPL's NPCCR amount up to the in-service date, followed by the related base rate revenue requirements through the end of the year. As required

EXHIBIT 31

by subsection 7(a) of Rule 25-6.0423, FPL will file a separate petition for Commission approval of a base rate adjustment for the plant in service.

Turkey Point 6 & 7 Project

12. FPL is continuing to apply a thoughtful, step-wise approach to the development of the Turkey Point 6 & 7 new nuclear generation units. The primary focus at this stage of the project has been, and remains, obtaining the necessary federal, state and local approvals for construction and operation of Turkey Point 6 & 7. FPL's current assessment is that the developments at the national level, state level, and project level needed for a clear path to construction have not achieved a high level of predictability. Therefore expenditures beyond those required to obtain the necessary licenses, permits and approvals would be premature in 2010 and 2011.

13. By continuing to seek the necessary licenses, permits and approvals, FPL is maintaining progress toward delivering the benefits of new nuclear generation to FPL's customers without experiencing unnecessary cost or schedule risks. Once this phase of the project is complete, FPL will be able to review the then-existing economics, the accumulated experience of other new nuclear projects and the state and federal energy policy environment in its consideration of project next steps. As a result of this decision, revised in-service dates of 2022 for Unit 6 and 2023 for Unit 7 are being used for planning purposes. As explained in the testimony of Mr. Scroggs, the revised in-service date for planning purposes is derived by sequencing the Preparation and Construction phase activities, based upon currently available information, to begin after the expected receipt of a Combined License from the NRC and completion of other necessary licensing and permitting work.

EXHIBIT 31

14. FPL has incurred or expects to incur $42,629,655 of pre-construction costs ($42,125,853 jurisdictional), including carrying charges of ($4,734,838); and $145,927 of site selection costs for Turkey Point 6 & 7 in 2010. The pre-construction costs are related to licensing and permitting activities. The site selection costs consist of a return on the deferred tax asset/liability that is created by the difference in timing between the recovery of site selection costs (i.e., taxable income) and the offsetting deductions that are recovered when the plant is placed into service. All of these costs are related to or resulting from the project and are reasonable. Pursuant to subsection (5)(a) of the Rule, FPL requests recovery of the true-up of its jurisdictional costs in its 2011 NPPCR amount.

2011 PROJECTED COSTS

Uprate Project

15. During 2011, FPL will be responding to NRC Requests for Additional Information on its LAR submittals and expects to be nearing completion of its Long Lead Equipment Procurement. Additionally, FPL will be implementing engineered modification packages during three scheduled outages and preparing the modification packages for implementation during the outages scheduled in 2011 and 2012. FPL projects that it will incur $547,756,895 in construction costs ($521,701,593 jurisdictional, net of participant credits) and $4,161,728 in O&M costs ($3,916,249 jurisdictional, net of participant credits) in 2011. All of FPL's uprate costs are separate and apart from other nuclear plant expenditures, would not be incurred but for the Uprate Project, and are reasonable. The carrying charges on the 2011 construction costs are estimated to total $49,101,231. Pursuant to the Rule, FPL requests recovery of these carrying charges and its O&M costs in the 2011 NPPCR amount.

EXHIBIT 31

16. FPL also plans to place a number of systems associated with the Uprate Project into service during 2011, as described in the testimony and exhibits of Mr. Jones. The projected $701,683,862 ($667,295,960 jurisdictional, net of participants) of associated costs will be transferred to plant in service at various times throughout the year as systems are placed into service, resulting in base rate revenue requirements of approximately $26,313,195 through the end of 2011. Carrying charges on construction costs related to these systems have been included in FPL's request up to each system's projected in-service date, followed by the related base rate revenue requirements through the end of the year, consistent with the applicable statute, Rule and the Commission's Order No. PSC-08-0749-FOF-EI in Docket 080009-EI. As required by subsection 7(a) of Rule 25-6.0423, FPL will file a separate petition for Commission approval of a base rate adjustment for the plant in service.

Turkey Point 6 & 7 Project

17. During 2011, FPL will incur expenses related to the continued support of the licenses, permits, and other approvals necessary to maintain the option to add new nuclear generation from Turkey Point 6 & 7 to FPL's system. FPL projects that it will incur $29,469,475 of pre-construction costs ($29,121,201 jurisdictional), including carrying charges of $2,189,166; and $171,032 of site selection costs for Turkey Point 6 & 7 in 2011. The site selection costs consist of carrying charges accrued on the unrecovered balance of the deferred tax asset/liability. All of the costs are related to or resulting from the project and are reasonable. Pursuant to subsection (5)(a) of the Rule, FPL requests recovery of these jurisdictional costs in its 2011 NPPCR amount.

EXHIBIT 31

LONG TERM FEASIBILITY ANALYSES

18. Rule 25-6.0423(5)(c)5, Fla. Admin. Code, requires that utilities "submit for Commission review and approval a detailed analysis of the long-term feasibility of completing the power plant." The Commission stated last year in Order No. PSC-09-0783-FOF-EI at page 14 (referring to Order No. PSC-08-0237-FOF-EI), that FPL was required to include updated fuel forecasts, environmental forecasts, break-even costs, and capital cost estimates, and that FPL should account for "sunk costs" in its feasibility analysis. Further, the Commission specifically ordered FPL to update its non-binding capital cost estimates in this docket (*see* Order No. PSC-09-0783-FOF-EI, p. 16). FPL has complied with these requirements. Using updated assumptions and inputs, each project continues to be a solidly cost-effective generation addition for FPL's customers, as described in detail by FPL Witness Sim.

Uprates Project Feasibility

19. As described in Mr. Jones's testimony, FPL has updated its project assumptions for the incremental power that is expected to be produced by the Uprates and for the total project cost. Upon completion, the Uprates will produce a minimum of 399 megawatts of electric power ("MWe") and could produce a theoretical maximum of up to 463 MWe for FPL's customers. The minimum reflects FPL's need determination assumption (414 MWe), less the St. Lucie Unit 2 co-owners' share of the output. The maximum reflects the turbine vendor's estimate of the turbine generator's performance (approximately 500 MWe) if the "best case scenario" of plant parameters are achieved, less the co-owners' share of PSL Unit 2 and increased house loads caused by operating the uprated equipment. Taking into account the current uncertainty of whether "best case" plant parameters will be achieved, FPL's current estimate is that a total of about 450 MWe will be produced by the uprated units for FPL customers. FPL has also updated

EXHIBIT 31

its non-binding total cost estimate (including transmission, carrying costs, etc.) consistent with the Commission's direction in Order No. PSC-09-0783-FOF-EI. FPL's updated non-binding cost estimate is a forecast range of approximately $2,050 million to $2,300 million as described by Mr. Jones. FPL used the high end of this range as the starting point for its feasibility analysis.

20. As described by Dr. Sim, the Uprates Project continues to be a cost-effective addition for FPL's customers, taking into account all updated assumptions. FPL's analysis for the Uprates Project was performed by comparing the cumulative present value of revenue requirements ("CPVRR") of a resource plan that included the Uprates with a resource plan that does not. The "Resource Plan with Nuclear Uprates" is projected to have a lower cumulative present value of revenue requirements than the "Resource Plan without Nuclear Uprates" in all seven fuel and environmental compliance cost scenarios analyzed. For example, in the Medium Fuel Cost, Environmental II scenario, the project is currently expected to reduce costs to customers by more than $1.1 billion in CPVRR compared to the plan without the project. Accordingly, the resource plan that includes the Uprates Project remains an economically superior resource plan for FPL's customers. Additionally, as explained by Mr. Jones, the EPU Project remains feasible with respect to other, non-economic considerations.

Turkey Point 6 & 7 Feasibility

21. Pursuant to the Commission's direction in Order No. PSC-09-0783-FOF-EI, FPL performed a thorough re-assessment of its project cost estimate. As explained in Mr. Scroggs's testimony, FPL re-evaluated each line item in its original cost estimate and added new line items to capture what additional information is currently available. The revised cost estimate indicates an overnight cost of $4,991/kW in 2010 dollars. This cost estimate "check" was then compared to FPL's non-binding cost estimate range. After adjusting the original cost estimate range for the

EXHIBIT 31

known size of the selected unit technology, the revised overnight cost estimate range is $3,397/kW to $4,940/kW in 2010 dollars. The revised cost estimate check confirms that the Turkey Point 6 & 7 project costs are consistent with, but at the high end of, the revised cost estimate range. Additionally, as explained by Mr. Reed, FPL's cost estimate range falls within a reasonable range of comparable projects currently under development in the United States.

22. As described by Dr. Sim, Turkey Point 6 & 7 continues to be a cost-effective addition for FPL's customers, taking into account all updated assumptions, including the currently projected in-service dates. FPL's analysis of Turkey Point 6 & 7 was performed by calculating a "breakeven capital cost" – the capital cost amount FPL could spend on new nuclear and breakeven with what it would spend for a combined cycle resource addition on a CPVRR basis – and comparing it to its current project cost estimate. The breakeven costs are higher than FPL's cost estimate (i.e., the results are favorable) in all seven fuel and environmental compliance cost scenarios analyzed. Accordingly, Turkey Point 6 & 7 continues to be an economically sound choice for FPL's customers. Additionally, as explained by Mr. Scroggs, the Turkey Point 6 & 7 project remains feasible with respect to other, non-economic considerations.

CONCLUSION

23. FPL's 2010 actual/estimated and 2011 projected costs for the Uprate Project and for Turkey Point 6 & 7 consist of reasonable amounts that are expected to be expended for the projects during those years. FPL's planned expenditures are subject to a rigorous planning and budgeting process, and key decisions affecting those expenditures receive the benefit of informed, thorough and multi-disciplined assessment as well as executive management review, all as described and shown in FPL's testimony and exhibits, including NFRs. Additionally, each project continues to be cost-effective for customers, as demonstrated by FPL's 2010 feasibility

EXHIBIT 31

analyses. For all the foregoing reasons, as discussed in the testimony of FPL's witnesses, FPL's 2010 actual/estimated and 2011 projected costs are reasonable, and its feasibility analyses should be approved.

WHEREFORE, Florida Power & Light Company respectfully requests that the Commission enter an order (i) approving recovery of an NPPCR jurisdictional amount of $28,754,660 through the CCRC during the period January – December 2011, reflecting the 2009 true-up, 2010 true-up and 2011 projected carrying charges on construction costs, O&M costs, and base rate revenue requirements for the Uprate Project as well as the 2009 true-up, 2010 true-up and 2011 projected site selection costs, pre-construction costs and associated carrying charges for Turkey Point 6 & 7; (ii) determining that FPL's 2010 actual/estimated and 2011 projected costs for the Uprate Project and Turkey Point 6 & 7 are reasonable; and (iii) approving FPL's Uprates Project feasibility analysis and Turkey Point 6 & 7 feasibility analysis.

Respectfully submitted this 3rd day of May, 2010.

By: ______________________________
Bryan S. Anderson
Fla. Auth. House Counsel No. 219511
Jessica A. Cano
Fla. Bar No. 0037372
Kenneth M. Rubin
Fla. Bar No. 349038
Attorneys for Florida Power & Light Company
700 Universe Boulevard
Juno Beach, Florida 33408-0420
(561) 304-5253
(561) 691-7135 (fax)

EXHIBIT 31

CERTIFICATE OF SERVICE
DOCKET NO. 100009-EI

I HEREBY CERTIFY that a true and correct copy of FPL's Petition for Approval of Nuclear Power Plant Cost Recovery Amount for the Period January – December 2011, was served by hand delivery* and/or U.S. Mail this 3rd day of May, 2010 to the following:

Anna Williams, Esq.*
Lisa Bennett, Esq.
Keino Young, Esq.
Division of Legal Services
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850
LBENNETT@PSC.STATE.FL.US
KYOUNG@PSC.STATE.FL.US
ANWILLIA@PSC.STATE.FL.US

J. R. Kelly, Esq.
Charles Rehwinkel, Esq.
Joseph McGlothlin
Office of Public Counsel
c/o The Florida Legislature
111 West Madison Street, Room 812
Tallahassee, Florida 32399
mcglothlin.joseph@leg.state.fl.us
Kelly.jr@leg.state.fl.us
Rehwinkel.Charles@leg.state.fl.us

J. Michael Walls, Esq.
Carlton Fields Law Firm
P.O. Box 3239
Tampa, Florida 33601-3239
mwalls@carltonfields.com
Attorney for Progress

Dianne M. Triplett, Esq.
Progress Energy Florida
229 1st Avenue N PEF-152
St. Petersburg, Florida 33701
dianne.triplett@pgnmail.com
Attorney for Progress

Jon C. Moyle, Jr.
Vicki Gordon Kauhan
Keefe Anchors Gordon & Moyle, PA
118 North Gadsden Street
Tallahassee, Florida 32301
vkaufman@kagmlaw.com
jmoyle@kagmlaw.com
Attorneys for FIPUG

John W. McWhirter, Jr., Esq.
Davidson McWhirter, P.A.
PO Box 3350
Tampa, Florida 33601
jmcwhirter@mac-law.com
Attorney for FIPUG

R. Alexander Glenn, Esq.
John T. Burnett, Esq.
Progress Energy Service Company, LLC
P.O. Box 14042
St. Petersburg, Florida 33733-4042
john.burnett@pgnmail.com
alex.glenn@pgnmail.com
Attorneys for Progress

James W. Brew, Esq.
F. Alvin Taylor, Esq.
Brickfield, Burchette, Ritts & Stone, P.C.
1025 Thomas Jefferson Street, NW
Eighth Floor, West Tower
Washington, DC 20007-5201
jbrew@bbrslaw.com
ataylor@bbrslaw.com
Attorneys for PCS Phosphate

EXHIBIT 31

Randy B. Miller
White Springs Agricultural Chemicals, Inc.
Post Office Box 300
15843 Southeast 78th Street
White Springs, Florida 32096
RMiller@pcsphosphate.com

Mr. Paul Lewis, Jr.
106 East College Ave., Suite 800
Tallahassee, Florida 32301-7740
paul.lewisjr@pgnmail.com

Captain Shayla L. McNeill
Air Force Legal Operations Agency (AFLOA)
Utility Litigation Field Support Center (ULFSC)
139 Barnes Drive, Suite 1
Tyndall AFB, FL 32403-5319
shayla.mcneill@tyndall.af.mil

By: ______________________
Bryan S. Anderson
Fla. Auth. House Counsel No. 219511

EXHIBIT 32

DOCKET NO. 080407-EG - Commission review of numeric conservation goals (Florida Power & Light Company)

DOCKET NO. 080408-EG - Commission review of numeric conservation goals (Progress Energy Florida)

DOCKET NO. 080409-EG - Commission review of numeric conservation goals (Tampa Electric Company)

DOCKET NO. 080410-EG - Commission review of numeric conservation goals (Gulf Power Company)

DOCKET NO. 080411-EG - Commission review of numeric conservation goals (Florida Public Utilities Company)

DOCKET NO. 080412-EG - Commission review of numeric conservation goals (Orlando Utilities Commission)

DOCKET NO. 080413-EG - Commission review of numeric conservation goals (JEA)

WITNESS: Direct Testimony Of Richard F. Spellman, President of GDS Associates, Inc. and Caroline Guidry, Engineer – Energy Efficiency & Demand-Side Management for GDS Associates, Inc., Appearing on Behalf of the Staff of the Florida Public Service Commission

DATE FILED: July 17, 2009

EXHIBIT 32

Index

EXHIBIT 32

DIRECT TESTIMONY OF RICHARD F. SPELLMAN and CAROLINE GUIDRY

1.0 QUALIFICATIONS

Q: Mr. Spellman, please state your name, position and business addresses.

A: My name is Richard F. Spellman and I am the President of GDS Associates, Inc. (GDS), an engineering and management consulting firm. My business address is Suite 800, 1850 Parkway Place, Marietta, Georgia 30067.

Q: Please describe GDS Associates, Inc.

A: GDS is an engineering and management consulting firm with over 170 employees in the United States (U.S.). GDS specializes in energy supply and energy efficiency planning and analysis issues with clients in the U.S. and Canada. Our services include:

(1) energy efficiency, renewable energy and demand response program design, implementation and evaluation;
(2) integrated resource planning;
(3) electric generation, transmission and distribution system planning;
(4) wholesale and retail rate studies; and
(5) other planning and implementation projects for electric and natural gas utilities and government agencies.

In addition to providing energy efficiency program planning and evaluation services, GDS is implementing energy efficiency and demand response programs for clients in several states.

EXHIBIT 32

Q: Are these government or utility clients?

A: Both. GDS provides engineering and energy consulting services to electric and natural gas utilities, government agencies, non-profit organizations, commercial organizations, other consulting firms, and homeowners.

Q: Please state your educational background and work experience.

A: My educational background and work experience are provided in my resume, which is attached as Exhibit RFS-1**.**

Q: Please summarize your work experience in the area of energy efficiency.

A: During my sixteen years at GDS, I have managed several large-scale consulting projects for GDS clients relating to the design, implementation and evaluation of energy efficiency and demand response programs. I have completed over thirty-six energy efficiency potential studies across the U.S., and I have completed numerous program evaluation and market assessment studies (including end-use metering studies, mail and phone surveys, internet-based surveys, in-depth interviews, focus groups, etc.). I have completed impact and process evaluations of energy efficiency, demand response and load management programs. I have testified on energy efficiency potential studies and other related planning issues before state regulatory commissions in Connecticut, Georgia, Maine, New Hampshire, New Mexico, North Carolina, Texas, Utah, and Vermont. My clients include electric and natural gas utilities, government agencies, non-profit organizations, and other commercial businesses.

EXHIBIT 32

Before joining GDS in 1993, I was the Manager of Marketing and Product Development at Central Maine Power Company (CMP) where I managed the design and implementation of CMP's energy efficiency and demand response programs (with a budget of over $26 million annually). I served as the chairman of the New England Power Pool DSM Planning Committee in 1991 and 1992, and I serve on the Board of Directors of the Association of Energy Services Professionals (AESP). My education includes a BA degree with distinction in Math/Economics from Dartmouth College (graduated cum laude and with distinction) and an MBA from the Thomas College Graduate School of Business. I am a graduate of the University of Michigan Graduate School of Business Administration Management II Program, the Electric Council of New England Skills of Utility Management Program, and I am a member of the Association of Energy Services Professionals.

Q. Mr. Spellman, please explain the portion of your panel's testimony for which you have responsibility.

A. I have the responsibility for all issues relating to the selection of cost effectiveness tests for Florida and for all issues relating to recommendations for energy efficiency goals for the seven FEECA utilities and other policy recommendations. In addition, Caroline Guidry and I are jointly responsible for the portion of the testimony relating to the review and analysis by GDS of the energy efficiency technical, economic, and achievable potential estimates developed by the seven FEECA utilities.[1]

---

[1] Utilities subject to FEECA include Florida Power & Light Company, Progress Energy Florida, Inc., Tampa Electric Company, Gulf Power Company, Florida Public Utilities Company, JEA, and OUC.

EXHIBIT 32

including utility incentives and participant contributions;

- Consider the need for incentives to promote both customer-owned and utility-owned energy efficiency and demand-side renewable energy systems;
- Consider costs imposed by state and federal regulations on the emission of GHGs; and
- Evaluate the technical potential of all demand-side and supply-side energy conservation measures, including demand-side renewable energy systems.

In addition, the Commission is permitted by Section 366.82 F.S., to:

- Allow efficiency investments across generation, transmission, and distribution as well as efficiencies within the user base; and
- Authorize financial rewards or penalties for those utilities over which it has rate-setting authority for exceeding or failing to meet the goals, respectively.

Q. What impact do these changes have on the conservation goal-setting process which is the subject of this proceeding?

A. By amending Section 366.82, F.S., in 2008, the Florida Legislature has directed the Commission to place increased emphasis on the level of energy efficiency goals in order to reduce and control the growth rates of electric consumption. The changes give the Commission broader authority to maximize the achievement of energy efficiency in Florida.

4.0 <u>CURRENT AND HISTORICAL FLORIDA ENERGY EFFICIENCY AND LOAD MANAGEMENT PROGRAMS</u>

EXHIBIT 32

Q. Have the FEECA utilities' energy efficiency and load management programs been successful in the past?

A. Yes, however, in the past, more focus has been placed on kilowatt (kW) savings than on kilowatt-hour (kWh) savings.

Q. How have the FEECA utilities historically ranked in the nation in terms of absolute kW savings from load management programs in the past?

A. In 2007, based on incremental annual kW savings from load management programs reported by each utility in the U.S. Energy Information Administration (EIA) Form 861 Database, out of the 192 utilities reporting absolute savings of over zero kW, the FEECA utilities received the following ranks:

- Progress Energy Florida, Inc. (formerly Florida Power Corp.): 2
- Florida Power & Light Company: 5
- Gulf Power Company: 39
- Tampa Electric Company: 70
- Florida Public Utilities Company: Not Reported
- JEA: Not Reported
- OUC: Not Reported

A graphical representation of all of the reporting utilities and the rank of the FEECA utilities according to absolute kW savings reported for years 2005, 2006, and 2007 can be found in Exhibit RFS-3. This exhibit also contains a listing of the top 20 utilities for these three years.

EXHIBIT 32

Q. In the past, how have the FEECA utilities historically ranked in the nation in terms of relative load management kW savings as a percentage of summer peak loads?

A. In 2007, based on cumulative annual kW savings from load management programs as a percentage of summer peak loads reported by each utility in the U.S. EIA Form 861 Database, out of the 192 utilities reporting annual effects of over zero kW, the FEECA utilities received the following ranks:

- Progress Energy Florida, Inc. (Florida Power Corp.): 38
- Florida Power & Light Company: 124
- Gulf Power Company: 141
- Tampa Electric Company: 180
- Florida Public Utilities Company: Not Reported
- JEA: Not Reported
- OUC: Not Reported

A graphical representation of all of the reporting utilities and the rank of the FEECA utilities according to relative cumulative kW savings as a percentage of summer peak load reported for years 2005, 2006, and 2007 can be found in Exhibit RFS-4. This exhibit also contains a listing of the top 20 utilities for these three years. In ranking utilities on their energy efficiency and load management achievements, it is important to consider the magnitude of the kWh and kW savings in proportion to each utility's annual kWh sales and peak load, and not just on the level of kW savings alone.

Q. How have the FEECA utilities historically ranked in the nation in terms of energy efficiency program savings in the past?

A. In 2007, based on incremental annual kWh savings from energy efficiency programs

EXHIBIT 32

reported by each utility in the U.S. EIA Form 861 Database, out of the 279 utilities reporting incremental savings of over zero kWh, none of the FEECA utilities scored in the top 100 electric utilities. The FEECA utilities received the following ranks for 2007:

- Florida Power & Light Company: 107
- Progress Energy Florida, Inc. (Florida Power Corp.): 133
- Gulf Power Company: 146
- JEA: 154
- Tampa Electric Company: 158
- Florida Public Utilities Company: 177
- OUC: Not Reported

A graphical representation of all of the reporting utilities and the rank of the FEECA utilities according to annual incremental kWh savings reported as a percentage of total sales for years 2005, 2006, and 2007 can be found in Exhibit RFS-5. This exhibit also contains a listing of the top 20 utilities for these three years.

Q. Have other electric utilities in Florida implemented energy efficiency programs?

A. Yes. According to the U.S. EIA Form 861 Database, seven other Florida electric utilities, in addition to the FEECA utilities, have reported kWh savings from energy efficiency programs. Exhibit RFS-6 shows the reported incremental kWh savings as a percentage of total retail sales for years 2005, 2006, and 2007 for all of the Florida utilities that reported energy efficiency savings for those years.

Q. How do the energy efficiency program savings of the non-FEECA utilities in Florida compare to the Florida FEECA utility energy efficiency program savings?

EXHIBIT 32

A. The top three "non-FEECA" electric utilities in Florida reporting savings in 2007 – Reedy Creek Improvement District (Reedy Creek), Gainesville Regional Utilities (GRU), and City of Tallahassee (Tallahassee) – achieved annual kWh savings of 0.98 percent, 0.76 percent, and 0.34 percent, respectively, of total 2007 kWh sales. FPL, which is the highest ranking FEECA utility, achieved incremental annual kWh savings as a percent of retail kWh sales in 2007 of only 0.20 percent, which is significantly less that the savings achieved by Reedy Creek, GRU, and Tallahassee. As shown on Exhibit RFS-6, out of the total 13 utilities reporting energy efficiency programs savings in Florida for 2007, the FEECA utilities are ranked as follows:

- Florida Power & Light Company: 4
- Progress Energy Florida, Inc.(Florida Power Corp.): 6
- Gulf Power Company: 7
- JEA: 8
- Tampa Electric Company: 9
- Florida Public Utilities Company: 11
- OUC: Not Reported

This comparison of kWh savings data for Florida electric utilities raises the question of why the seven FEECA utilities do not achieve annual kWh savings as high as that achieved by Reedy Creek, GRU, or Tallahassee. Furthermore, the 0.76 percent of annual kWh sales saved in just one year (2007) by GRU is as high as what some of the FEECA utilities propose to save over a 10-year period.

Q. Why is it important for Florida's electric utilities to increase the level of energy efficiency and conservation?

A. The following factors make aggressive implementation of electric energy efficiency programs imperative for the State of Florida:

- According to the Florida Reliability Coordinating Council, Inc.'s (FRCC) 2009 Regional Load and Resource Plan,[2] consumption of electricity in Florida (as measured by growth in net energy for load) is expected to experience an average annual compound growth rate of 1.8 percent over the period from 2009 to 2018. Energy efficiency programs can help reduce the demand for electricity at a levelized cost per lifetime kWh saved that is much less expensive than building and operating a new nuclear power plant or power plant fueled with clean coal. A main objective of FEECA is to decrease the rate of growth in electricity consumption. Implementation of aggressive energy efficiency programs can help meet this objective.
- Having more energy efficiency resources in the utilities' energy resource plans provides a more diversified, less costly and less risky mix of energy resources.
- Investing more in cost-effective energy efficiency can help reduce Florida's consumption of fossil fuels. This is a key objective of the FEECA statute.
- Investing more in cost-effective energy efficiency can help Florida increase its energy independence and make the state less reliant on outside sources of energy supply.
- Investing more in cost-effective energy efficiency can help reduce emissions

---

[2] Florida Reliability Coordination Counsel, Inc.'s (FRCC) 2009 Regional Load and Resource Plan (July 2009), page 1. Available at: https://www.frcc.com/Planning/Shared%20Documents/Load%20and%20Resource%20Plans/2009%20LRP_Web.pdf

of SO_2, NO_X, CO_2, and particulates in Florida. Unlike coal and gas-fired plants, energy efficiency investments do not produce carbon dioxide, a major greenhouse gas.

- Investing more in cost-effective energy efficiency can help increase "green" jobs in the State of Florida.

5.0 EVALUATION OF POTENTIAL STUDIES

Q. Has GDS reviewed the potential studies completed by the seven FEECA utilities?

A. Yes. GDS has reviewed the technical potential studies for all seven FEECA utilities as well as the statewide technical potential report. GDS has also reviewed the methodology and results of the economic and achievable potential studies, which are described in the testimonies filed by witnesses for each utility.

Q. What methodological requirements should be utilized in the potential studies used as a basis to set goals for the FEECA utilities?

A. The potential studies should reflect the primary objectives of FEECA which are to: (1) reduce the growth rates of Florida's weather-sensitive peak demand, (2) reduce and control the overall growth in electricity consumption, and (3) reduce consumption of scarce fossil fuels. Additionally, pursuant to Section 366.82, F.S., the Commission, in developing the goals, should also evaluate the technical potential of all demand-side and supply-side energy conservation measures, including demand-side renewable energy systems. Because of the nature of the objectives and the audience, the potential studies should be thorough, reflect the environment and market of the service territory, be accurate in their approximations of technical potential savings and market potential, and be transparent so that technically oriented and non-technically oriented stakeholders may

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Resume of Richard F. Spellman
Exhibit RFS-1
Page 1 of 14

EDUCATION: Management II Program, University of Michigan, Graduate School of Business, 1987
M.B.A., Thomas College, 1980
Amos Tuck Graduate School of Business, 1974-75
B.A., Math/Economics, Dartmouth College, 1974 (graduated with distinction)

PROFESSIONAL MEMBERSHIP: Association of Energy Service Professionals,
Board of Directors of AESP – 2005 to Present
Chair of AESP Policy Committee – 1997 & 1998,
Vice Chair AESP Policy Committee – 1995 & 1996

EXPERIENCE:

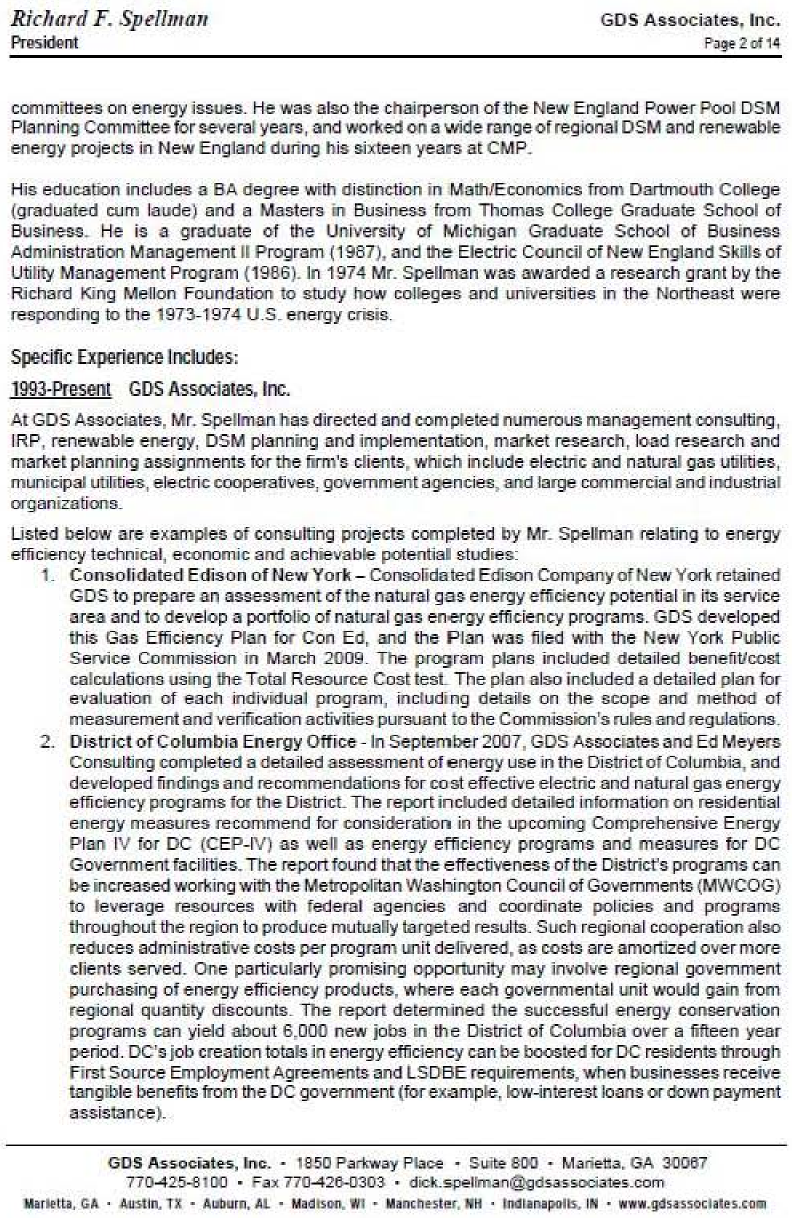
Mr. Spellman is the President of GDS Associates and the Chair of the GDS Board of Directors. He has over 30 years of energy industry experience. He has managed natural gas and electric energy efficiency, demand response and renewable energy consulting projects in such states as California, Connecticut, Georgia, Florida, Hawaii, Indiana, Louisiana, Maine, Massachusetts, Nebraska, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Utah, Vermont, Virginia, and Wisconsin for GDS clients.

Mr. Spellman has also completed over three dozen electric and natural gas energy efficiency technical potential studies for clients across North America. He has also served in project management positions for energy efficiency and demand response implementation projects for electric utility clients, Wisconsin Focus on Energy and Efficiency Maine. From 1999 to December 2002, Mr. Spellman served as the Program Manager for the Wisconsin Focus on Energy Commercial and Industrial pilot energy efficiency programs (Systems Benefit Charge funded) implemented in a 23-county area in Northeast Wisconsin, and he served as the Deputy Project Director for the $60 million Wisconsin Focus on Energy Business Program from March of 2001 until June of 2003. He also served as the Deputy Program Manager for the Efficiency Maine Small Business Program from 2003 through 2007.

He has designed and implemented **DSM bidding programs** for such clients as Central Maine Power Company, the Business Program of Wisconsin Focus on Energy, and the East Texas Electric Cooperative. Mr. Spellman has also chaired several committees to review energy efficiency and demand response proposals received in response to DSM RFPs (for Central Maine Power Company, Wisconsin Focus on Energy, East Texas Electric Cooperative, etc.).

In addition to program implementation projects, Mr. Spellman has completed renewable energy and conservation program market assessments, technical potential studies, market research, program designs, and Integrated Resource Plans for a number of the firm's clients. He has served as the Chair of the Policy Topic Committee of the Association of Energy Services Professionals (AESP) and he is currently a member of the Board of Directors of AESP.

Before joining GDS in Atlanta, Mr. Spellman was the Manager of Marketing and Product Development at Central Maine Power Company, where he was employed from 1977 to 1993. He has extensive experience working with collaboratives and community organizations on conservation and renewable energy issues. While at CMP he managed CMP's $26 million portfolio of energy efficiency programs. He also worked on CMP's market transformation program efforts with appliance and building standards, energy efficient lighting and motors, new construction and renewable energy programs. He worked on national market transformation programs such as the Super Efficient Refrigerator Program, and the EPA's Green Lights and Energy Star Programs. Finally, he has a solid track record testifying for clients before Commissions and legislative



committees on energy issues. He was also the chairperson of the New England Power Pool DSM Planning Committee for several years, and worked on a wide range of regional DSM and renewable energy projects in New England during his sixteen years at CMP.

His education includes a BA degree with distinction in Math/Economics from Dartmouth College (graduated cum laude) and a Masters in Business from Thomas College Graduate School of Business. He is a graduate of the University of Michigan Graduate School of Business Administration Management II Program (1987), and the Electric Council of New England Skills of Utility Management Program (1986). In 1974 Mr. Spellman was awarded a research grant by the Richard King Mellon Foundation to study how colleges and universities in the Northeast were responding to the 1973-1974 U.S. energy crisis.

Specific Experience Includes:

1993-Present GDS Associates, Inc.

At GDS Associates, Mr. Spellman has directed and completed numerous management consulting, IRP, renewable energy, DSM planning and implementation, market research, load research and market planning assignments for the firm's clients, which include electric and natural gas utilities, municipal utilities, electric cooperatives, government agencies, and large commercial and industrial organizations.

Listed below are examples of consulting projects completed by Mr. Spellman relating to energy efficiency technical, economic and achievable potential studies:

1. **Consolidated Edison of New York** – Consolidated Edison Company of New York retained GDS to prepare an assessment of the natural gas energy efficiency potential in its service area and to develop a portfolio of natural gas energy efficiency programs. GDS developed this Gas Efficiency Plan for Con Ed, and the Plan was filed with the New York Public Service Commission in March 2009. The program plans included detailed benefit/cost calculations using the Total Resource Cost test. The plan also included a detailed plan for evaluation of each individual program, including details on the scope and method of measurement and verification activities pursuant to the Commission's rules and regulations.
2. **District of Columbia Energy Office** - In September 2007, GDS Associates and Ed Meyers Consulting completed a detailed assessment of energy use in the District of Columbia, and developed findings and recommendations for cost effective electric and natural gas energy efficiency programs for the District. The report included detailed information on residential energy measures recommend for consideration in the upcoming Comprehensive Energy Plan IV for DC (CEP-IV) as well as energy efficiency programs and measures for DC Government facilities. The report found that the effectiveness of the District's programs can be increased working with the Metropolitan Washington Council of Governments (MWCOG) to leverage resources with federal agencies and coordinate policies and programs throughout the region to produce mutually targeted results. Such regional cooperation also reduces administrative costs per program unit delivered, as costs are amortized over more clients served. One particularly promising opportunity may involve regional government purchasing of energy efficiency products, where each governmental unit would gain from regional quantity discounts. The report determined the successful energy conservation programs can yield about 6,000 new jobs in the District of Columbia over a fifteen year period. DC's job creation totals in energy efficiency can be boosted for DC residents through First Source Employment Agreements and LSDBE requirements, when businesses receive tangible benefits from the DC government (for example, low-interest loans or down payment assistance).

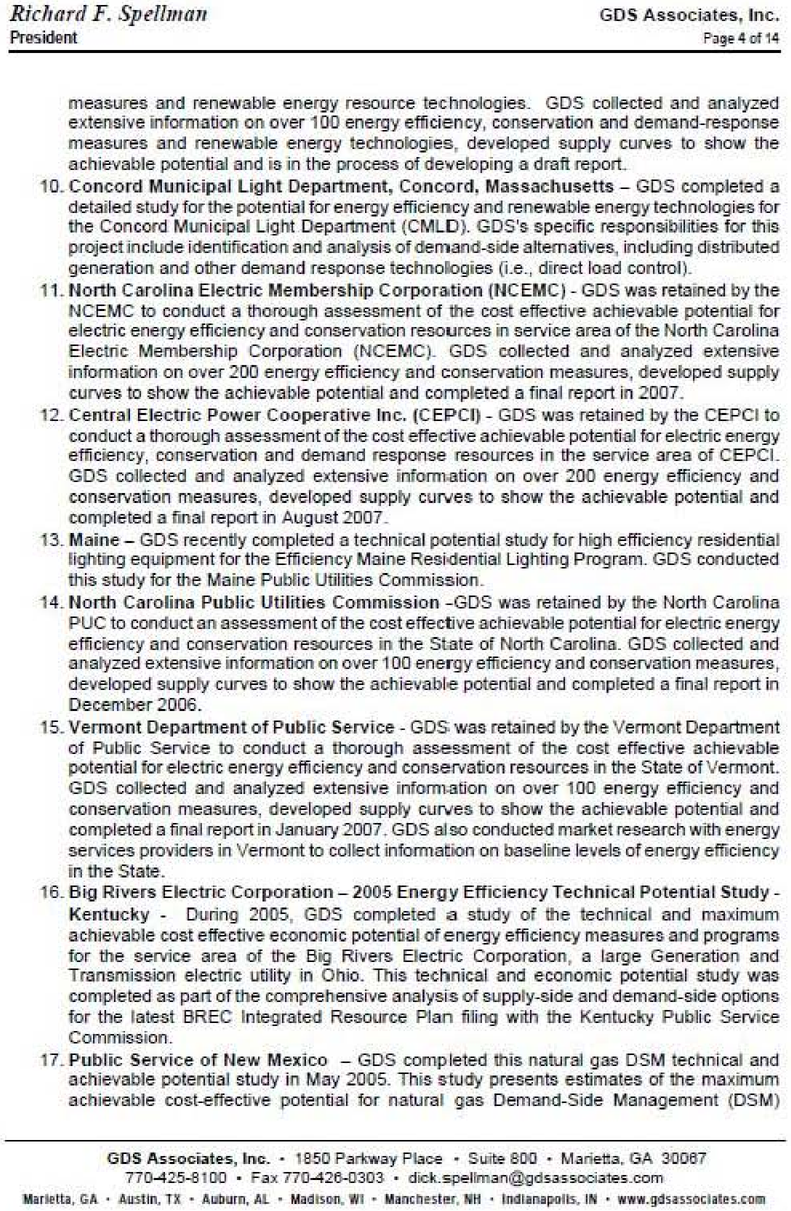
EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Resume of Richard F. Spellman
Exhibit RFS-1

3. **New Hampshire Public Utilities Commission** - In 2008, GDS in partnership with RLW Analytics, Research Into Action and RKM Research and Communications was retained by the New Hampshire Public Utilities Commission to conduct a thorough assessment of the potential for electric and natural gas energy efficiency in the state of New Hampshire. To support the energy efficient potential analysis, the GDS Team conducted residential and small commercial telephone surveys and large C&I site visits. The data collected will help determine key study inputs such as equipment saturations and baseline efficiency levels. The GDS Team has identified hundreds of electric and natural gas energy efficiency measures which are being analyzed to identify cost-effective measures. Estimates of the technical, economic and achievable electric and natural gas savings potential over the next ten years and the cost necessary to achieve these savings will then be developed.
4. **Hoosier Energy** - GDS was retained by Hoosier Energy to conduct a thorough assessment of the cost effective achievable potential for electric energy efficiency and demand response measures in service area of Hoosier Energy in southern Indiana. GDS collected and analyzed extensive information on over 200 energy efficiency measures and 25 demand response measures, developed supply curves to show the achievable potential and completed a report by December 2008.
5. **Brazos Electric Cooperative** - GDS was retained by Brazos Electric Cooperative to conduct a thorough assessment of the cost effective achievable potential for electric energy efficiency and demand response measures in the service area of this large electric cooperative in Eastern Texas. GDS collected and analyzed extensive information on over 200 energy efficiency measures and 25 demand response measures, developed supply curves to show the achievable potential and completed a draft report by September 2008.
6. **Arkansas Electric Cooperative Corporation** - GDS was retained by Arkansas Electric Cooperative Corporation to conduct a thorough assessment of the cost effective achievable potential for electric energy efficiency and demand response measures in the service area of this large electric cooperative in Arkansas. GDS collected and analyzed extensive information on over 200 energy efficiency measures and 25 demand response measures, developed supply curves to show the achievable potential and completed a draft report by September 2008.
7. **Central Maine Power Company (CMP)** - As a subcontractor to La Capra Associates, GDS was retained by CMP to conduct an assessment of the potential for cost-effective electric energy efficiency and demand response as an alternative to transmission system expansion in 5 sub-areas of the CMP service area. GDS collected and analyzed extensive information on over 100 energy efficiency and conservation measures, developed supply curves to show the achievable potential and is in the process of developing a draft findings report.
8. **Bonneville Power Administration (BPA)** - GDS was retained by BPA to conduct an assessment of their Non-Wires Solutions initiative development process and the current state of the initiative. The BPA Non Wires Solutions Program assesses the feasibility of energy efficiency and demand response programs as an alternative to building new electric transmission lines in the BPA service area. GDS reviewed program materials and reports, designed an interview guide and conducted in-depth, interviews with key BPA staff. Our analysis identified program strengths, weaknesses and potential improvements in key program areas including design, implementation, planning, cost impact & allocation and resources. A final report was delivered on June 8, 2007.
9. **Reading Municipal Light Department (Reading, Massachusetts)** - GDS was retained by the RMLD to assess the technical, economic, and market potential for reducing (avoiding) electricity use and peak demand, and reducing fossil-fueled electricity use and peak demand, in RMLD's service territory by implementing a wide range of end-use efficiency

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Resume of Richard F. Spellman
Exhibit RFS-1



measures and renewable energy resource technologies. GDS collected and analyzed extensive information on over 100 energy efficiency, conservation and demand-response measures and renewable energy technologies, developed supply curves to show the achievable potential and is in the process of developing a draft report.

10. **Concord Municipal Light Department, Concord, Massachusetts** – GDS completed a detailed study for the potential for energy efficiency and renewable energy technologies for the Concord Municipal Light Department (CMLD). GDS's specific responsibilities for this project include identification and analysis of demand-side alternatives, including distributed generation and other demand response technologies (i.e., direct load control).
11. **North Carolina Electric Membership Corporation (NCEMC)** - GDS was retained by the NCEMC to conduct a thorough assessment of the cost effective achievable potential for electric energy efficiency and conservation resources in service area of the North Carolina Electric Membership Corporation (NCEMC). GDS collected and analyzed extensive information on over 200 energy efficiency and conservation measures, developed supply curves to show the achievable potential and completed a final report in 2007.
12. **Central Electric Power Cooperative Inc. (CEPCI)** - GDS was retained by the CEPCI to conduct a thorough assessment of the cost effective achievable potential for electric energy efficiency, conservation and demand response resources in the service area of CEPCI. GDS collected and analyzed extensive information on over 200 energy efficiency and conservation measures, developed supply curves to show the achievable potential and completed a final report in August 2007.
13. **Maine** – GDS recently completed a technical potential study for high efficiency residential lighting equipment for the Efficiency Maine Residential Lighting Program. GDS conducted this study for the Maine Public Utilities Commission.
14. **North Carolina Public Utilities Commission** -GDS was retained by the North Carolina PUC to conduct an assessment of the cost effective achievable potential for electric energy efficiency and conservation resources in the State of North Carolina. GDS collected and analyzed extensive information on over 100 energy efficiency and conservation measures, developed supply curves to show the achievable potential and completed a final report in December 2006.
15. **Vermont Department of Public Service** - GDS was retained by the Vermont Department of Public Service to conduct a thorough assessment of the cost effective achievable potential for electric energy efficiency and conservation resources in the State of Vermont. GDS collected and analyzed extensive information on over 100 energy efficiency and conservation measures, developed supply curves to show the achievable potential and completed a final report in January 2007. GDS also conducted market research with energy services providers in Vermont to collect information on baseline levels of energy efficiency in the State.
16. **Big Rivers Electric Corporation – 2005 Energy Efficiency Technical Potential Study - Kentucky** - During 2005, GDS completed a study of the technical and maximum achievable cost effective economic potential of energy efficiency measures and programs for the service area of the Big Rivers Electric Corporation, a large Generation and Transmission electric utility in Ohio. This technical and economic potential study was completed as part of the comprehensive analysis of supply-side and demand-side options for the latest BREC Integrated Resource Plan filing with the Kentucky Public Service Commission.
17. **Public Service of New Mexico** – GDS completed this natural gas DSM technical and achievable potential study in May 2005. This study presents estimates of the maximum achievable cost-effective potential for natural gas Demand-Side Management (DSM)

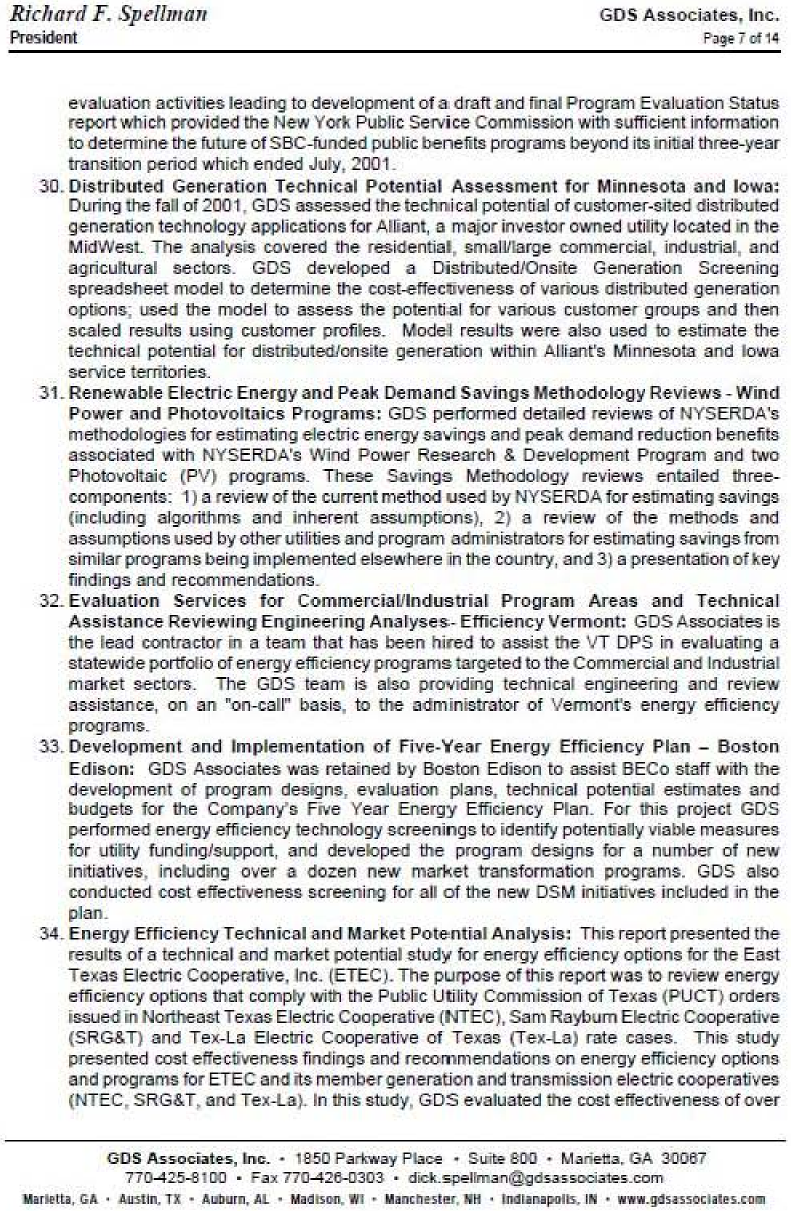
opportunities in the service area of Public Service of New Mexico. The main output of this study is a concise, fully documented report on the opportunities for achievable, cost effective natural gas energy efficiency programs in New Mexico.

18. **Utah Energy Office and Questar Gas Company –** GDS completed this natural gas DSM technical and achievable potential study in June 2004. This study presents estimates of the maximum achievable cost-effective potential for natural gas Demand-Side Management (DSM) opportunities in the State of Utah. The main output of this study is a concise, fully documented report on the opportunities for achievable, cost effective natural gas energy efficiency programs in Utah. This study assessed the impacts that gas DSM measures and programs can have on natural gas use, assesses the economic costs and benefits of DSM programs, and assesses the revenue impacts to Questar Gas Company. The final report also includes an assessment of the environmental impacts of the achievable DSM options identified in this study.
19. **Energy Efficiency Potential in Georgia – Study for the Alliance to Save Energy –** GDS completed this study for the Alliance to Save Energy in July 2004. This study provides estimates of the maximum achievable cost effective potential in the State of Georgia for several "top-ranked" energy efficiency programs. In addition, GDS presented expert witness testimony on behalf of the ASE before the Georgia Public Service Commission that covered the following issues:
    - the potential net present value dollar savings to ratepayers in Georgia due to the implementation of cost effective energy efficiency programs.
    - the cost effectiveness of these energy efficiency programs
    - energy efficiency tariffs that could be implemented in Georgia to save energy
    - up-to-date information on energy efficiency and DSM success stories and energy savings in other regions of North America and the technical potential for DSM in Georgia
    - improvements that could be made in the DSM measure screening process in Georgia.
    - recommendations for DSM cost recovery and shareholder incentive mechanisms.
20. **Energy Efficiency Potential in Florida – Study for the Alliance to Save Energy and the Southern Alliance for Clean Energy –** GDS completed this study for the Alliance to Save Energy in July 2004. This study provides estimates of the maximum achievable cost effective potential in the State of Florida for several "top-ranked" energy efficiency programs
21. **Connecticut Energy Conservation Management Board** – In March 2003, GDS was retained by the Connecticut Energy Conservation Management Board to conduct a thorough assessment of the cost effective maximum achievable technical potential for energy efficiency and conservation resources in the State of Connecticut and two sub-regions of the State. GDS collected and analyzed extensive information on over 250 energy efficiency and conservation, and developed supply curves to show the maximum achievable potential. GDS completed the final report in June 2004.
22. **Alliant Energy Corporate Services** - As an update to an assessment of potential customer-sited/distributed generation technology applications in all categories (residential, small/large commercial, industrial, and agricultural) conducted by GDS in 2001, Alliant requested that modeling assumptions be reviewed and revised, as necessary. In addition, the Distributed/Onsite Generation Screening (DOGS) tool was reviewed by MN Department of Commerce as part of a filing in 2001 and they requested expansion of applicable technologies and fuels, including: bio-diesel and methane from landfills and digesters to fuel reciprocating engines; methanol, ethanol, gasoline, and methane for electricity production from fuel cells. The revised model results will be used to estimate the market potential for

distributed/onsite generation within Alliant's Minnesota service territories.

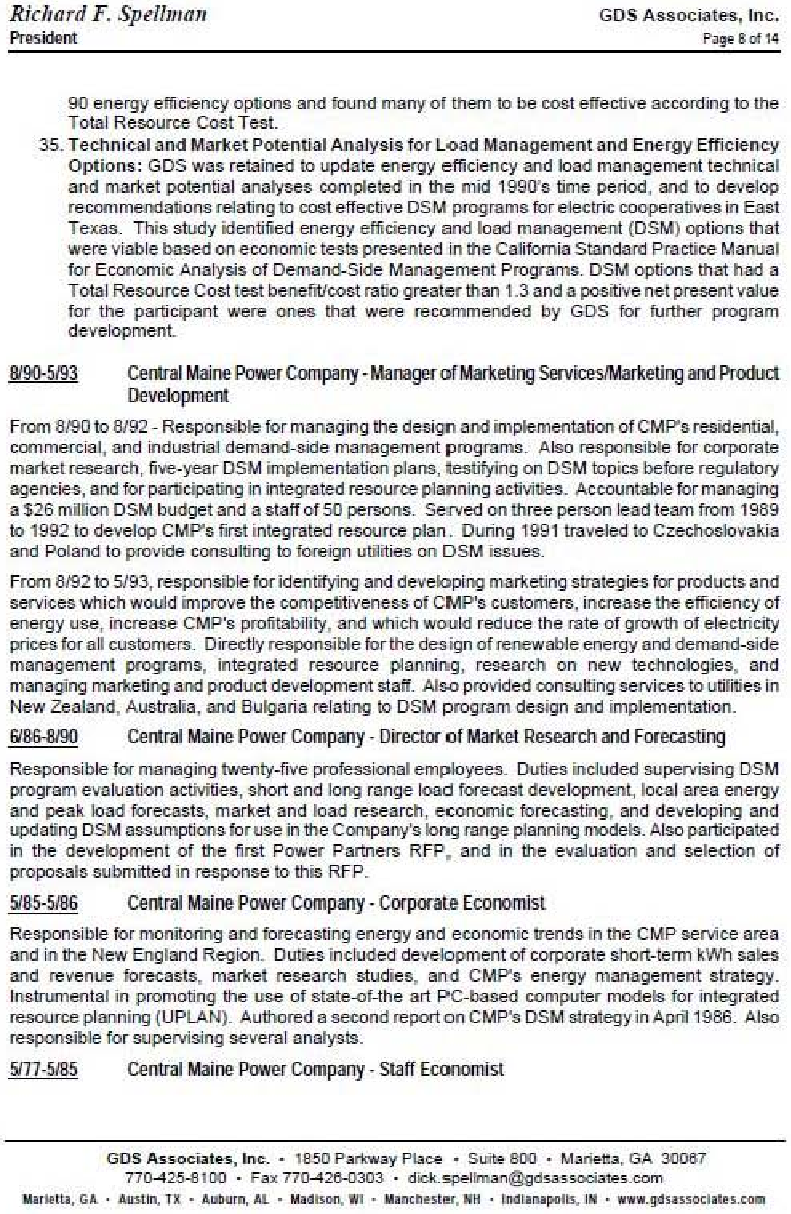
23. **Massachusetts GasNetworks** – In January of 2004, GDS was hired by GasNetworks (a network of several natural gas utilities in Massachusetts) to develop benefit/cost analyses and energy savings potential estimates for GasNetworks' regional market transformation and demand-side management programs. Benefit/cost ratios and energy savings potential estimates were developed for several regional gas energy efficiency programs using a spreadsheet model, and similar data were developed for each program for each service area for each natural gas utility participating in this study.
24. **Northern Utilities (Gas Company)** – In 2002 GDS was hired by Northern Utilities to prepare benefit/cost analyses and energy savings potential estimates of a portfolio of energy efficiency programs proposed for implementation in their New Hampshire service area. This project was completed during September 2002 and a final report was filed with the New Hampshire PUC. A workshop was conducted at the NH Public Utilities Commission early in 2003 to review cost-effectiveness methodologies and key model input/output requirements.
25. **KeySpan Energy Delivery (Gas Company)** – In 2002 GDS was hired by KeySpan Energy Delivery – New Hampshire to prepare benefit/cost analyses and energy savings potential estimates of ten energy natural gas energy efficiency programs proposed for implementation in the KeySpan New Hampshire service area. This project was completed during September 2002 and a final report was filed with the New Hampshire PUC that month.
26. **Big Rivers Electric Corporation – 2002 Energy Efficiency Technical Potential Study - Kentucky** - During 2002, GDS completed a study of the technical and economic potential of energy efficiency and load management measures and programs for the service area of the Big Rivers Electric Corporation, a large Generation and Transmission electric utility in Ohio. This technical and economic potential study was completed as part of the comprehensive analysis of supply-side and demand-side options for the latest BREC Integrated Resource Plan filing with the Kentucky Public Service Commission.
27. **City of Grand Island, Nebraska – Municipal Utility – Energy Efficiency Technical Potential Study** - GDS completed a study of the technical and economic potential for energy efficiency and load management measures and programs for the service area of this large municipal electric utility in Nebraska. This technical and economic potential study was completed as part of the comprehensive analysis of supply-side and demand-side options for an Integrated Resource Plan for this utility.
28. **City of Lafayette, Louisiana – Municipal Utility – Energy Efficiency Technical Potential Study** - GDS completed a study of the technical and economic potential for energy efficiency and load management measures and programs for the service area of this large municipal electric utility in Louisiana. This technical and economic potential study was completed as part of the comprehensive analysis of supply-side and demand-side options for an Integrated Resource Plan for this utility.
29. **New York State Energy Research and Development Authority (NYSERDA) - Energy $mart℠ Program Evaluation Services:** In the fall of 1999, GDS was retained by NYSERDA to be the prime evaluation contractor for the New York Energy $mart℠ program. During the years 2000, 2001, 2002, and 2003, GDS has been responsible for providing energy efficiency program and measure data collection, analysis, and report writing services to NYSERDA in support of their overall evaluation and market assessment efforts, and to determine actual savings of the programs. To date, GDS team evaluation activities have included development of a Gap Analysis for the purpose of setting priorities and allocating evaluation resources to the various New York Energy $mart℠ project areas; and numerous

EXHIBIT 32



evaluation activities leading to development of a draft and final Program Evaluation Status report which provided the New York Public Service Commission with sufficient information to determine the future of SBC-funded public benefits programs beyond its initial three-year transition period which ended July, 2001.

30. **Distributed Generation Technical Potential Assessment for Minnesota and Iowa:** During the fall of 2001, GDS assessed the technical potential of customer-sited distributed generation technology applications for Alliant, a major investor owned utility located in the MidWest. The analysis covered the residential, small/large commercial, industrial, and agricultural sectors. GDS developed a Distributed/Onsite Generation Screening spreadsheet model to determine the cost-effectiveness of various distributed generation options; used the model to assess the potential for various customer groups and then scaled results using customer profiles. Model results were also used to estimate the technical potential for distributed/onsite generation within Alliant's Minnesota and Iowa service territories.
31. **Renewable Electric Energy and Peak Demand Savings Methodology Reviews - Wind Power and Photovoltaics Programs:** GDS performed detailed reviews of NYSERDA's methodologies for estimating electric energy savings and peak demand reduction benefits associated with NYSERDA's Wind Power Research & Development Program and two Photovoltaic (PV) programs. These Savings Methodology reviews entailed three-components: 1) a review of the current method used by NYSERDA for estimating savings (including algorithms and inherent assumptions), 2) a review of the methods and assumptions used by other utilities and program administrators for estimating savings from similar programs being implemented elsewhere in the country, and 3) a presentation of key findings and recommendations.
32. **Evaluation Services for Commercial/Industrial Program Areas and Technical Assistance Reviewing Engineering Analyses- Efficiency Vermont:** GDS Associates is the lead contractor in a team that has been hired to assist the VT DPS in evaluating a statewide portfolio of energy efficiency programs targeted to the Commercial and Industrial market sectors. The GDS team is also providing technical engineering and review assistance, on an "on-call" basis, to the administrator of Vermont's energy efficiency programs.
33. **Development and Implementation of Five-Year Energy Efficiency Plan – Boston Edison:** GDS Associates was retained by Boston Edison to assist BECo staff with the development of program designs, evaluation plans, technical potential estimates and budgets for the Company's Five Year Energy Efficiency Plan. For this project GDS performed energy efficiency technology screenings to identify potentially viable measures for utility funding/support, and developed the program designs for a number of new initiatives, including over a dozen new market transformation programs. GDS also conducted cost effectiveness screening for all of the new DSM initiatives included in the plan.
34. **Energy Efficiency Technical and Market Potential Analysis:** This report presented the results of a technical and market potential study for energy efficiency options for the East Texas Electric Cooperative, Inc. (ETEC). The purpose of this report was to review energy efficiency options that comply with the Public Utility Commission of Texas (PUCT) orders issued in Northeast Texas Electric Cooperative (NTEC), Sam Rayburn Electric Cooperative (SRG&T) and Tex-La Electric Cooperative of Texas (Tex-La) rate cases. This study presented cost effectiveness findings and recommendations on energy efficiency options and programs for ETEC and its member generation and transmission electric cooperatives (NTEC, SRG&T, and Tex-La). In this study, GDS evaluated the cost effectiveness of over



90 energy efficiency options and found many of them to be cost effective according to the Total Resource Cost Test.

35. **Technical and Market Potential Analysis for Load Management and Energy Efficiency Options:** GDS was retained to update energy efficiency and load management technical and market potential analyses completed in the mid 1990's time period, and to develop recommendations relating to cost effective DSM programs for electric cooperatives in East Texas. This study identified energy efficiency and load management (DSM) options that were viable based on economic tests presented in the California Standard Practice Manual for Economic Analysis of Demand-Side Management Programs. DSM options that had a Total Resource Cost test benefit/cost ratio greater than 1.3 and a positive net present value for the participant were ones that were recommended by GDS for further program development.

8/90-5/93 **Central Maine Power Company - Manager of Marketing Services/Marketing and Product Development**

From 8/90 to 8/92 - Responsible for managing the design and implementation of CMP's residential, commercial, and industrial demand-side management programs. Also responsible for corporate market research, five-year DSM implementation plans, testifying on DSM topics before regulatory agencies, and for participating in integrated resource planning activities. Accountable for managing a $26 million DSM budget and a staff of 50 persons. Served on three person lead team from 1989 to 1992 to develop CMP's first integrated resource plan. During 1991 traveled to Czechoslovakia and Poland to provide consulting to foreign utilities on DSM issues.

From 8/92 to 5/93, responsible for identifying and developing marketing strategies for products and services which would improve the competitiveness of CMP's customers, increase the efficiency of energy use, increase CMP's profitability, and which would reduce the rate of growth of electricity prices for all customers. Directly responsible for the design of renewable energy and demand-side management programs, integrated resource planning, research on new technologies, and managing marketing and product development staff. Also provided consulting services to utilities in New Zealand, Australia, and Bulgaria relating to DSM program design and implementation.

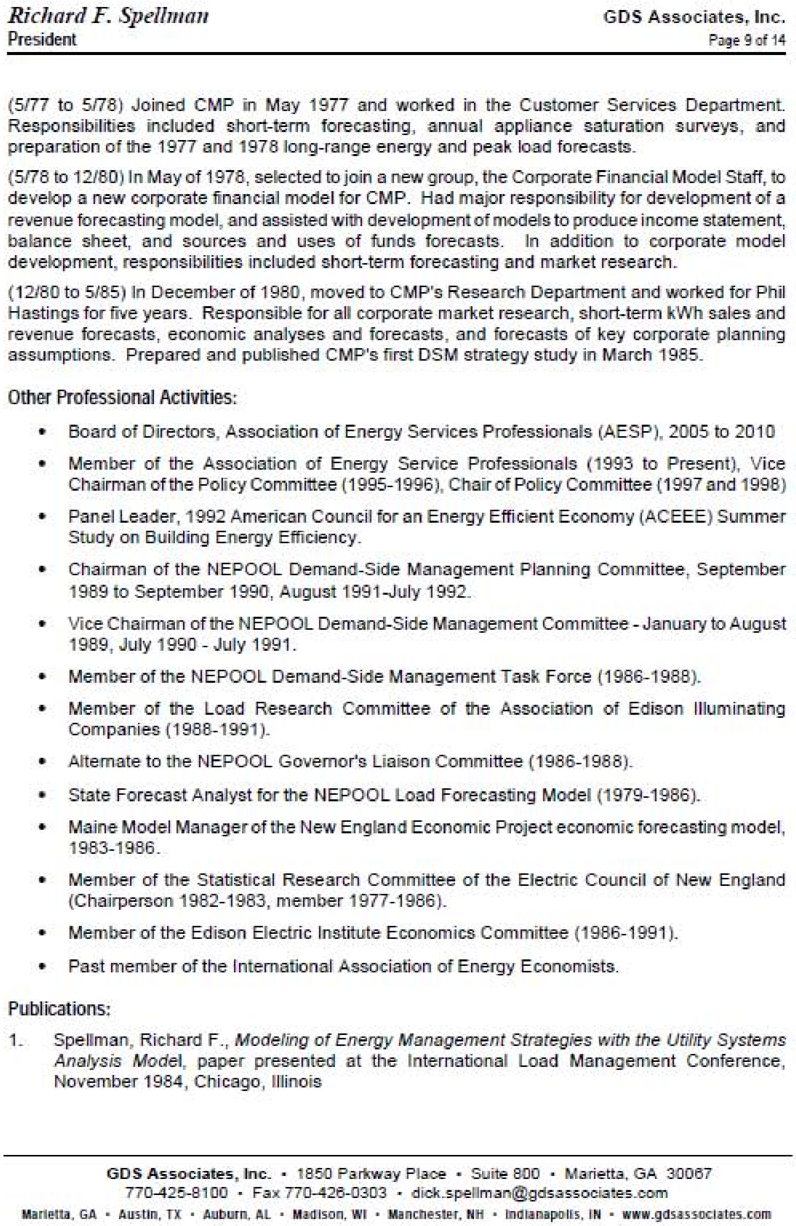
6/86-8/90 **Central Maine Power Company - Director of Market Research and Forecasting**

Responsible for managing twenty-five professional employees. Duties included supervising DSM program evaluation activities, short and long range load forecast development, local area energy and peak load forecasts, market and load research, economic forecasting, and developing and updating DSM assumptions for use in the Company's long range planning models. Also participated in the development of the first Power Partners RFP, and in the evaluation and selection of proposals submitted in response to this RFP.

5/85-5/86 **Central Maine Power Company - Corporate Economist**

Responsible for monitoring and forecasting energy and economic trends in the CMP service area and in the New England Region. Duties included development of corporate short-term kWh sales and revenue forecasts, market research studies, and CMP's energy management strategy. Instrumental in promoting the use of state-of-the art PC-based computer models for integrated resource planning (UPLAN). Authored a second report on CMP's DSM strategy in April 1986. Also responsible for supervising several analysts.

5/77-5/85 **Central Maine Power Company - Staff Economist**



(5/77 to 5/78) Joined CMP in May 1977 and worked in the Customer Services Department. Responsibilities included short-term forecasting, annual appliance saturation surveys, and preparation of the 1977 and 1978 long-range energy and peak load forecasts.

(5/78 to 12/80) In May of 1978, selected to join a new group, the Corporate Financial Model Staff, to develop a new corporate financial model for CMP. Had major responsibility for development of a revenue forecasting model, and assisted with development of models to produce income statement, balance sheet, and sources and uses of funds forecasts. In addition to corporate model development, responsibilities included short-term forecasting and market research.

(12/80 to 5/85) In December of 1980, moved to CMP's Research Department and worked for Phil Hastings for five years. Responsible for all corporate market research, short-term kWh sales and revenue forecasts, economic analyses and forecasts, and forecasts of key corporate planning assumptions. Prepared and published CMP's first DSM strategy study in March 1985.

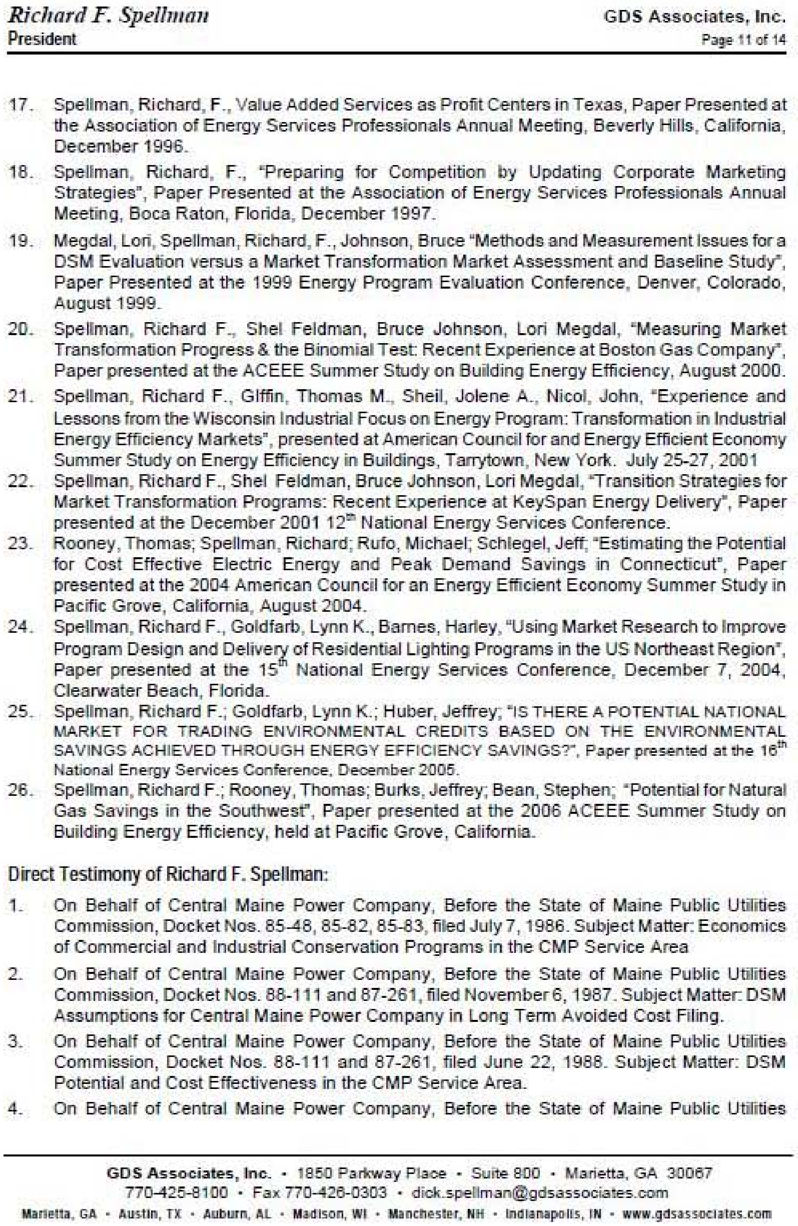
Other Professional Activities:

- Board of Directors, Association of Energy Services Professionals (AESP), 2005 to 2010
- Member of the Association of Energy Service Professionals (1993 to Present), Vice Chairman of the Policy Committee (1995-1996), Chair of Policy Committee (1997 and 1998)
- Panel Leader, 1992 American Council for an Energy Efficient Economy (ACEEE) Summer Study on Building Energy Efficiency.
- Chairman of the NEPOOL Demand-Side Management Planning Committee, September 1989 to September 1990, August 1991-July 1992.
- Vice Chairman of the NEPOOL Demand-Side Management Committee - January to August 1989, July 1990 - July 1991.
- Member of the NEPOOL Demand-Side Management Task Force (1986-1988).
- Member of the Load Research Committee of the Association of Edison Illuminating Companies (1988-1991).
- Alternate to the NEPOOL Governor's Liaison Committee (1986-1988).
- State Forecast Analyst for the NEPOOL Load Forecasting Model (1979-1986).
- Maine Model Manager of the New England Economic Project economic forecasting model, 1983-1986.
- Member of the Statistical Research Committee of the Electric Council of New England (Chairperson 1982-1983, member 1977-1986).
- Member of the Edison Electric Institute Economics Committee (1986-1991).
- Past member of the International Association of Energy Economists.

Publications:

1. Spellman, Richard F., *Modeling of Energy Management Strategies with the Utility Systems Analysis Mode*l, paper presented at the International Load Management Conference, November 1984, Chicago, Illinois

2. Spellman, Richard F., *Use of Computer Models and Load Research Data for Developing Energy Management Strategies*, paper presented at the Fifth Annual Northeast Load Research Conference, September 10-12, 1986, Farmington, Connecticut
3. Spellman, Richard F., *Potential Market Penetration of DSM Programs at Central Maine Power*, paper presented at Third National Conference on Utility DSM Programs, June 16-18, 1987, Houston, Texas
4. Spellman, Richard F., *Demand-Side Management Market Penetration: Modeling and Resource Planning Perspectives from Central Maine Power Company*, paper presented at the Fourth National Conference on Utility DSM Programs, May 2-4, 1989, Cincinnati, Ohio
5. Spellman, Richard F., *Using Program Evaluation Data for Long-Range Resource Planning at Central Maine Power Company*, paper presented at the Canadian Electrical Association's Conference on Enhancing Electricity's Value to Society, October 22-24, 1990, Toronto, Canada
6. Spellman, Richard F., *Demand-Side Management from a North American Perspective*, Keynote Address to the International Energy Agency Conference on Advanced Technologies for Electric Demand-Side Management, written for Joe C. Collier, Jr., President and Chief Executive Officer of Central Maine Power Company, paper presented in Sorrento, Italy on April 3, 1991
7. Leamon, Ann K., and Spellman, Richard F., *From the Bottom Up: T&D and DSM*, paper presented at the 5th National Demand-Side Management conference, July 30 - August 1, 1991, Boston, Massachusetts
8. Haeri, M. Hossein, and Spellman, Richard F., *Integration of Evaluation Results into the Resource Planning Process*, paper presented at the 5th National Demand-Side Management Conference, July 30 - August 1, 1991, Boston, Massachusetts
9. Spellman, Richard F., *Does Fuel Switching Make Sense for an Electric Utility?*, paper presented at the 1992 International Energy Efficiency and DSM Conference, October 22, 1992, Toronto, Ontario
10. Spellman, Richard F., and Brunette, Marguerite, *Market Research for the Design, Implementation, and Evaluation of a Compact Fluorescent Lighting Program*, paper presented at the EPRI/EUMRC Market Research Symposium, November 17-20, 1992, Dallas, Texas
11. Spellman, Richard F., Forum For Applied Research and Public Policy/Fall 1992, *Energy Management: A View from Maine* (Journal Article)
12. Spellman, Richard F., *DSM Incentives Plus Electric Rate Adjustment Mechanisms Equal Bottom Line Impact*, paper presented at the 6th National Demand-Side Management Conference, March 24-26, 1993, Miami Beach, Florida
13. Spellman, Richard F., Van Wie, David A., Peaco, Daniel E., Lawrence, and Dennis R., *Optimizing Demand-Side and Supply Resources Using Linear Programming*
14. Spellman, Richard F., Utility Experience With Load Management in Texas, EPRI/Houston Lighting and Power Co. Load Management Conference, May 3, 1994, Houston, Texas.
15. Spellman, Richard, F., The Role of DSM in the Privatized Electricity Sector in England and Wales, and New Zealand, Paper Presented at the Association of Demand-Side Management Professionals Annual Meeting, Orlando, Florida, December 1994.
16. Spellman, Richard, F., Energy Services in A Global Environment, Paper Presented at the Association of Energy Services Professionals Annual Meeting, Phoenix, Arizona, December 1995.



17. Spellman, Richard, F., Value Added Services as Profit Centers in Texas, Paper Presented at the Association of Energy Services Professionals Annual Meeting, Beverly Hills, California, December 1996.
18. Spellman, Richard, F., "Preparing for Competition by Updating Corporate Marketing Strategies", Paper Presented at the Association of Energy Services Professionals Annual Meeting, Boca Raton, Florida, December 1997.
19. Megdal, Lori, Spellman, Richard, F., Johnson, Bruce "Methods and Measurement Issues for a DSM Evaluation versus a Market Transformation Market Assessment and Baseline Study", Paper Presented at the 1999 Energy Program Evaluation Conference, Denver, Colorado, August 1999.
20. Spellman, Richard F., Shel Feldman, Bruce Johnson, Lori Megdal, "Measuring Market Transformation Progress & the Binomial Test: Recent Experience at Boston Gas Company", Paper presented at the ACEEE Summer Study on Building Energy Efficiency, August 2000.
21. Spellman, Richard F., Giffin, Thomas M., Sheil, Jolene A., Nicol, John, "Experience and Lessons from the Wisconsin Industrial Focus on Energy Program: Transformation in Industrial Energy Efficiency Markets", presented at American Council for and Energy Efficient Economy Summer Study on Energy Efficiency in Buildings, Tarrytown, New York. July 25-27, 2001
22. Spellman, Richard F., Shel Feldman, Bruce Johnson, Lori Megdal, "Transition Strategies for Market Transformation Programs: Recent Experience at KeySpan Energy Delivery", Paper presented at the December 2001 12th National Energy Services Conference.
23. Rooney, Thomas; Spellman, Richard; Rufo, Michael; Schlegel, Jeff; "Estimating the Potential for Cost Effective Electric Energy and Peak Demand Savings in Connecticut", Paper presented at the 2004 American Council for an Energy Efficient Economy Summer Study in Pacific Grove, California, August 2004.
24. Spellman, Richard F., Goldfarb, Lynn K., Barnes, Harley, "Using Market Research to Improve Program Design and Delivery of Residential Lighting Programs in the US Northeast Region", Paper presented at the 15th National Energy Services Conference, December 7, 2004, Clearwater Beach, Florida.
25. Spellman, Richard F.; Goldfarb, Lynn K.; Huber, Jeffrey; "IS THERE A POTENTIAL NATIONAL MARKET FOR TRADING ENVIRONMENTAL CREDITS BASED ON THE ENVIRONMENTAL SAVINGS ACHIEVED THROUGH ENERGY EFFICIENCY SAVINGS?", Paper presented at the 16th National Energy Services Conference, December 2005.
26. Spellman, Richard F.; Rooney, Thomas; Burks, Jeffrey; Bean, Stephen; "Potential for Natural Gas Savings in the Southwest", Paper presented at the 2006 ACEEE Summer Study on Building Energy Efficiency, held at Pacific Grove, California.

Direct Testimony of Richard F. Spellman:

1. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities Commission, Docket Nos. 85-48, 85-82, 85-83, filed July 7, 1986. Subject Matter: Economics of Commercial and Industrial Conservation Programs in the CMP Service Area
2. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities Commission, Docket Nos. 88-111 and 87-261, filed November 6, 1987. Subject Matter: DSM Assumptions for Central Maine Power Company in Long Term Avoided Cost Filing.
3. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities Commission, Docket Nos. 88-111 and 87-261, filed June 22, 1988. Subject Matter: DSM Potential and Cost Effectiveness in the CMP Service Area.
4. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities

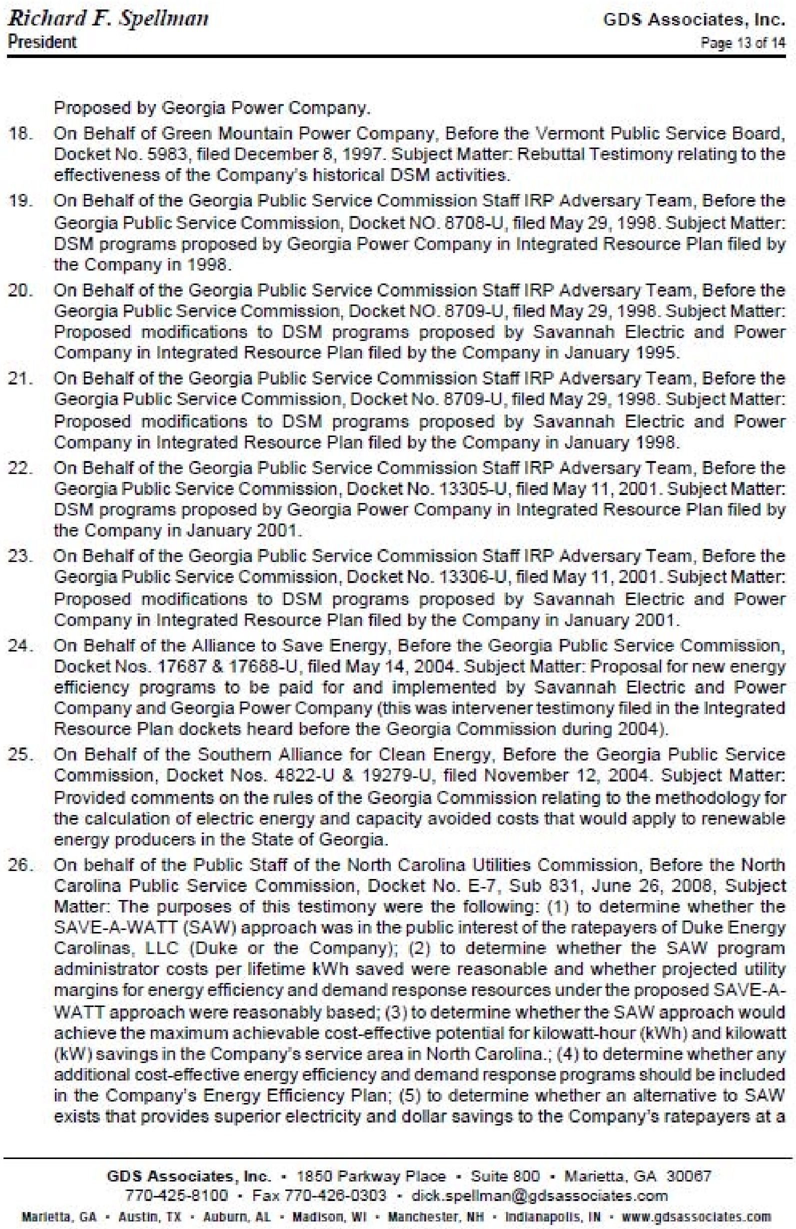
EXHIBIT 32

Commission, Docket No. 89-68, filed May 19, 1989. Subject Matter: Review and explain the basis for the updated short-term kWh sales forecast on which CMP's revised Attrition Study is based.

5. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities Commission, Docket No. 89-68, filed October 24, 1989. Subject Matter: Review and explain the basis for the short-term kWh sales forecast on which CMP's Attrition Study is based.
6. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities Commission, Docket No. 91-213, filed November 15, 1991. Subject Matter: Present CMP's conclusions regarding the advisability of inaugurating a residential space heat conversion program in the Company's service territory.
7. On Behalf of Central Maine Power Company, Before the State of Maine Public Utilities Commission, Docket No. 91-213, filed July 31, 1992. Subject Matter: Present updated information regarding the advisability of inaugurating a residential space heat conversion program in the Company's service territory.
8. On Behalf of Tex-La Electric Cooperative of Texas, Inc. Before the Public Utilities Commission of Texas, Docket No. 12289, filed July 1993. Subject Matter: Tex-La's DSM activities and updating of TEX-LA Energy Efficiency Plan.
9. On Behalf of Tex-La Electric Cooperative of Texas, Inc. Before the Public Utilities Commission of Texas, Docket No. 12289, filed July 1993. Subject Matter: Rebuttal testimony relating to TEX-LA's DSM activities.
10. On Behalf of H.E. Butt Grocery Company, Before the Public Utilities Commission of Texas, Docket No. 12820, Filed October 17, 1994. Subject Matter: Proposed modifications to Central Power and Light DSM Programs.
11. On Behalf of The Coalition of Cities and The City of Houston, Before the Public Utilities Commission of Texas, Docket No. 12065, filed November 15, 1994. Subject Matter: Proposed changes to Houston Lighting and Power Company's DSM programs.
12. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket NO. 5602-U, filed May 8, 1995. Subject Matter: Proposed modifications to DSM programs proposed by Georgia Power Company in Integrated Resource Plan filed by the Company in January 1995.
13. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket NO. 5601-U, filed May 8, 1995. Subject Matter: Proposed modifications to DSM programs proposed by Savannah Electric and Power Company in Integrated Resource Plan filed by the Company in January 1995.
14. On Behalf of the Sam Rayburn G&T Electric Cooperative, Inc., Before the Public Utilities Commission of Texas, Docket No. 14893, filed September 1995. Subject Matter: Description of SRG&T Compliance with prior Commission orders relating to SRG&Ts DSM activities.
15. On Behalf of the Sam Rayburn G&T Electric Cooperative, Inc., Before the Public Utilities Commission of Texas, Docket No. 14893, filed January 1996. Subject Matter: Rebuttal testimony relating to SRG&Ts DSM activities.
16. On Behalf of the Sam Rayburn G&T Electric Cooperative, Inc., Before the Public Utilities Commission of Texas, Docket No. 14893, filed March 1996. Subject Matter: Surrebuttal testimony relating to SRG&Ts DSM activities.
17. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket Nos. 6315-U and 6325-U, filed April 5, 1996. Subject Matter: Evaluation of Benefits and Costs of Residential Load Management Program

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Resume of Richard F. Spellman
Exhibit RFS-1
Page 13 of 14

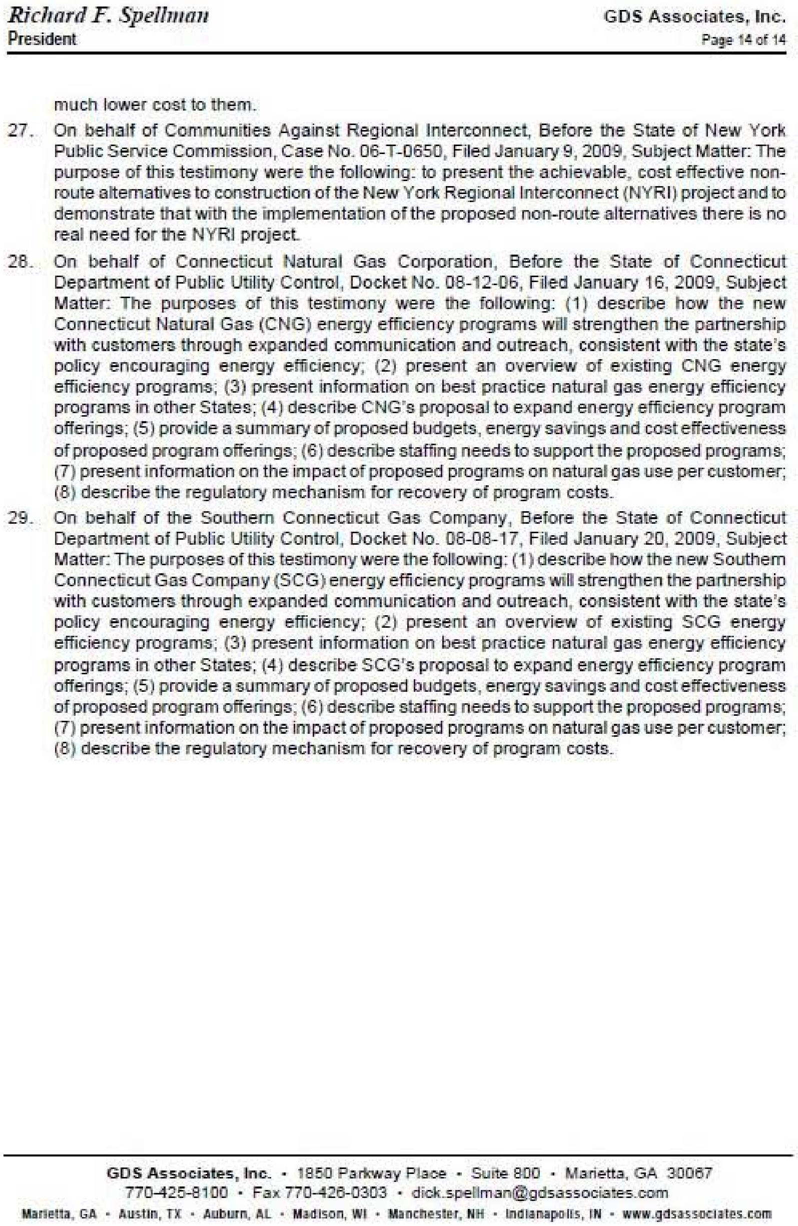


Proposed by Georgia Power Company.

18. On Behalf of Green Mountain Power Company, Before the Vermont Public Service Board, Docket No. 5983, filed December 8, 1997. Subject Matter: Rebuttal Testimony relating to the effectiveness of the Company's historical DSM activities.
19. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket NO. 8708-U, filed May 29, 1998. Subject Matter: DSM programs proposed by Georgia Power Company in Integrated Resource Plan filed by the Company in 1998.
20. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket NO. 8709-U, filed May 29, 1998. Subject Matter: Proposed modifications to DSM programs proposed by Savannah Electric and Power Company in Integrated Resource Plan filed by the Company in January 1995.
21. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket No. 8709-U, filed May 29, 1998. Subject Matter: Proposed modifications to DSM programs proposed by Savannah Electric and Power Company in Integrated Resource Plan filed by the Company in January 1998.
22. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket No. 13305-U, filed May 11, 2001. Subject Matter: DSM programs proposed by Georgia Power Company in Integrated Resource Plan filed by the Company in January 2001.
23. On Behalf of the Georgia Public Service Commission Staff IRP Adversary Team, Before the Georgia Public Service Commission, Docket No. 13306-U, filed May 11, 2001. Subject Matter: Proposed modifications to DSM programs proposed by Savannah Electric and Power Company in Integrated Resource Plan filed by the Company in January 2001.
24. On Behalf of the Alliance to Save Energy, Before the Georgia Public Service Commission, Docket Nos. 17687 & 17688-U, filed May 14, 2004. Subject Matter: Proposal for new energy efficiency programs to be paid for and implemented by Savannah Electric and Power Company and Georgia Power Company (this was intervener testimony filed in the Integrated Resource Plan dockets heard before the Georgia Commission during 2004).
25. On Behalf of the Southern Alliance for Clean Energy, Before the Georgia Public Service Commission, Docket Nos. 4822-U & 19279-U, filed November 12, 2004. Subject Matter: Provided comments on the rules of the Georgia Commission relating to the methodology for the calculation of electric energy and capacity avoided costs that would apply to renewable energy producers in the State of Georgia.
26. On behalf of the Public Staff of the North Carolina Utilities Commission, Before the North Carolina Public Service Commission, Docket No. E-7, Sub 831, June 26, 2008, Subject Matter: The purposes of this testimony were the following: (1) to determine whether the SAVE-A-WATT (SAW) approach was in the public interest of the ratepayers of Duke Energy Carolinas, LLC (Duke or the Company); (2) to determine whether the SAW program administrator costs per lifetime kWh saved were reasonable and whether projected utility margins for energy efficiency and demand response resources under the proposed SAVE-A-WATT approach were reasonably based; (3) to determine whether the SAW approach would achieve the maximum achievable cost-effective potential for kilowatt-hour (kWh) and kilowatt (kW) savings in the Company's service area in North Carolina.; (4) to determine whether any additional cost-effective energy efficiency and demand response programs should be included in the Company's Energy Efficiency Plan; (5) to determine whether an alternative to SAW exists that provides superior electricity and dollar savings to the Company's ratepayers at a

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Resume of Richard F. Spellman
Exhibit RFS-1
Page 14 of 14



much lower cost to them.

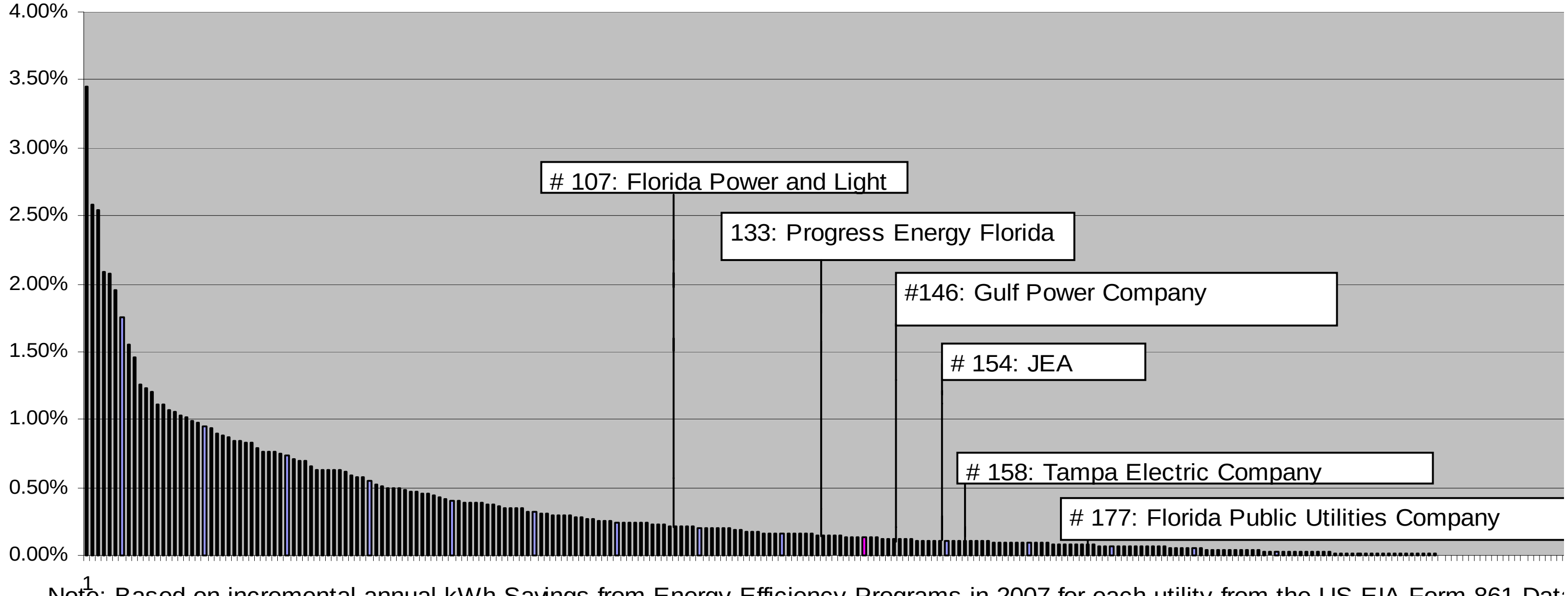
27. On behalf of Communities Against Regional Interconnect, Before the State of New York Public Service Commission, Case No. 06-T-0650, Filed January 9, 2009, Subject Matter: The purpose of this testimony were the following: to present the achievable, cost effective non-route alternatives to construction of the New York Regional Interconnect (NYRI) project and to demonstrate that with the implementation of the proposed non-route alternatives there is no real need for the NYRI project.
28. On behalf of Connecticut Natural Gas Corporation, Before the State of Connecticut Department of Public Utility Control, Docket No. 08-12-06, Filed January 16, 2009, Subject Matter: The purposes of this testimony were the following: (1) describe how the new Connecticut Natural Gas (CNG) energy efficiency programs will strengthen the partnership with customers through expanded communication and outreach, consistent with the state's policy encouraging energy efficiency; (2) present an overview of existing CNG energy efficiency programs; (3) present information on best practice natural gas energy efficiency programs in other States; (4) describe CNG's proposal to expand energy efficiency program offerings; (5) provide a summary of proposed budgets, energy savings and cost effectiveness of proposed program offerings; (6) describe staffing needs to support the proposed programs; (7) present information on the impact of proposed programs on natural gas use per customer; (8) describe the regulatory mechanism for recovery of program costs.
29. On behalf of the Southern Connecticut Gas Company, Before the State of Connecticut Department of Public Utility Control, Docket No. 08-08-17, Filed January 20, 2009, Subject Matter: The purposes of this testimony were the following: (1) describe how the new Southern Connecticut Gas Company (SCG) energy efficiency programs will strengthen the partnership with customers through expanded communication and outreach, consistent with the state's policy encouraging energy efficiency; (2) present an overview of existing SCG energy efficiency programs; (3) present information on best practice natural gas energy efficiency programs in other States; (4) describe SCG's proposal to expand energy efficiency program offerings; (5) provide a summary of proposed budgets, energy savings and cost effectiveness of proposed program offerings; (6) describe staffing needs to support the proposed programs; (7) present information on the impact of proposed programs on natural gas use per customer; (8) describe the regulatory mechanism for recovery of program costs.

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Rankings of US Electric Utilities by kWh Savings
as Percent of Sales
Exhibit RFS-5
Page 1 of 6

Exhibit RFS - 5: Ranking of FEECA Utilities by Incremental Annual kWh Savings as Percent of Sales

Figure 1: Rankings of US Electric Utilities as a % of Annual kWh Sales Saved with Energy Efficiency Programs in 2007



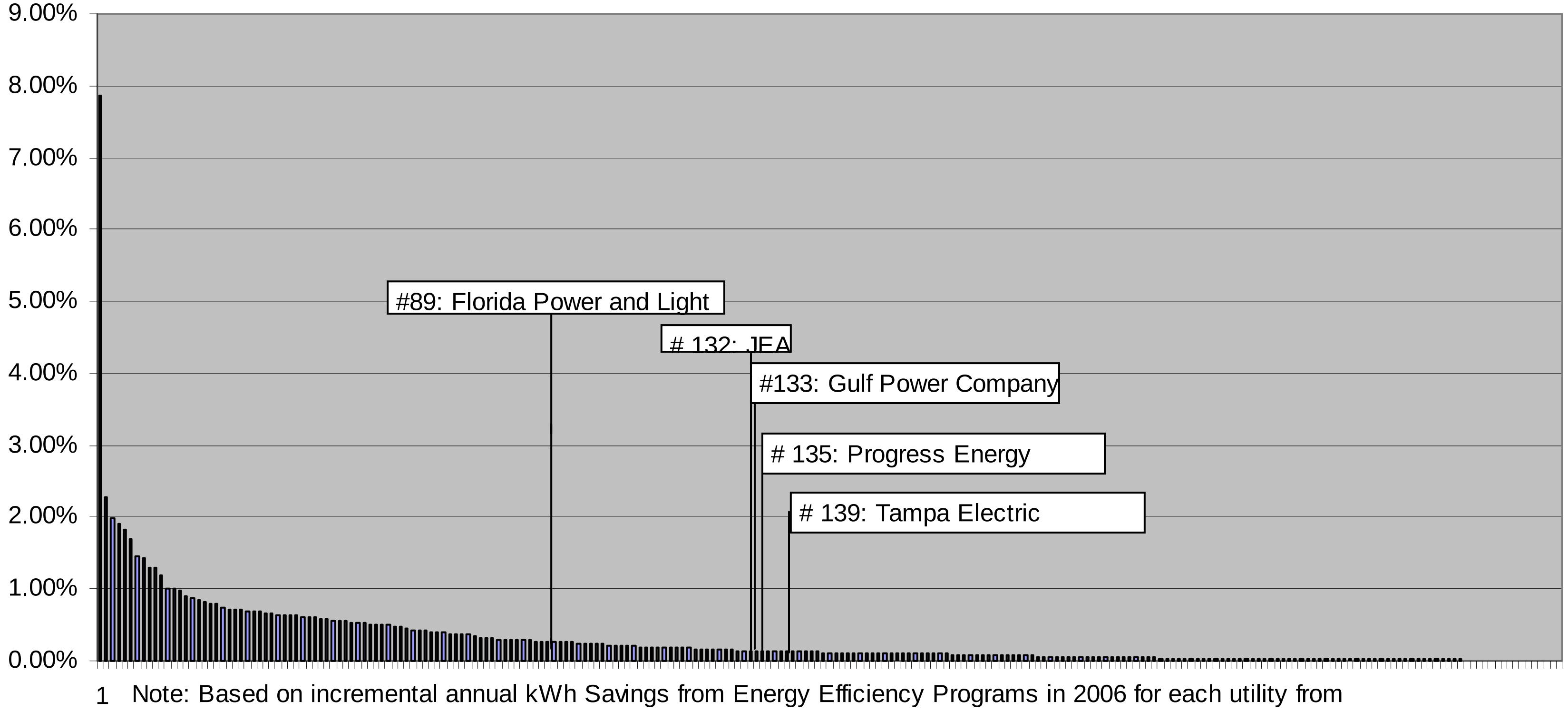
Note: Based on incremental annual kWh Savings from Energy Efficiency Programs in 2007 for each utility from the US EIA Form 861 Data

Note: Orlando Utility Company did not report savings for 2007.

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Rankings of US Electric Utilities by kWh Savings
as Percent of Sales
Exhibit RFS-5

Figure 2: Rankings of US Electric Utilities as a % of Annual kWh Sales Saved with Energy Efficiency Programs in 2006



Note: Based on incremental annual kWh Savings from Energy Efficiency Programs in 2006 for each utility from the US EIA Form 861 Database

Note: Orlando Utility Company and Florida Public Utilities Company did not report savings for 2006.

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Rankings of US Electric Utilities by kWh Savings
as Percent of Sales
Exhibit RFS-5
Page 3 of 6

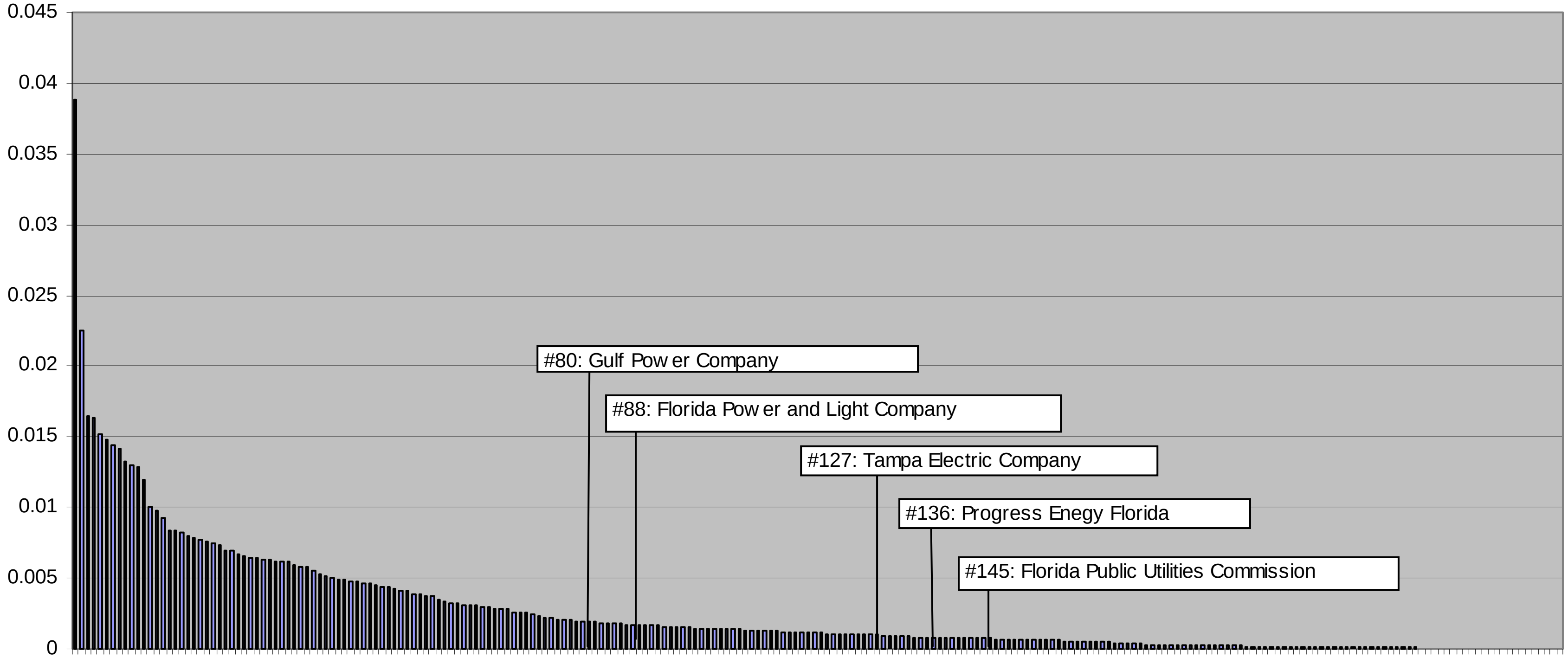


Figure 3: Rankings of US Electric Utilities as a % of Annual kWh Sales Saved with Energy Efficiency Programs in 2005

#80: Gulf Power Company

#88: Florida Power and Light Company

#127: Tampa Electric Company

#136: Progress Enegy Florida

#145: Florida Public Utilities Commission

Note: Based on incremental annual kWh Savings from Energy Efficiency Programs in 2005 for each utility from the US EIA Form 861

Note: Orlando Utility Company and JEA did not report savings for 2005.

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Rankings of US Electric Utilities by kWh Savings
as Percent of Sales
Exhibit RFS-5

Figure 4: Top Twenty Utilities Ranked by Annual 2007 Energy Savings as a Percentage of Annual kWh Sales

Utility Code	**Rank**	**Utility Name**	**State**	**2007 Energy Efficiency Savings (kWh) Incremental**	**2007 Annual Retail kWh Sales**	**Annual 2007 Energy Efficiency Savings as a % of Annual kWh Sales**
2182	1	City of Breckenridge	CO	1,462,000	42,336,000	3.45%
7303	2	Glidden Rural Electric Coop	IA	2,606,000	101,177,000	2.58%
2548	3	Burlington City of	VT	9,276,000	364,586,000	2.54%
14328	4	Pacific Gas & Electric Co	CA	1,662,875,000	79,450,903,000	2.09%
20806	5	City of Windom	MN	1,480,000	71,208,000	2.08%
17609	6	Southern California Edison Co	CA	1,551,503,000	79,505,231,000	1.95%
4176	7	Connecticut Light & Power Co	CT	281,367,000	16,054,317,000	1.75%
11804	8	Massachusetts Electric Co	MA	195,357,000	12,543,637,000	1.56%
19497	9	United Illuminating Co	CT	86,011,000	5,917,448,000	1.45%
10768	10	Laurens Electric Coop, Inc	SC	12,519,000	996,410,000	1.26%
20455	11	Western Massachusetts Elec Co	MA	25,873,000	2,098,952,000	1.23%
16181	12	Rochester Public Utilities	NY	15,815,000	1,307,897,000	1.21%
12312	13	Merced Irrigation District	CA	4,709,000	422,674,000	1.11%
6374	14	Fitchburg Gas & Elec Light Co	NH	3,049,000	276,004,000	1.10%
405	15	City of Alta	IA	166,000	15,587,000	1.06%
24590	16	Unitil Energy Systems	CT	9,983,000	941,779,000	1.06%
15500	17	Puget Sound Energy Inc	WA	222,310,000	21,626,537,000	1.03%
1015	18	Austin Energy	TX	117,649,000	11,546,977,000	1.02%
6022	19	Eugene City of	OR	26,914,000	2,728,684,000	0.99%
15776	20	Reedy Creek Improvement Dist	FL	11,607,000	1,183,620,000	0.98%
Weighted Average Annual kWh Savings as a Percent of Annual Retail kWh Sales				4,230,924,000	236,012,344,000	1.79%

EXHIBIT 32

Figure 5: Top Twenty Utilities Ranked by Annual 2006 Energy Savings as a Percentage of Annual kWh Sales

Utility Code	Rank	Utility Name	State	2006 Energy Effciency Savings (kWh) Incremental	2006 Annual Retail kWh Sales	Annual 2006 Energy Efficiency Savings as a % of Annual kWh Sales
14534	1	City of Pasadena	CA	96,632,000	1,229,963,000	7.86%
7303	2	Glidden Rural Electric Coop	IA	2,243,000	98,493,000	2.28%
11804	3	Massachusetts Electric Co	MA	256,956,000	12,990,328,000	1.98%
20455	4	Western Massachusetts Elec Co	MA	43,298,000	2,276,376,000	1.90%
2548	5	Burlington City of	VT	6,604,000	359,268,000	1.84%
2182	6	City of Breckenridge	CO	682,000	40,123,000	1.70%
12312	7	Merced Irrigation District	CA	5,451,000	375,279,000	1.45%
13214	8	Narragansett Electric Co	RI	96,048,000	6,707,930,000	1.43%
10768	9	Laurens Electric Coop, Inc	SC	12,433,000	951,468,000	1.31%
19497	10	United Illuminating Co	CT	76,242,000	5,919,000,000	1.29%
4176	11	Connecticut Light & Power Co	CT	264,916,000	22,109,070,000	1.20%
14328	12	Pacific Gas & Electric Co	CA	779,603,000	76,817,131,000	1.01%
17609	13	Southern California Edison Co	CA	787,563,000	78,863,143,000	1.00%
3477	14	Chicopee City of	MA	4,438,000	458,566,000	0.97%
6374	15	Fitchburg Gas & Elec Light Co	NH	2,548,000	283,887,000	0.90%
24590	16	Unitil Energy Systems	NH	9,210,000	1,048,943,000	0.88%
9417	17	Interstate Power and Light Co	IA	134,177,000	16,026,131,000	0.84%
16181	18	Rochester Public Utilities	MN	10,417,000	1,266,716,000	0.82%
17166	19	Sierra Pacific Power Co	NV	69,404,000	8,726,238,000	0.80%
15500	20	Puget Sound Energy Inc	WA	166,254,000	21,091,533,000	0.79%
Weighted Average Annual kWh Savings as a Percent of Annual Retail kWh Sales				2,562,817,000	236,548,053,000	1.08%

EXHIBIT 32

Docket Nos. 080413-EG, 080412-EG, 080411-EG, 080410-EG,
080409-EG, 080408-EG, 080407-EG
Rankings of US Electric Utilities by kWh Savings
as Percent of Sales
Exhibit RFS-5

Figure 6: Top Twenty Utilities Ranked by Annual 2005 Energy Savings as a Percentage of Annual kWh Sales

Utility Code	Rank	Utility Name	State	2005 Energy Efficiency Savings (kWh) Incremental	2005 Annual retail kWh Sales	Annual 2005 Energy Efficiency Savings as a % of Annual kWh Sales
10768	1	Laurens Electric Coop, Inc	SC	35,951,000	924,781,000	3.89%
7303	2	Glidden Rural Electric Coop	IA	2,008,000	89,156,000	2.25%
17609	3	Southern California Edison Co	CA	1,239,175,000	75,301,581,000	1.65%
14328	4	Pacific Gas & Electric Co	CA	1,191,221,000	72,727,705,000	1.64%
12647	5	Minnesota Power Inc	MN	137,033,000	9,051,942,000	1.51%
1998	6	Boston Edison Co	MA	160,406,000	10,888,695,000	1.47%
4089	7	Commonwealth Electric Co	MA	31,760,000	2,210,570,000	1.44%
21013	8	City of Worthington	MN	2,634,000	186,896,000	1.41%
19497	9	United Illuminating Co	CT	80,931,000	6,106,000,000	1.33%
20455	10	Western Massachusetts Elec Co	MA	40,238,000	3,113,996,000	1.29%
11804	11	Massachusetts Electric Co	MA	199,421,000	15,491,461,000	1.29%
6374	12	Fitchburg Gas & Elec Light Co	NH	3,986,000	332,612,000	1.20%
1015	13	Austin Energy	TX	111,000,000	10,997,914,000	1.01%
4176	14	Connecticut Light & Power Co	CT	236,818,000	24,125,638,000	0.98%
13214	15	Narragansett Electric Co	RI	66,093,000	7,115,094,000	0.93%
12312	16	Merced Irrigation District	CA	2,905,000	345,224,000	0.84%
15500	17	Puget Sound Energy Inc	WA	171,390,000	20,465,557,000	0.84%
6022	18	Eugene City of	OR	22,030,000	2,663,174,000	0.83%
2886	19	Cambridge Electric Light Co	MA	8,845,000	1,117,811,000	0.79%
13441	20	New Hampshire Elec Coop Inc	NH	5,878,000	747,260,000	0.79%
Weighted Average Annual kWh Savings as a Percent of Annual Retail kWh Sales				3,749,723,000	264,003,067,000	1.42%

EXHIBIT 33

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Commission review of numeric conservation goals (Florida Power & Light Company).	DOCKET NO. 080407-EG
In re: Commission review of numeric conservation goals (Progress Energy Florida, Inc.).	DOCKET NO. 080408-EG
In re: Commission review of numeric conservation goals (Tampa Electric Company).	DOCKET NO. 080409-EG
In re: Commission review of numeric conservation goals (Gulf Power Company).	DOCKET NO. 080410-EG
In re: Commission review of numeric conservation goals (Florida Public Utilities Company).	DOCKET NO. 080411-EG
In re: Commission review of numeric conservation goals (Orlando Utilities Commission).	DOCKET NO. 080412-EG
In re: Commission review of numeric conservation goals (JEA).	DOCKET NO. 080413-EG ORDER NO. PSC-09-0855-FOF-EG ISSUED: December 30, 2009

The following Commissioners participated in the disposition of this matter:

MATTHEW M. CARTER II, Chairman
LISA POLAK EDGAR
NANCY ARGENZIANO
NATHAN A. SKOP
DAVID E. KLEMENT

APPEARANCES:

R. WADE LITCHFIELD and JESSICA CANO, ESQUIRES, 700 Universe Blvd., Juno Beach, Florida 33408; and CHARLES A. GUYTON, ESQUIRE, Squire, Sanders & Dempsey, LLP, 215 South Monroe Street, Suite 601, Tallahassee, Florida 32301
On behalf of Florida Power & Light Company (FPL)

DOCUMENT NUMBER-DATE
12263 DEC 30 8
FPSC-COMMISSION CLERK

EXHIBIT 33

R. ALEXANDER GLENN and JOHN T. BURNETT, ESQUIRES, Progress Energy Service Company, LLC, Post Office Box 14042, St. Petersburg, Florida 33733-4042
On behalf of Progress Energy Florida, Inc. (PEF)

LEE L. WILLIS and JAMES D. BEASLEY, ESQUIRES, Ausley & McMullen, Post Office Box 391, Tallahassee, Florida 32302
On behalf of Tampa Electric Company (TECO)

JEFFREY A. STONE, RUSSELL A. BADDERS, and STEVEN R. GRIFFIN, ESQUIRES, Beggs & Lane, Post Office Box 12950, Pensacola, Florida 32591-2950
On behalf of Gulf Power Company (GULF)

NORMAN H. HORTON, JR., ESQUIRE, Messer, Caparello & Self, P.A., Post Office Box 15579, Tallahassee, Florida 32317
On behalf of Florida Public Utilities Company (FPUC)

ROY C. YOUNG, ESQUIRE, Young vanAssenderp, P.A., 225 South Adams Street, Suite 200, Tallahassee, Florida 32301; W. CHRIS BROWDER, ESQUIRE, Orlando Utilities Commission, 100 W. Anderson Street, Orlando, Florida 32802
On behalf of Orlando Utilities Commission (OUC)

GARY V. PERKO and BROOKE E. LEWIS, ESQUIRES, Hopping Green & Sams, P.A., Post Office Box 6526, Tallahassee, Florida 32314
On behalf of JEA

SUSAN CLARK, ESQUIRE, Radey Thomas Yon and Clark, 301 South Bronough Street, Suite 200, Tallahassee, Florida 32301
On behalf of ITRON, Inc.

JEREMY SUSAC, Executive Director, Florida Energy and Climate Commission, 600 South Calhoun Street, Suite 251, Tallahassee, Florida 32399-0001
On behalf of the Florida Energy and Climate Commission (FECC)

VICKI GORDON KAUFMAN, JON C. MOYLE, JR., ESQUIRES, Keefe Anchors Gordon & Moyle, P.A., 118 North Gadsden Street, Tallahassee, Florida 32301; and JOHN W. MCWHIRTER, JR., ESQUIRE, McWhirter Law Firm, Post Office Box 3350, Tampa, Florida 33601-3350
On behalf of the Florida Industrial Power Users Group (FIPUG)

EXHIBIT 33

SUZANNE BROWNLESS, ESQUIRE, Suzanne Brownless, PA, 1975 Buford Blvd., Tallahassee, Florida 32308
On behalf of the Florida Solar Coalition (FSC)

E. LEON JACOBS, JR., ESQUIRE, Williams & Jacobs, LLC, 1720 S. Gadsden St., MS 14, Suite 201, Tallahassee, Florida 32301; BENJAMIN LONGSTRETH, Natural Resources Defense Council, 1200 New York Avenue NW, Washington, DC 20005; BRANDI COLANDER, Natural Resources Defense Council, 40 West 20th Street, New York, NY 10011; DANIEL WEINER, Jenner & Block, 1099 New York Avenue NW, Washington, DC; and GEORGE S. CAVROS, ESQUIRE, 120 E. Oakland Park Boulevard, Suite 105, Fort Lauderdale, Florida 33334
On behalf of the Natural Resources Defense Council (NRDC) and Southern Alliance for Clean Energy (SACE)

KATHERINE E. FLEMING and ERIK L. SAYLER, ESQUIRES, Florida Public Service Commission, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399
On behalf of the Florida Public Service Commission (Staff)

MARY ANNE HELTON, DEPUTY GENERAL COUNSEL, Florida Public Service Commission, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399
Advisor to the Florida Public Service Commission

FINAL ORDER APPROVING NUMERIC CONSERVATION GOALS

BY THE COMMISSION:

BACKGROUND

Sections 366.80 through 366.85, and 403.519, Florida Statutes (F.S.), are known collectively as the Florida Energy Efficiency and Conservation Act (FEECA). Section 366.82(2), F.S., requires us to adopt appropriate goals designed to increase the conservation of expensive resources, such as petroleum fuels, to reduce and control the growth rates of electric consumption and weather-sensitive peak demand. Pursuant to Section 366.82(6), F.S., we must review the conservation goals of each utility subject to FEECA at least every five years. The seven utilities subject to FEECA are Florida Power & Light Company (FPL), Progress Energy Florida, Inc. (PEF), Tampa Electric Company (TECO), Gulf Power Company (Gulf), Florida Public Utilities Company (FPUC), Orlando Utilities Commission (OUC), and JEA (referred to collectively as the FEECA utilities). Goals were last established for the FEECA utilities in August 2004 (Docket Nos. 040029-EG through 040035-EG). Therefore, new goals must be established by January 2010.

EXHIBIT 33

In preparation for the new goals proceeding, we conducted a series of workshops exploring energy conservation initiatives and the requirements of the FEECA statutes. The first workshop, held on November 29, 2007, explored how we could encourage additional energy conservation. A second workshop held on April 25, 2008, examined how the costs and benefits of utility-sponsored energy conservation or demand-side management (DSM) programs, that target end-use customers, should be evaluated.

In 2008, the Legislature amended Section 366.82, F.S., such that when goals are established, we are required to: (1) evaluate the full technical potential of all available demand-side and supply-side conservation and efficiency measures, including demand-side renewable energy systems, (2) establish goals to encourage the development of demand-side renewable energy systems, and (3) allow efficiency investments across generation, transmission, and distribution as well as efficiencies within the user base. The Legislature also authorized us to allow an investor-owned electric utility (IOU) an additional return on equity of up to 50 basis points for exceeding 20 percent of their annual load-growth through energy efficiency and conservation measures and may authorize financial penalties for those utilities that fail to meet their goals. The additional return on equity shall be established by this Commission through a limited proceeding. Finally, the amendments to Section 366.82, F.S., provided funds for this Commission to obtain professional consulting services if needed. These statutes are implemented by Rules 25-17.001 through 25-17.0015, Florida Administrative Code (F.A.C.).

We held a third workshop on June 4, 2008, focused on appropriate methodologies for collecting information for a technical potential study. On June 26, 2008, seven dockets (080407-EG through 080413-EG) were established and represent the fourth time that we will set numeric conservation goals for each of the FEECA utilities. On November 3, 2008, we held a fourth workshop on the development of demand-side and supply-side conservation goals, including demand-side renewable energy systems. The results of the Technical Potential Study, conducted by the consulting firm ITRON on behalf of the seven FEECA utilities were presented at a fifth Commission workshop held on December 15, 2008.

On November 13, 2008, our staff contracted with GDS Associates, Inc. (GDS) to provide independent technical consulting and expert witness services during the conservation goal-setting proceeding. GDS is a multi-service engineering and management consulting firm, headquartered in Marietta, Georgia, with offices in Alabama, Texas, Maine, New Hampshire, Wisconsin, and Virginia. The firm has a broad array of management, strategic, and programmatic consulting expertise and specializes in energy, energy efficiency, water and utility planning issues. GDS was retained to review and critique the overall goals proposed by each utility, provide expert testimony and recommendations on alternative goals, where warranted. As an independent consultant, GDS was neither a separate party nor a representative of the staff. As such, GDS did not file post-hearing position statements or briefs.

By Order No. PSC-08-0816-PCO-EG, issued December 18, 2008, these dockets were consolidated for purposes of hearing and controlling dates were established. By Order No. PSC-09-0152-PCO, issued March 12, 2009, the controlling dates were revised, requiring the utilities

EXHIBIT 33

to file direct testimony and exhibits on June 1, 2009. FPUC requested, and was granted, an extension of time to file its direct testimony on June 4, 2009.

The Natural Resources Defense Council and the Southern Alliance for Clean Energy (NRDC/SACE) were granted leave to intervene by the Commission on January 9, 2009.[1] The Florida Solar Coalition (FSC) was granted leave to intervene on January 27, 2009.[2] We acknowledged the intervention of the Florida Energy and Climate Commission (FECC) on March 11, 2009.[3] The Florida Industrial Power Users Group (FIPUG) was granted leave to intervene on July 15, 2009.[4]

An evidentiary hearing was held on August 10 - 13, 2009. We have jurisdiction over this matter pursuant to Sections 366.80 through 366.82, F.S.

On August 28, 2009, the FECC filed post-hearing comments in the proceeding. While the FECC took no position on any issues, the FECC concluded in its post-hearing comments that:

> The PSC should approve a level of goals for each utility that satisfies the utility's resource needs and results in reasonably achievable lower rates for all electric customers. As called for in the recent legislation, the PSC should also take into account environmental compliance costs that are almost a certainty over this goals-planning horizon. In this regard, the FECC supports a reasonably achievable level of DSM Goals based on measures that pass the E-RIM and Participants Tests to achieve the least-cost strategy for the general body of ratepayers. Additionally, the FECC believes that coupling cost-effective measures that satisfy E-RIM with solar measures that do not satisfy E-RIM will increase the customer take rate of solar applications at the lowest possible cost.

TECHNICAL POTENTIAL STUDY

For the current goal setting proceeding, the seven FEECA utilities invited NRDC/SACE to form a Collaborative to conduct an assessment of the technical potential for energy and peak demand savings from energy efficiency, demand response, and customer-scale renewable energy in their service territories.[5] The Collaborative then developed a request for proposal to conduct the study. The proposals were evaluated and the ITRON team was selected by the Collaborative to conduct the Technical Potential Study.[6]

FPL contended that the Technical Potential Study employed an iterative process that began with a list of measures that were provided within its original request for proposal (RFP).

---

[1] Order No. PSC-09-0027-PCO-EG, issued January 9, 2009 (NRDC/SACE).
[2] Order No. PSC-09-0062-PCO-EG, issued January 27, 2009 (FSC).
[3] Order No. PSC-09-0150-PCO-EG, issued March 11, 2009 (FECC).
[4] Order No. PSC-09-0500-PCO-EG, issued July 15, 2009 (FIPUG).
[5] Technical Potential for Electric Energy and Peak Demand Savings in Florida, Final Report, pp. 1-1.
[6] Technical Potential for Electric Energy and Peak Demand Savings in Florida, Final Report, pp. 1-1 – 1-2.

EXHIBIT 33

PEF stated that the study focuses on measures that will work in Florida, have the greatest potential impact, and have a realistic possibility for adoption. TECO argued that using the collaborative process allowed each member to draw upon the collective judgment of the group, which would insure the ultimate proposals were the product of a rigorous and orderly process. Gulf asserted that NRDC/SACE were able to submit additional measures to be considered for analysis in the technical potential. FPUC argued that the study provides an adequate assessment of the technical potential. JEA/OUC argued that the study used measures and assessment techniques that were fully vetted through the collaborative process. The FEECA utilities contended that the study commissioned by the Collaborative satisfies Section 366.82(3), F.S.

NRDC/SACE argued that the study did not provide an adequate assessment of the technical potential. NRDC/SACE stated that the technical potential does not consider the full technical potential of all available demand- and supply-side efficiency measures. FSC argued that ranking measure savings by the use of "stacking" by the Collaborative is incorrect. FSC also criticized the study for omitting solar hybrid systems. FIPUG's brief and the comments filed by the FECC did not specifically address the Technical Potential Study.

Analysis

Witness Rufo, Director in the Consulting and Analysis Group at ITRON, stated that the technical potential is a theoretical construct that represents an upper limit of energy efficiency. Technical potential is what is technically feasible, regardless of cost, customer acceptance, or normal replacement schedules. The Technical Potential Study was conducted for each FEECA utility and then combined to create a statewide technical potential.

According to the testimony of witness Rufo, the Collaborative's first step was to identify and select the energy efficiency, demand response, and solar photovoltaic (PV) measures to be analyzed. The energy efficiency measures were developed with the FEECA utilities, ITRON, and NRDC/SACE, all proposing measures. Once a master list was developed, ITRON conducted assessments of data availability and measure specific modeling issues. Demand response measures were identified using a combination of literature reviews of current programs and discussions within the Collaborative. The PV measures were identified by explicitly considering six characteristics specific to PV electrical systems. The six characteristics are: (1) PV material type, (2) energy storage, (3) tracking versus fixed, (4) array mounting design, (5) host sites, and (6) on- versus off-grid systems.

The ITRON assessment of the full technical potential included 257 unique energy efficiency measures, seven demand response programs, and three unique PV measures. Included in the energy efficiency list were 61 residential measures, 78 commercial measures, and 118 industrial measures. The demand response list included five residential, and two commercial/industrial measures. The PV list included one residential (roof top application) and two commercial measures (one rooftop application and one parking lot application).

EXHIBIT 33

Some of the 257 measures, such as Seasonal Energy Efficiency Ratio (SEER) 19 central air conditioners, hybrid desiccant-direct expansion cooling systems, and heat pump water heaters are likely to face supply constraints in the near future. The energy efficiency list also includes some end-use specific renewable measures, e.g., solar water heating and PV-powered pool pumps. While some measures may have obstacles to overcome regarding customer acceptance, it is appropriate to include them in the technical potential.

The table below shows the results of the Statewide Technical Potential Study. Baseline energy is the total electricity sales for the FEECA utilities in 2007.[7]

Sector	Annual Energy			Summer System Peak			Winter System Peak		
	Base line (2007)	Technical Potential		Base line (2007)	Technical Potential		Base line (2007)	Technical Potential	
	(GWh)	(GWh)	(%)	(MW)	(MW)	(%)	(MW)	(MW)	(%)
Residential	94,745	36,584	38.6%	22,263	10,032	45.1%	22,728	6,461	28.4%
Commercial	65,051	19,924	30.6%	9,840	4,079	41.5%	7,490	2,206	29.5%
Industrial	11,877	2,108	17.7%	1,721	265	12.8%	1,289	217	17.5%
Total	171,672	58,616	34.1%	33,825	14,375	42.5%	31,508	8,883	28.2%

None of the parties offered any alternatives that were Florida-specific. They only showed that other states showed greater potential. They were unable to show how savings in other states could be achieved in Florida. Witness Rufo testified that criticisms of the ITRON data and modeling methods by NRDC/SACE and the staff witness are either without merit, inaccurate, or insignificant. Witness Rufo further testified that the baseline and measure data used in the Technical Potential Study reflect the best available data given the time and resources available.

The FEECA utilities did not develop supply-side conservation or efficiency measures to the same degree that they did demand-side measures. Generating utilities made note of their ongoing or planned efficiency and savings projects, but did not subject supply-side measures to the same analysis, nor did they develop the extensive lists of measures, that were examined by ITRON for demand-side savings. Supply-side measures require substantially different analytical methods than do demand-side systems and provide results that are difficult to combine with conservation goals. Supply-side efficiencies and conservation, rendered properly, would result either in less fuel being required or less loss along the transmission and distribution network. The Commission routinely addresses opportunities for supply-side efficiency improvements in our review of Ten-Year Site Plans. Therefore, such measures are better addressed separately from demand-side measures where their options can be better explored.

---

[7] Technical Potential for Electric Energy and Peak Demand Savings in Florida, Final Report, pp. 3-14.

EXHIBIT 33

Conclusion

Based on the record, we find that the Collaborative provided an adequate assessment of the technical potential of all available demand-side and supply-side conservation and efficiency measures, including demand-side renewable energy systems, pursuant to Section 366.82(3), F.S.

ACHIEVABLE POTENTIAL

Each of the FEECA utilities agreed that an adequate assessment of achievable potential was provided. The FEECA utilities that addressed the supply-side options, likewise, agreed that it was better addressed through a separate proceeding.

FSC, in its post-hearing brief, found the assessment insufficient for the five IOUs. FSC took no position on the municipal utilities. FSC's objection in the case of the IOUs mainly related to problems it had with the cost-effectiveness testing used in the process, which is further addressed below. NRDC/SACE, in its post-hearing brief, argued that the achievable potential was insufficient across the board and cited opposition to the cost-effectiveness testing.

Following the development of the DSM technical potential, previously discussed, three steps were used to develop the achievable potential: initial cost-effectiveness screening, determination of incentive levels, and development of achievable potential for six separate scenarios. Discussion of each step follows. FPUC, JEA, and OUC did not use this process and are discussed separately.

Initial Cost-Effectiveness Screening

During this phase of the process, the four generating IOUs (FPL, PEF, TECO, and Gulf) applied three cost-effectiveness tests to each measure: Enhanced Rate Impact Measure Test (E-RIM), Enhanced Total Resource Cost Test (E-TRC), and the Participants Test. None of the three tests included incentives that could be provided to participating customers. During this phase of the testing, the utilities also identified measures that had a payback period of less than two years in order to identify the free riders. Rule 25-17.0021(3), F.A.C., reads, in part:

> Each utility's projection shall reflect consideration of overlapping measures, rebound effects, free riders, interactions with building codes and appliance efficiency standards, and the utility's latest monitoring and evaluation of conservation programs and measures.

In order to meet the requirements of this Rule, the four generating IOUs removed certain measures because of participant "payback" periods of less than two years. Savings realized from such measures exceeded their costs within two years, according to utility analysis. These savings result from reduced kWh usage and, resultantly, a lower bill. The costs of such measures are up-front capital costs, where they exist, of installing or beginning the measure. Measures must both pass the Participants Test and have a payback of two years or less without any incentives to

EXHIBIT 33

be removed during this step. We initially recognized a two-year payback period to address the free-ridership issue following the 1994 conservation goals hearing. By Order No. PSC-94-1313-FOF-EG,[8] we initially recognized FPL's use of the two-year payback period, and it has been used consistently ever since.

The two-year payback period was agreed to by the Collaborative as a means of addressing the free-ridership issue. In his testimony, FPL witness Dean described the rationale for the two-year period. He noted that estimates of the annual return on investment required to spur purchase of energy efficiency measures range from approximately 26 percent, which represents a payback period of just under four years, to over 100 percent, which represents a payback period less than a year. He further noted that most studies place the annual return on investment necessary to incent purchase in the 40 to 60 percent range. A 50 percent figure, which represents a payback of exactly two years, is squarely in the middle of that range.

The two-year payback criterion identified a substantial amount of energy savings from demand-side measures. For an illustrative example, the following chart demonstrates the amount of energy savings that could potentially be achieved from such measures:

Utility	(A) Maximum Achievable E-TRC (GWh)*	(B) E-TRC + 2-year payback measures (GWh)*	(C) Amount excluded due to 2-year screen (GWh) (B-A)	(D) Percent excluded due to 2-year screen (C/B)
FPL	2177.0	12066.9	9889.9	82.0%
PEF	1584.5	4689.8	3105.3	66.2%
TECO	310.3	1939.9	1629.6	84.0%
Gulf	251.4	1279.9	1028.5	80.4%
JEA	138.5	1070.7	932.2	87.1%
OUC	78.8	511.2	432.4	84.6%
FPUC	12.9	59.2	46.3	78.2%
Total	4553.4	21617.6	17064.2	78.9%

Even though the utilities did not include such measures in their proposed goals, customers are still free to adopt such measures and realize the resultant financial savings the measures represent. We are concerned that the utilities' use of the two-year payback criteria had the effect of screening out a substantial amount of potential savings. In order to recognize this potential, we have included in the residential goals for FPL, PEF, Gulf and TECO, savings from

---

[8] Order No. PSC-94-1313-FOF-EG, issued October 25, 1994, Docket No. 93-0548-EG, In re: Adoption of Numeric Conservation Goals and Consideration of National Energy Policy Act Standards (Section 111) by Florida Power and Light Company; Docket No. 93-0549-EG, In re: Adoption of Numeric Conservation Goals and Consideration of National Energy Policy Act Standards (Section 111) by Florida Power Corporation; Docket No. 93-0550-EG, In re: Adoption of Numeric Conservation Goals and Consideration of National Energy Policy Act Standards (Section 111) by Gulf Power Company; Docket No. 93-0551-EG, In re: Adoption of Numeric Conservation Goals and Consideration of National Energy Policy Act Standards (Section 111) by Tampa Electric Company.

EXHIBIT 33

the residential measures included in the top-ten energy savings measures that were screened-out by the two-year payback criterion.

Incentive Levels

The second step in the process for the four generating IOUs was to establish proper incentive levels. As a result, incentive levels for measures that did not pass the Participants Test during the initial cost-effectiveness screening (without incentives) were adjusted until the measures passed. Following this action, the E-RIM and E-TRC tests were re-run using costs that included the resulting incentive. Some measures that could not pass the Participants Test cost-effectiveness screening without incentives were removed from the achievable potential at this stage. Because measures were required to pass the Participants Test as well as E-RIM or E-TRC, incentives added to measures to allow them to be cost-effective for customers rendered some measures no longer cost-effective under either the E-RIM or E-TRC tests.

Scenario Analysis

In the third step of the process, the four generating IOUs analyzed measures that passed cost-effectiveness screening with incentives, in order to develop six scenarios for achievable potential. These utilities developed low, mid, and high incentive scenarios for both E-RIM and E-TRC. From these six scenarios, the achievable potential was developed. This achievable potential formed the basis of the goals proposed by the utilities in the next step of the overall process.

Other FEECA Utilities

FPUC, OUC, and JEA allowed ITRON to develop the achievable potential for them. ITRON followed a similar process in developing the achievable potential for the three small utilities that was followed for the generating IOUs in making their calculations. In each of these three cases, ITRON found no DSM measures that passed the E-RIM Test. As a result, the achievable potential for each of these three utilities was zero in all categories. These utilities are all smaller than the generating IOUs. Because of fewer customers, administrative costs and program development tend to render measures less cost-effective than they are for the generating IOUs.

Demand-Side Renewable Energy Systems

The Collaborative analyzed a small range of renewable energy systems in their analysis of achievable potential.[9] These measures were confined to geothermal heat pumps, solar water heaters, and small photovoltaic (PV) systems. These renewable energy systems were subjected to the same range of cost-effectiveness testing as the DSM measures discussed above. The generating IOUs found that some geothermal heat pumps did pass the cost-effectiveness tests

---

[9] Technical Potential for Electric Energy and Peak Demand Savings in Florida, Final Report, pp. A1 – A27.

EXHIBIT 33

and were included in the achievable potential. PEF also included some solar thermal measures in its achievable potential. No FEECA utility found that Solar PV measures passed the economic screening and thus should not be included in the achievable potential. Renewable energy systems were subject to the same analysis as conventional energy efficiency measures and either were incorporated into or excluded from achievable potential by the same standards.[10]

Conclusion

Each of the FEECA utilities, with the aid of ITRON, performed an adequate analysis of the demand-side conservation and efficiency measures, including demand-side renewable energy systems. The FEECA utilities did not provide an analysis of supply-side measures. We agree, however, that the methods appropriate to analyze demand-side measures are not well-suited to weighing supply-side measures. As a result, supply-side measures are best addressed in a separate proceeding.

REQUIRED COST-EFFECTIVENESS TESTS

Recent amendments to Section 366.82, F.S., provide greater specificity as to what we must consider when establishing conservation goals. The recent amendments, in relevant part, are as follows:

> (3) In developing the goals, the commission shall evaluate the full technical potential of all available demand-side and supply-side conservation and efficiency measures, including demand-side renewable energy systems. In establishing the goals, the commission shall take into consideration:
>
> (a) The costs and benefits to customers participating in the measure.
>
> (b) The costs and benefits to the general body of ratepayers as a whole, including utility incentives and participant contributions.

Appropriate Test for Section 366.82(3)(a), F.S.

All parties, except FSC, agreed that the Participants Test captures all of the relevant costs and benefits for customers who elect to participate in a DSM measure. The parties further agreed that the requirements of Section 366.82(3)(a), F.S., are reflected in the proposed goals because all included measures pass the Participants Test.

FSC argued that the goals proposed by FPL, PEF, TECO, Gulf, and FPUC do not adequately reflect the costs and benefits to customers participating in the measures pursuant to Section 366.82(3)(a), F.S. FSC appears to take issue with the techniques employed by the IOUs in calculating the energy savings and incentives for solar measures and argued that these flawed calculations cause solar measures to fail the Participants Test. In its analysis, FSC explained

---

[10] Technical Potential for Electric Energy and Peak Demand Savings in Florida, Final Report, pp. ES5 – ES 6.

EXHIBIT 33

how the impact of "stacking" increases the necessary incentive and lowers the energy savings attributed to solar technologies, thereby increasing the likelihood that these measures will fail the Participants Test. FSC took no position regarding OUC and JEA.

Section 366.82(3)(a), F.S., requires that we take into consideration the costs and benefits to customers participating in any measure to be included in a utility's DSM program. In addition, Rule 25-17.008, F.A.C., incorporates our Cost Effectiveness Manual.[11] The Cost Effectiveness Manual requires the application of the Participants Test in order to determine the cost-effectiveness of conservation programs by measuring the impact of the program on the participating customers. The customers' benefits of participation in programs may include bill reductions, incentives, and tax credits. Customer's costs may include bill increases, equipment and materials, and operations and maintenance.

Although FSC expressed its opinion that the inputs to the Participants Test are flawed, it agreed with the application of this test in general, along with the E-TRC Test. However, FSC offered no alternative inputs for the investor-owned utilities, nor did it provide any alternative to the results obtained from the application of the Participants Test. The FSC questioned ITRON on its use of "stacking" in the Technical Potential Study. Stacking is a means to understand the interaction between available measures to make sure that savings are not double counted. Witness Rufo testified that the use of "stacking" is an accepted practice to eliminate double counting that could occur if the measures were not stacked. We believe that "stacking" is useful and justified as it is a means to ensure that the savings from a program are not counted if those savings would be offset by the savings in a different measure.

We find that the Participants Test, as used by the utilities in this proceeding, satisfies the requirements of Section 366.82(3)(a), F.S. As described in Rule 25-17.008, F.A.C., the Participants Test measures the impact of the program on the participating customers. Based on the evidence in the record, as well as existing Commission Rules, we find that the Participants Test must be considered when establishing conservation goals in order to satisfy Section 366.82(3)(a), F.S.

Appropriate Test for Section 366.82(3)(b), F.S.

The FEECA utilities agreed that Section 366.82, F.S., does not specify or require a single cost-effectiveness test, but that a combination of two tests is sufficient to meet the requirements, specifically the RIM and Participants Tests. The TRC Test is considered by the utilities to be insufficient to meet the statute, and goals based upon it would have an upward pressure on rates. They also agreed that their analysis was comprehensive, including effects from a variety of sources, such as building codes, overlapping measures, appliance standards, and other sources. Four of the seven FEECA utilities filed "enhanced" versions of the RIM and TRC tests, referenced as E-RIM and E-TRC. These tests included benefits from avoided carbon compliance costs.

---

[11] Florida Public Service Commission Cost Effectiveness Manual for Demand Side Management Programs and Self-Service Wheeling Proposals, effective July 17, 1991.

EXHIBIT 33

NRDC/SACE asserted that the language found in Section 366.82(3)(b), F.S., clearly describes the TRC Test. NRDC/SACE argued that the TRC Test is the cost-effectiveness test that focuses on the "general body of ratepayers as a whole." NRDC/SACE further elaborated that the TRC Test, unlike the RIM Test, includes both "utility incentives and participant contributions." In addition, a flaw in the calculation of benefits is the denial of value for reduced demand until the in-service date of the avoided unit. Also, the possibility of avoiding units that are already approved but have not yet finished construction should be considered. Finally, NRDC/SACE contended that administrative costs allocated to measures were unreasonable and caused an inappropriate reduction of the goals.

FIPUG suggested that we primarily consider the final impact on customers, and that any goals should not present an undue rate impact upon customers. FIPUG contended that we should continue to give significant weight to the RIM Test. FIPUG asserted, however, that the test should be performed consistently and uniformly between utilities.

FSC asserted that the analysis by the investor-owned utilities was insufficient, and that the reduction of savings associated with solar measures was reduced by inappropriately stacking measures. FSC supported the E-TRC and Participants Tests, and further suggested that measures should be considered in combination or on a portfolio basis.

Section 366.82(3)(b), F.S., requires this Commission to consider "[t]he costs and benefits to the general body of ratepayers as a whole, including utility incentives and participant contributions." Both the RIM and TRC Tests address costs and benefits beyond those associated solely with the program participant. Four of the seven FEECA utilities filed "enhanced" versions of the RIM and TRC tests, referenced as E-RIM and E-TRC. These tests are identical to the RIM and TRC tests but include an estimate of avoided carbon compliance costs. As such, E-RIM and E-TRC portfolios will have greater savings than RIM or TRC portfolios respectively.

Rule 25-17.008, F.A.C., and the Cost Effectiveness Manual were adopted as part of the implementation of Section 366.82, F.S., prior to the recent amendments. Rule 25-17.008(3), F.A.C., directs us to evaluate the cost-effectivness of conservation measures and programs utilizing the following three tests: (1) the Participants Test, (2) the Total Resource Cost Test (TRC), and (3) the Rate Impact Measure Test (RIM). Rule 25-17.008(4), F.A.C., allows a party to provide additional data for cost-effectiveness reporting, such as the E-RIM and E-TRC tests. The figure below provides an illustration of the costs and benefits evaluated under each test.

EXHIBIT 33

Summary of Cost Effectiveness Test Components

	Participant	Total Resource Cost	Rate Impact Measure
Benefits	Bill Savings	Avoided Generation	Avoided Generation
	Incentives	Avoided Distribution	Avoided Distribution
	Tax Credits	Net System Fuel	Net System Fuel
Costs	Measure Cost	Equipment	Equipment
		Administrative	Administrative
		Measure Cost	Incentives
			Lost Revenues

It should first be noted that the RIM and TRC tests both consider benefits associated with avoiding supply side generation, i.e., construction of power plants, transmission, and distribution. The RIM and TRC tests also consider costs associated with additional supplies and costs associated with the utilities cost to offer the program. While some similarities exist between the two tests, it is the differences that are significant in determining which one, if not both, complies with Section 366.82(3)(b), F.S., and should be used to establish goals. The table below focuses on the differences in costs between the two tests.

Difference Between RIM and TRC Tests

	Total Resource Cost	Rate Impact Measure
Costs	Measure Cost	Incentives
		Lost Revenues

As illustrated above, the RIM Test considers utility offered incentives which are specifically required in Section 366.82(3)(b), F.S. Utility offered incentives are recovered through the Energy Conservation Cost Recovery clause and are a cost borne by all ratepayers. Therefore, a customer participating in a program, which is incentivized by the utility, receives a benefit; however, the incentive paid by the utility results in a cost to the general body of ratepayers. The TRC Test does not consider costs associated with utility incentives.

EXHIBIT 33

The TRC Test, as described in Rule 25-17.008, F.A.C., measures the net costs of a conservation program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. The consideration of costs incurred by the participant is specifically required by Section 366.82(3)(b), F.S. Because the TRC Test excludes lost revenues, a measure that is cost-effective under the TRC Test would be less revenue intensive than a utility's next planned supply-side resource addition. However, the rate impact may be greater due to the reduced sales.

When establishing conservation goals, Section 366.82(3)(d), F.S., requires us to consider the costs imposed by state and federal regulations on the emission of greenhouse gases. The statute does not define "greenhouse gases," nor requires us to consider projected costs that may be imposed. However, in considering this requirement, the utilities viewed CO_2 as one of the generally accepted greenhouse gases close to being regulated. Other regulated gases, such as sulfur dioxide (SOx) and nitrous oxides (NOx), are already regulated by federal statute and the costs are included in the standard RIM and TRC tests. Each utility's calculation of a measures' cost-effectiveness employed modified versions of the RIM and the TRC tests that added a cost impact of CO_2 to the calculations. The revised tests are referred to as the E-RIM and E-TRC Tests. The utilities used different sources to establish the cost of CO_2 emissions, thereby employing different values in their cost-effectiveness testing. Therefore, FPL's goals could not be determined using TECO's estimated CO_2 costs.

Conclusion

While all parties agreed that the Participants Test is required by Section 366.82(3)(a), F.S., the same consensus does not exist when determining the appropriate test or tests for Section 366.82(3)(b) and (d), F.S. The seven FEECA utilities believe that the E-RIM Test satisfies the requirements of the statute while NRDC/SACE and FSC believe the E-TRC Test satisfies the requirements. We would note that the language added in 2008did not explicitly identify a particular test that must be used to set goals. Based on the analysis above, we find that consideration of both the RIM and TRC tests is necessary to fulfill the requirements of Section 366.82(3)(b), F.S. Both the RIM and the TRC Tests address costs and benefits beyond those associated solely with the program participant. By having RIM and TRC results, we can evaluate the most cost-effective way to balance the goals of deferring capacity and capturing energy savings while minimizing rate impacts to all customers. The "enhanced" versions of the RIM and TRC tests, referenced as E-RIM and E-TRC, are identical to the RIM and TRC tests, but include an estimate of avoided carbon compliance costs. As such, E-RIM and E-TRC portfolios will have greater savings than RIM or TRC portfolios respectively.

COMMISSION APPROVED GOALS

The goals proposed by each utility rely upon the E-RIM Test. Our intention is to approve conservation goals for each utility that are more robust than what each utility proposed. Therefore, we approve goals based on the unconstrained E-TRC Test for FPL, PEF, TECO, Gulf, and FPUC. The unconstrained E-TRC test is cost effective, from a system basis, and does not limit the amount of energy efficiency based on resource reliability needs. The E-TRC test

EXHIBIT 33

includes cost estimates for future greenhouse gas emissions, but does not include utility lost revenues or customer incentive payments. As such, the E-TRC values are higher than the utility proposed E-RIM values. In addition, we have included the saving estimates for the residential portion of the top ten measures that were shown to have a payback period of two years or less in the numeric goals for FPL, PEF, TECO, and Gulf. When submitting their programs for our approval, the utilities can consider the residential portion of the top ten measures, but they shall not be limited to those specific measures.

OUC and JEA proposed goals of zero, yet committed to continue their current DSM program offerings. We are setting goals for OUC and JEA based on their current programs so as not to unduly increase rates. The annual numeric goals for each utility are shown below:

EXHIBIT 33

Commission-Approved Conservation Goals for FPL

	Residential								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	25.2	42.5	67.7	20.9	12.3	33.2	29.1	90.5	119.6
2011	37.2	42.5	79.7	30.1	12.3	42.4	55.3	90.5	145.8
2012	47.7	42.5	90.2	38.0	12.3	50.3	78.3	90.5	168.8
2013	56.0	42.5	98.5	44.0	12.3	56.3	96.2	90.5	186.7
2014	61.8	42.5	104.3	47.9	12.3	60.2	109.5	90.5	200.0
2015	58.2	42.5	100.7	43.6	12.3	55.9	102.5	90.5	193.0
2016	53.4	42.5	95.9	39.0	12.3	51.3	92.9	90.5	183.4
2017	48.9	42.5	91.4	34.7	12.3	47.0	83.7	90.5	174.2
2018	44.9	42.5	87.4	30.9	12.3	43.2	75.9	90.5	166.4
2019	40.8	42.5	83.3	27.1	12.3	39.4	67.0	90.5	157.5
Total	474.0	425.0	899.0	356.0	123.0	479.0	790.3	905.0	1,695.3

	Commercial/Industrial								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	42.7	0.0	42.7	8.1	0.0	8.1	84.7	0.0	84.7
2011	62.5	0.0	62.5	9.9	0.0	9.9	149.4	0.0	149.4
2012	76.3	0.0	76.3	11.6	0.0	11.6	191.5	0.0	191.5
2013	81.3	0.0	81.3	13.1	0.0	13.1	202.7	0.0	202.7
2014	79.3	0.0	79.3	14.4	0.0	14.4	194.1	0.0	194.1
2015	71.5	0.0	71.5	15.1	0.0	15.1	167.5	0.0	167.5
2016	60.0	0.0	60.0	15.0	0.0	15.0	134.2	0.0	134.2
2017	48.7	0.0	48.7	14.1	0.0	14.1	104.8	0.0	104.8
2018	41.3	0.0	41.3	13.2	0.0	13.2	86.9	0.0	86.9
2019	35.0	0.0	35.0	12.0	0.0	12.0	71.0	0.0	71.0
Total	598.7	0.0	598.7	126.3	0.0	126.3	1,386.7	0.0	1,386.7

EXHIBIT 33

Commission-Approved Conservation Goals for PEF

	Residential								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	40.6	43.9	84.5	63.7	19.0	82.7	99.6	190.3	289.9
2011	42.5	43.9	86.4	69.2	19.0	88.2	105.6	190.3	295.9
2012	45.5	43.9	89.4	73.2	19.0	92.2	114.7	190.3	305.0
2013	47.5	43.9	91.4	75.9	19.0	94.9	120.7	190.3	311.0
2014	49.4	43.9	93.3	78.6	19.0	97.6	126.8	190.3	317.1
2015	54.8	43.9	98.7	83.3	19.0	102.3	147.9	190.3	338.2
2016	63.3	43.9	107.2	94.1	19.0	113.1	135.8	190.3	326.1
2017	62.9	43.9	106.8	93.5	19.0	112.5	129.8	190.3	320.1
2018	57.4	43.9	101.3	86.0	19.0	105.0	117.7	190.3	308.0
2019	42.9	43.9	86.8	61.5	19.0	80.5	108.6	190.3	298.9
Total	506.6	439.0	945.6	779.1	190.0	969.1	1,207.1	1,903.0	3,110.1

	Commercial/Industrial								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	13.7	0.0	13.7	5.3	0.0	5.3	31.1	0.0	31.1
2011	16.2	0.0	16.2	5.3	0.0	5.3	33.0	0.0	33.0
2012	25.5	0.0	25.5	11.4	0.0	11.4	35.9	0.0	35.9
2013	25.9	0.0	25.9	11.5	0.0	11.5	37.7	0.0	37.7
2014	26.4	0.0	26.4	11.5	0.0	11.5	39.6	0.0	39.6
2015	27.6	0.0	27.6	11.7	0.0	11.7	46.2	0.0	46.2
2016	27.1	0.0	27.1	11.6	0.0	11.6	42.5	0.0	42.5
2017	27.0	0.0	27.0	11.6	0.0	11.6	40.6	0.0	40.6
2018	25.7	0.0	25.7	11.4	0.0	11.4	36.8	0.0	36.8
2019	22.3	0.0	22.3	11.3	0.0	11.3	34.0	0.0	34.0
Total	237.3	0.0	237.3	102.6	0.0	102.6	377.4	0.0	377.4

EXHIBIT 33

Commission-Approved Conservation Goals for TECO

	Residential								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	2.7	1.9	4.6	2.8	3.6	6.4	4.8	5.0	9.8
2011	4.7	1.9	6.6	4.9	3.6	8.5	9.0	5.0	14.0
2012	6.5	1.9	8.4	6.6	3.6	10.2	12.7	5.0	17.7
2013	8.0	1.9	9.9	7.9	3.6	11.5	15.6	5.0	20.6
2014	8.9	1.9	10.8	8.6	3.6	12.2	17.6	5.0	22.6
2015	9.0	1.9	10.9	8.0	3.6	11.6	18.0	5.0	23.0
2016	7.9	1.9	9.8	6.5	3.6	10.1	16.3	5.0	21.3
2017	7.1	1.9	9.0	5.2	3.6	8.8	14.4	5.0	19.4
2018	6.4	1.9	8.3	4.4	3.6	8.0	13.3	5.0	18.3
2019	5.9	1.9	7.8	3.8	3.6	7.4	12.3	5.0	17.3
Total	67.1	19.0	86.1	58.7	36.0	94.7	134.0	50.0	184.0

	Commercial/Industrial								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	2.5	0.0	2.5	0.9	0.0	0.9	6.5	0.0	6.5
2011	3.6	0.0	3.6	1.1	0.0	1.1	10.6	0.0	10.6
2012	4.3	0.0	4.3	1.4	0.0	1.4	15.4	0.0	15.4
2013	5.1	0.0	5.1	1.3	0.0	1.3	16.2	0.0	16.2
2014	5.4	0.0	5.4	1.5	0.0	1.5	19.5	0.0	19.5
2015	6.0	0.0	6.0	1.7	0.0	1.7	20.9	0.0	20.9
2016	6.2	0.0	6.2	1.6	0.0	1.6	21.6	0.0	21.6
2017	6.3	0.0	6.3	1.6	0.0	1.6	21.8	0.0	21.8
2018	6.4	0.0	6.4	1.7	0.0	1.7	22.1	0.0	22.1
2019	6.3	0.0	6.3	1.7	0.0	1.7	21.7	0.0	21.7
Total	52.1	0.0	52.1	14.5	0.0	14.5	176.3	0.0	176.3

EXHIBIT 33

Commission-Approved Conservation Goals for Gulf

	Residential								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	1.90	5.60	7.50	1.90	4.00	5.90	2.8	32.20	35.00
2011	2.70	5.60	8.30	2.50	4.00	6.50	5.4	32.20	37.60
2012	3.80	5.60	9.40	3.40	4.00	7.40	8.4	32.20	40.60
2013	4.90	5.60	10.50	4.50	4.00	8.50	11.6	32.20	43.80
2014	6.10	5.60	11.70	5.50	4.00	9.50	14.6	32.20	46.80
2015	7.20	5.60	12.80	6.90	4.00	10.90	18.0	32.20	50.20
2016	8.40	5.60	14.00	8.10	4.00	12.10	21.4	32.20	53.60
2017	9.10	5.60	14.70	8.70	4.00	12.70	23.2	32.20	55.40
2018	9.30	5.60	14.90	9.30	4.00	13.30	24.0	32.20	56.20
2019	9.50	5.60	15.10	9.70	4.00	13.70	24.5	32.20	56.70
Total	62.90	56.00	118.90	60.50	40.00	100.50	153.9	322.00	475.90

	Commercial/Industrial								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	1.20	0.00	1.20	0.50	0.00	0.50	3.20	0.00	3.20
2011	1.60	0.00	1.60	0.60	0.00	0.60	5.60	0.00	5.60
2012	2.10	0.00	2.10	0.80	0.00	0.80	7.70	0.00	7.70
2013	2.40	0.00	2.40	0.90	0.00	0.90	9.50	0.00	9.50
2014	2.70	0.00	2.70	1.00	0.00	1.00	10.80	0.00	10.80
2015	2.90	0.00	2.90	1.00	0.00	1.00	11.70	0.00	11.70
2016	3.00	0.00	3.00	1.20	0.00	1.20	12.30	0.00	12.30
2017	3.20	0.00	3.20	1.10	0.00	1.10	12.70	0.00	12.70
2018	3.10	0.00	3.10	1.10	0.00	1.10	12.50	0.00	12.50
2019	3.10	0.00	3.10	1.10	0.00	1.10	11.90	0.00	11.90
Total	25.30	0.00	25.30	9.30	0.00	9.30	97.90	0.00	97.90

EXHIBIT 33

Commission-Approved Conservation Goals for FPUC

	Residential								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2011	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2012	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2013	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2014	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2015	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2016	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2017	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2018	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
2019	0.2	N/A	0.2	0.1	N/A	0.1	0.5	N/A	0.5
Total	2.0	N/A	2.0	1.3	N/A	1.3	5.1	N/A	5.1

	Commercial/Industrial								
	Summer (MW)			Winter (MW)			Annual (GWh)		
Year	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal	E-TRC	Residential <2-Yr. Payback	Commission Approved Goal
2010	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2011	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2012	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2013	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2014	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2015	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2016	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2017	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2018	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
2019	0.2	N/A	0.2	0.1	N/A	0.1	0.8	N/A	0.8
Total	2.3	N/A	2.3	0.6	N/A	0.6	7.8	N/A	7.8

EXHIBIT 33

Commission-Approved Conservation Goals for OUC

	Residential			Commercial/Industrial		
Year	**Summer (MW)**	**Winter (MW)**	**Annual (GWh)**	**Summer (MW)**	**Winter (MW)**	**Annual (GWh)**
2010	0.50	0.20	1.80	0.70	0.70	1.80
2011	0.50	0.20	1.80	0.70	0.70	1.80
2012	0.50	0.20	1.80	0.70	0.70	1.80
2013	0.50	0.20	1.80	0.70	0.70	1.80
2014	0.50	0.20	1.80	0.70	0.70	1.80
2015	0.50	0.20	1.80	0.70	0.70	1.80
2016	0.50	0.20	1.80	0.70	0.70	1.80
2017	0.50	0.20	1.80	0.70	0.70	1.80
2018	0.50	0.20	1.80	0.70	0.70	1.80
2019	0.50	0.20	1.80	0.70	0.70	1.80
Total	5.00	2.00	18.00	7.00	7.00	18.00

Commission-Approved Conservation Goals for JEA

	Residential			Commercial/Industrial		
Year	**Summer (MW)**	**Winter (MW)**	**Annual (GWh)**	**Summer (MW)**	**Winter (MW)**	**Annual (GWh)**
2010	2.0	1.6	6.9	2.4	1.4	22.1
2011	2.0	1.6	6.9	2.4	1.4	22.1
2012	2.0	1.6	6.9	2.4	1.4	22.1
2013	2.0	1.6	6.9	2.4	1.4	22.1
2014	2.0	1.6	6.9	2.4	1.4	22.1
2015	2.0	1.6	6.9	2.4	1.4	22.1
2016	2.0	1.6	6.9	2.4	1.4	22.1
2017	2.0	1.6	6.9	2.4	1.4	22.1
2018	2.0	1.6	6.9	2.4	1.4	22.1
2019	2.0	1.6	6.9	2.4	1.4	22.1
Total	20.3	15.5	69.0	24.0	14.3	221.0

INCENTIVES

FPL, PEF, TECO, and Gulf took the position that incentives do not need to be established at this time, but rather should be evaluated and established, if necessary, through a separate proceeding. FPUC argued that utility-owned energy efficiency and renewable energy systems are supply-side issues that are not applicable to it as a non-generating utility. Both OUC and JEA argued that, because municipal utilities are not subject to rate-of-return regulation, the issue

EXHIBIT 33

of incentives is not relevant to them. According to FIPUG, the type and amount of incentives and their impact on rates should determine whether incentives are established. FIPUG provided no additional comments on the issue of incentives for utilities in its brief or direct testimony. FSC argued that incentives should be established but offered no supporting comments in its brief and did not file testimony. While NRDC/SACE argued that we should establish an incentive that will allow utilities an opportunity to share in the net benefits that cost-effective efficiency programs provide customers, it agreed with the FEECA utilities that the issue of financial incentives should be deferred to a subsequent proceeding, with the caveat that incentives are only appropriate if linked to the achievement of strong goals.

Section 366.82(3)(c), F.S., requires this Commission to consider whether incentives are needed to promote both customer-owned and utility-owned energy efficiency and demand-side renewable energy systems. In addition, Section 366.82(9), F.S., authorizes this Commission to allow an investor-owned electric utility an additional return on equity of up to 50 basis points for exceeding 20 percent of its annual load-growth through energy efficiency and conservation measures. The statute further states that this Commission shall establish such additional return on equity through a limited proceeding. This provision clearly allows us to award an incentive based upon a utility's performance and specifies the procedural mechanism for doing so.

None of the parties favored establishing incentives as part of this proceeding, with the exception of FSC, who filed no supporting comments and did not file testimony. In addition, staff witness Spellman recommended that if we believe that at some point incentives are necessary and appropriate, then the specific mechanism can be developed, in accordance with the FEECA statutes, in a separate proceeding, but not at this time. There is limited discussion in the record regarding the need for performance incentives or penalties, or analysis of how they should be structured. We agree with witness Spellman that a more appropriate course of action is to address the issue of incentives in a future proceeding when the necessary analysis has been done and all interested stakeholders can participate.

Section 366.82(8), F.S., states:

> The commission may authorize financial rewards for those utilities over which it has rate setting authority that exceed their goals and may authorize financial penalties for those utilities that fail to meet their goals, including, but not limited to, the sharing of generation, transmission, and distribution cost savings associated with conservation, energy efficiency, and demand-side renewable energy systems additions.

An IOU may choose to petition this Commission for an additional return on equity based upon its performance at any time the company believes such an incentive to be warranted. This Commission, on its own motion, may initiate a proceeding to penalize a utility for failing to meet its goals.

EXHIBIT 33

We believe establishing incentives during this proceeding would unnecessarily increase costs to ratepayers at a time when consumers are already facing financial challenges. Increasing rates in order to provide incentives to utilities is more appropriately addressed in a future proceeding after utilities have demonstrated and we have evaluated their performance.

With regard to customer-owned energy-efficiency and demand-side renewable energy systems, incentives are typically provided through each DSM program. Our staff evaluates each program proposed by a utility prior to making a recommendation as to whether it should be approved. Part of our staff's evaluation process includes an analysis of the cost-effectiveness tests performed by the utility, including the appropriateness of any incentives the utility proposes to offer to customers taking advantage of a particular program as well as the cost and benefits to all customers. Therefore, in our view, a mechanism for providing customers with incentives is already in place and we should continue to make decisions about customer incentives on an individual program basis. We find that it is not necessary to establish additional incentives for customers at this time as doing so would result in higher rates for all customers.

Conclusion

We find that incentives to promote energy efficiency and demand-side renewable energy systems should not be established at this time. We have met the requirements of Section 366.82(3)(c), F.S., by considering, during this proceeding, whether incentives are needed to promote energy efficiency and demand-side renewable energy systems. We will be in a better position to determine whether incentives are needed after we review the utilities' progress in reaching the goals established in these dockets. We may establish, through a limited proceeding, a financial reward or penalty for a rate-regulated utility based upon the utility's performance in accordance with Section 366.82(8) and (9), F.S. Utility customers are already eligible to receive incentives through existing DSM programs, and should not be harmed by considering additional incentives in a separate proceeding.

CONSIDERATION TO IMPACT ON RATES

The four generating IOUs agreed that the impact on rates should be considered in the goal setting process. FPUC, JEA, and OUC believed that we must continue to consider the impact on rates as a primary determinant in setting goals under FEECA.

FIPUG claimed that it is important that rate impact not be overlooked when conservation goals are set and programs are evaluated. FSC believed there are also other factors to be considered by us when setting conservation goals for the public utilities.

NRDC/SACE contended that consideration of the impact on rates does not belong in the goal setting process because of the 2008 FEECA amendments. Further, NRDC/SACE contended that customers are more interested in their monthly utility bills than in rates and would benefit most if energy efficiency programs are widely available.

EXHIBIT 33

As specified in Section 366.01, F.S., the regulation of public utilities is declared to be in the public interest. Chapter 366 is to be liberally construed for the protection of the public welfare. Several sections within the Chapter, specifically Sections 366.03, 366.041, and 366.05, F.S., refer to the powers of the Commission and setting rates that are fair, just, and reasonable. The 2008 legislative changes to FEECA did not change our responsibility to set such rates.

Under FEECA, we are charged with setting goals and approving plans related to the promotion of cost-effective demand-side renewable energy systems and the conservation of electric energy. The 2008 changes to FEECA specified that this Commission is to take into consideration the costs and benefits of ratepayers as a whole, in addition to the cost and benefits to customers participating in a measure. FEECA makes it clear that we must consider the economic impact to all, both participants and non-participants. This can only be done by ensuring rates to all are fair, just, and reasonable.

When setting conservation goals there are two basic components to a rate impact: Energy Conservation Cost Recovery and base rates. The costs to implement a DSM Program consist of administrative, equipment, and incentive payments to the participants. These costs are recovered by the utility through the Energy Conservation Cost Recovery clause. Cost recovery is reviewed on an annual basis when true-up numbers are confirmed. When approved, the utility allocates that expense to its general body of ratepayers and rates immediately go up for all ratepayers until that cost is recovered. When new DSM programs are implemented or incentive payments to participants are increased, the cost of implementing the program will directly lead to an increase in rates as these costs are recovered.

Base rates are established by this Commission in a rate case. Between rate cases, we monitor the company's Return on Equity (ROE) within a range of reasonable return, usually + or – 1 percent or 100 basis points. If the ROE of a utility exceeds the 100 basis point range, we can initiate a rate case to adjust rates downward. If the ROE falls below the 100 basis point range, the utility may file a petition with this Commission for a rate increase.

Energy saving DSM programs can have an impact on a utility's base rates. Utilities have a fixed cost of providing safe, reliable service. When revenues go down because fewer kWh were consumed, the utility may have to make up the difference by requesting an increase in rates in order to maintain a reasonable ROE.

The downturn of the present economy, coupled with soaring unemployment, make rates and the monthly utility bill ever more important to utility customers. When speaking about customers who participate in a utility program and receive an incentive, FPL witness Dean testified that utility customers generally will use less energy and even though rates are higher for everyone, program participants purchase less energy and thus are net beneficiaries of the program because their lower consumption lowers their total bill. Witness Dean further testified that these costs disproportionately fall upon those who are unable to participate in programs. Similarly, JEA witness Vento testified that customers such as renters who do not or cannot implement a DSM measure, and therefore have no corresponding benefit of reduced consumption to offset the rate increase, will be subject to increased utility bills.

EXHIBIT 33

Witness Pollock also recognized the importance of conservation in lowering utility bills as all consumers "face challenging economic times." Witness Pollock testified that the importance of pursuing conservation programs must be balanced against their cost and impact of that cost on ratepayers. Witness Pollock further testified that consideration of rate impacts in the evaluation of conservation programs helps to minimize both rates and costs for ratepayers. Finally, PEF witness Masiello testified that this Commission should also balance the needs of all stakeholders and minimize any adverse impacts to customers.

Conclusion

As provided in Section 366.04, F.S., we are given ". . . jurisdiction to regulate and supervise each public utility with respect to its rates and service." In past FEECA proceedings, the impact on rates has been a primary consideration of this Commission when establishing conservation goals and approving programs of the public utilities. The 2008 legislative changes to FEECA did not diminish the importance of rate impact when establishing goals for the utilities.

Those who do not or cannot participate in an incentive program will not see their monthly utility bill go down unless they directly decrease their consumption of electricity. If that is not possible, non-participants could actually see an increase in the monthly utility bill. Since participation in DSM programs is voluntary and this Commission is unable to control the amount of electricity each household consumes, we should ensure the lowest possible overall rates to meet the needs of all consumers.

Section 366.82(7), F.S., states that this Commission can modify plans and programs if they would have an undue impact on the costs passed on to customers. We believe that the Legislature intended for this Commission to be conscious of the impact on rates of any programs we evaluate to meet goals.

SEPARATE GOALS FOR DEMAND-SIDE RENEWABLE ENERGY SYSTEMS

All seven FEECA utilities took the position that we should not establish separate goals for demand-side renewable energy systems. FPL believed that the FEECA amendments, in particular, Section 366.82(3), F.S., ". . . require this Commission to consider renewable energy systems in the conservation goal setting process." FPL contended that this statutory requirement was met because ITRON and FPL evaluated these resources in this goal setting process. FPL, PEF, TECO, and Gulf contended that demand-side renewable resources were evaluated as a part of the conservation goals analysis and these measures were not found to be cost-effective; therefore, a separate goal is not necessary. Gulf asserted that demand-side renewables should be evaluated with the same methodology that is used to evaluate energy efficiency measures. PEF currently offers demand-side renewable programs and is developing new initiatives. FPL noted that it will consider demand-side renewable measures in the program development stage. Gulf is currently evaluating a pilot solar thermal water heating program.

EXHIBIT 33

FPUC, OUC, and JEA contended that, in setting goals, there should not be a bias toward any particular resource. Otherwise, FPUC, OUC, and JEA stated that goals could be set without appropriate consideration of costs and benefits to the participants and customers as a whole as required by Section 366.82(a) and (b), F.S. In addition, JEA and OUC argued that as municipal utilities, they cannot recover costs for demand-side renewable programs through the Energy Conservation Cost Recovery clause. JEA and OUC also noted that both companies offer demand-side renewable programs.

FSC contended that Section 366.82, F.S., requires this Commission to establish separate goals for demand-side renewables. FSC recommended that to meet this statutory obligation, we should require the FEECA IOUs to offer solar PV and solar water heating rebate programs to both residential and commercial customers. Further, FSC stated that we should authorize each IOU to recover up to 1 percent of annual retail sales revenue (based on 2008 revenues) to fund rebates for the next five years. FSC suggested a rebate of $2 per watt for PV systems with a capacity up to 50 kW. FSC contended that we should establish a performance-based incentive program for PV systems with a capacity greater than 50 kW. FSC recommended that incentives be reduced over the five years to account for market development and any resulting reduction in PV prices. FSC did not take a position with respect to OUC and JEA, which each currently have programs to encourage customers to install solar resources.

Section 366.82(2), F.S., was amended in 2008. The entire text of Section 366.82(2), F.S., follows, with the amendments underlined.

> The Commission shall adopt appropriate goals for increasing the efficiency of energy consumption and increasing the development of demand-side renewable energy systems, specifically including goals designed to increase the conservation of expensive resources, such as petroleum fuels, to reduce and control the growth rates of electric consumption, to reduce the growth rates of weather-sensitive peak demand, and to encourage development of demand-side renewable energy resources. The Commission may allow efficiency investments across generation, transmission, and distribution as well as efficiencies within the user base.

Because of the revisions to the statute, we requested that the utilities address demand-side renewables in their cost-effectiveness analyses. As previously discussed, the first step in the utilities' cost-effectiveness analysis for demand-side renewables was the Technical Potential Study performed by ITRON. Witness Rufo testified that ITRON estimated the technical potential for one residential rooftop PV system, one commercial rooftop PV system, one commercial ground-mounted PV system, and solar domestic hot water heaters. Witness Rufo testified that ITRON did not estimate the achievable potential for PV systems "due to the fact that PV measures did not pass the cost-effectiveness criteria established by the FEECA utilities for purposes of this study, i.e., TRC, RIM, and/or the Participants Test." Witness Rufo further testified that incentive levels were not calculated for solar measures (for JEA and OUC) because these measures did not pass RIM or TRC without incentives.

EXHIBIT 33

FPL, TECO, Gulf, FPUC, OUC, and JEA did not include savings from solar measures toward their goals because no solar measures were found to be cost-effective. However, PEF, OUC, and JEA have existing solar programs. PEF currently offers two solar programs. PEF's Solar Water Heater with EnergyWise program combines a demand-response program with a rebate for solar water heaters. PEF's SolarWise for Schools program allows interested customers to donate their monthly credits from participating in a load control program to support the installation of PV systems in schools. Witness Masiello testified that PEF has also developed new solar initiatives that will possibly be included in PEF's DSM program filing. Witness Masiello further testified that a separate goal for demand-side renewables is not needed because PEF included these resources in its goals.

We believe that the amendments to Section 366.82(2), F.S., clearly require us to set goals to increase the development of demand-side renewable energy systems. As indicated above, the Section states that the "Commission shall adopt appropriate goals for increasing the efficiency of energy consumption and <u>increasing the development of demand-side renewable energy systems</u>. . . ." (Emphasis added) We believe that in making these amendments to Section 366.82(2), F.S., the Legislature has placed additional emphasis on encouraging renewable energy systems. FSC and NRDC/SACE argued that the amendments to 366.82(2), F.S., require goals for these resources. Witness Spellman testified that "the legislation clearly requires the Commission to focus some specific attention on demand-side renewable energy resources as part of its goal setting process."

As discussed above, none of the demand-side renewable resources were found to be cost-effective under any test in the utilities' analyses. In the past, we have set goals equal to zero in cases where no DSM programs were found to be cost-effective, for example, for JEA and OUC. Therefore, based purely on the cost-effectiveness test results, we have the option to set goals equal to zero for demand-side renewable resources. However, we note that by amending FEECA, the Legislature placed added emphasis on demand-side renewable resources. The Legislature has also recently placed emphasis on these resources by funding solar rebates through the Florida Energy and Climate Commission.

In its brief, FSC recommended that we should require the four largest IOUs to spend a specified annual amount on solar PV and solar thermal water heating programs. NRDC/SACE agreed with FSC's position. FSC suggested that solar water heaters and PV systems under 50 kW in capacity should receive an up-front rebate, while financial support to larger PV systems up to 2 MW should be performance-based. FSC recommended a rebate of $2 per watt for residential and commercial PV systems up to 50 kW in capacity. FSC suggested that annual support should continue for five years, and decrease every year to account for market development and reductions in technology costs. FSC took no position on requiring programs for FPUC, JEA, and OUC.

Witness Spellman acknowledged that none of the solar PV and solar thermal technologies included in the ITRON study and utility cost-effectiveness analyses were found to be cost-effective. However, witness Spellman testified that research and development programs on these technologies will provide benefits "because of their potential for more efficient energy

EXHIBIT 33

production, the environmental benefits, and the conservation of non-renewable petroleum fuels." Witness Spellman believed that support for these technologies could result in lower costs over time. He also recommended that OUC and JEA be required to offer demand-side renewable programs, but recognized that we do not have ratemaking authority over these utilities. In order to protect the IOUs' ratepayers, utilities would be allowed to recover a specified amount of expenses through the Energy Conservation Cost Recovery clause. Witness Spellman did not advocate specific demand or energy savings goals for demand-side renewables. Witness Spellman suggested that these programs should focus on solar PV and solar water heating technologies, and did not believe that the demand and energy savings resulting from these programs should be counted toward a utility's conservation goals.

Witness Spellman recommended that expenditures on these solar programs should be capped at 10 percent of each IOU's five-year average of Energy Conservation Cost Recovery expenses for 2004 through 2008. These dollar amounts should be constant over the five year period until goals are reset. Witness Spellman recommended that the funds be used for up-front rebates on solar PV and solar water heating technologies for both residential and commercial customers.

Conclusion

We find that the amendments to Section 366.82(2), F.S., require us to establish goals for demand-side renewable energy systems. None of these resources were found to be cost-effective in the utilities' analyses. However, we can meet the intent of the Legislature to place added emphasis on these resources, while protecting ratepayers from undue rate increases by requiring the IOUs to offer renewable programs subject to an expenditure cap. We direct the IOUs to file pilot programs focusing on encouraging solar water heating and solar PV technologies in the DSM program approval proceeding. Expenditures allowed for recovery shall be limited to 10 percent of the average annual recovery through the Energy Conservation Cost Recovery clause in the previous five years as shown in the table below. Utilities are encouraged to design programs that take advantage of unique cost-saving opportunities, such as combining measures in a single program, or providing interested customers with the option to provide voluntary support.

EXHIBIT 33

Utility	**Commission Approved Annual Expense**
FPL	$15,536,870
Gulf	$900,338
PEF	$6,467,592
TECO	$1,531,018
FPUC	$47,233
Total	$24,483,051

ADDITIONAL GOALS FOR EFFICIENCY IMPROVEMENTS IN GENERATION, TRANSMISSION, AND DISTRIBUTION

We agree with FPL, PEF, TECO, and Gulf that goals need not be established for generation, transmission, and distribution in this proceeding. Gulf expanded the discussion arguing that guidelines have not been developed that would provide a methodical approach to identifying, quantifying, and proposing goals for supply-side conservation and energy efficiency measures. OUC and JEA both offered only that efficiency improvements in generation, transmission, and distribution are supply-side issues which are more appropriately addressed in the utilities' resource planning processes, thereby seeming to imply that such goal-setting has no place in a conservation goal-setting proceeding. FPUC, a non-generating IOU, took no position.

FSC's position suggested that the IOUs should conduct technical potential studies of efficiencies in generation, transmission, and distribution. Afterwards, this Commission should establish efficiency improvement goals in a separate proceeding. FSC took no position on the issue as it pertains to the two municipal utilities.

NRDC/SACE went a step further, arguing that increasing generating plant efficiency and reducing transmission and distribution losses benefit customers and the environment. They recommended that we set a date certain by which the companies will perform technical economic and potential studies for efficiency improvements at their existing facilities. However, they did not specifically suggest that we should set goals in these areas.

State legislative direction provides, "[t]he commission may allow efficiency investments across generation, transmission, and distribution . . . ." (Section 366.82(2), F.S.) Section 366.82(3), is more affirmative stating: "[i]n developing the goals, the commission <u>shall</u> evaluate the full technical potential of all available demand-side and supply-side conservation and efficiency measures . . . ." (Emphasis added) The FEECA utilities performed no technical

EXHIBIT 33

potential study of supply-side measures for this docket. The potential for supply-side improvements is an inherent element of the annual Ten-Year Site Plan submitted by each FEECA utility. Supply-side efficiency and conservation is also analyzed in every need determination for new sources of generation. In addition, efficiency improvements in generation, transmission, and distribution tend to reduce the potential savings available via demand-side management programs.

We believe that the utilities' motivation to deliver electric service to their customers in the most economically efficient means possible makes efficiency improvements in generation, transmission, and distribution a naturally occurring result of their operations. In the case of the five IOUs, such efficiency is inextricably tied to their efforts to make a profit. The two municipal utilities, while not driven by a profit motive per se, must still provide electrical service as efficiently and inexpensively as possible. Rule 25-17.001, F.A.C., supports this proposition because the rule states: ". . . general goals and methods for increasing the overall efficiency of the bulk electric power system of Florida are broadly stated since these methods are an ongoing part of the practice of every well-managed electric utility's programs and shall be continued."

Despite NRDC/SACE's observation that customers and the environment will benefit from facility efficiencies, they offer no evidence that utilities are not routinely seeking those efficiencies. FSC, in arguing that we should set goals in this area, likewise offers no support to suggest such action is warranted.

Conclusion

Efficiency improvements for generation, transmission, and distribution are continually reviewed through the utilities' planning processes in an attempt to reduce the cost of providing electrical service to their customers. With no evidence to suggest efficiency improvements in generation, transmission, and distribution are not occurring, we find that goals in these areas will not be set as part of this proceeding.

SEPARATE GOALS FOR ENERGY AUDIT PROGRAMS

The FEECA utilities, FIPUG, and FSC all agreed that separate goals for energy audits are not necessary. NRDC/SACE asserted that separate goals for residential and commercial/industrial customer participation in utility energy audit programs should be established by this Commission.

Section 366.82(11), F.S., mandates that we require utilities to offer energy audits and to report the actual results as well as the difference, if any, between the actual and projected results. The statute is implemented by Rule 25-17.003, F.A.C., which specifies the minimum requirements for performing energy audits as well as the types of audits that utilities offer to customers, and also details the requirements for record keeping regarding the customer's energy use prior to and following the audit. The utility can thereby ascertain whether the customer actually reduced his energy usage subsequent to the audit.

EXHIBIT 33

Witness Steinhurst testified that utility energy audit programs by themselves do not provide any direct demand reduction and energy savings. In order to conserve energy, the customer must implement some form of an energy saving measure. Witness Masiello testified that most if not all utilities require that an audit be performed before a customer can participate in DSM programs administered by the utility. This requirement means that having separate goals for audits would be duplicative, because the energy savings and demand reduction following the audits would be attributed to the individual measures that were recommended and implemented as a result of the audit, and therefore would already be counted towards savings goals. Witness Spellman testified that savings associated with energy saving measures installed by customers following a utility audit should be counted towards the savings of the particular program through which they obtained the measure and not the energy audit service. Witness Bryant testified that this is the method typically used to account for these savings.

Conclusion

The energy conservation achieved through customer education is included in the overall conservation goals and should be credited to the specific program into which the customer enrolls. In order to avoid duplication of demand reduction and energy savings, we find that no separate goals for participation in utility energy audit programs need be established.

EFFICIENT USE OF COGENERATION

FPL, PEF, Gulf, and TECO argued that no further action is needed concerning cogeneration due to the 2008 Legislative changes that were made to the FEECA statutes. Further, the Commission has addressed cogeneration in Chapter 25-17, F.A.C. FPUC, OUC, and JEA took no position on the issue of cogeneration. NRDC/SACE and FIPUG contended that there are barriers to the cogeneration process due to the unfair compensation rates afforded cogenerators by rule. Other parties were silent on the issue.

The Legislature recognizes the benefits of cogeneration in Section 366.051, F.S., where utility companies are required to purchase all electricity offered for sale by the cogenerator as outlined in Rule 25-17.082, F.A.C. We periodically establish rates for cogeneration equal to the utilities full avoided cost as guidelines for the purchase of energy. Rule 25-17.015, F.A.C., also allows each utility to recover its costs for energy conservation through cost recovery.

The FEECA utilities agree that this Commission need not take action regarding cogeneration in this goal setting proceeding. The 2008 Florida Legislature removed the term “cogeneration” from the FEECA statute, Section 366.82(2), F.S., replacing it with “demand side renewable energy systems.” The utilities contend that cogeneration is not to be considered part of the FEECA ten-year goal setting process. The utilities also contend that cogeneration systems must be evaluated on a site-specific, case-by-case basis, which does not lend itself to the FEECA conservation goals-setting process. The FEECA proceedings were commenced to set overall conservation goals for the FEECA utilities, and not designed as proceedings to focus on promoting cogeneration.

EXHIBIT 33

FIPUG believes there are barriers to the cogeneration process established by Commission Rule, which prevent industrial customers from full compensation for electricity generated by their cogeneration processes. FIPUG also believes it is a disadvantage if customers operate facilities at two or more different locations and cannot construct their own transmission lines to those locations. FIPUG contended cogenerator repayment at the utility's average fuel cost is much lower than the utility rate and that the reimbursement rate does not encourage cogeneration. The Legislature addressed the transmission and compensation issue of cogenerators in Section 366.051, F.S. This Commission has established "Conservation and Self-service Wheeling Cost" in Rule 25-17.008 F.A.C., "Energy Conservation Cost Recovery" in Rule 25-17.015 F.A.C., and "The Utility's Obligation to Purchase" in Rule 25-17.082 F.A.C.

Conclusion

The Florida Legislature recognizes cogeneration in Section 366.051, F.S., and in 2008 removed the term "cogeneration" from the FEECA statutes, Section 366.82, F.S. Cogeneration is encouraged by this Commission as a conservation effort, as evidenced by Rules 25-17.080 – 25-17.310, F.A.C. Therefore, the goals set do not need to address issues relating to cogeneration in this proceeding.

COMMISSION AUTHORITY OVER OUC AND JEA

Under FEECA, we have jurisdiction over OUC and JEA's conservation goals and plans. Section 366.81, F.S. (2008), states in pertinent part:

> The Legislature . . . finds that the Florida Public Service Commission is the appropriate agency to adopt goals and approve plans . . . . The Legislature directs the commission to develop and adopt overall goals and authorizes the commission to require each utility to develop plans and implement programs for increasing energy efficiency and conservation and demand-side renewable energy systems within its service area, subject to the approval of the commission. . . . The Legislature further finds and declares that ss. 366.80-366.85 and 403.519 [FEECA] are to be liberally construed . . . .

(Emphasis added)

For purposes of the FEECA statutes, Section 366.82(1)(a), F.S. (2008), defines a utility as being:

> "Utility" means any person or entity of whatever form which provides electricity or natural gas at retail to the public, specifically including municipalities or instrumentalities thereof . . . specifically excluding any municipality or instrumentality thereof, . . . providing electricity at retail to the public whose annual sales as of July 1, 1993, to end-use customers is less than 2,000 gigawatt hours.

EXHIBIT 33

(Emphasis added)[12] Section 366.82(2), F.S., provides "[t]he commission shall adopt appropriate goals for increasing the efficiency of energy consumption . . . ."

Our statutory jurisdiction to set goals under FEECA is clear. The Legislature has required that we develop, establish, and adopt appropriate conservation goals for all utilities under the jurisdiction of FEECA. According to Section 366.82(1)(a), F.S., both OUC and JEA, as municipal utilities with sales exceeding 2,000 gigawatt hours, fall under our FEECA jurisdiction. Therefore, we must adopt appropriate conservation goals for OUC and JEA pursuant to Section 366.82(2) and (3), F.S.

Furthermore, this Commission has previously addressed whether it is prohibited under FEECA from considering conservation programs, and by correlation, goals that would increase rates for municipal and cooperative electric utilities. In Order No. PSC-93-1305-FOF-EG, issued September 8, 1993, this Commission considered that question and determined that FEECA contains no such prohibition, but this Commission would, as a matter of policy, attempt to set conservation goals that would not result in rate increases for municipal utilities.[13]

We disagree with OUC and JEA's assertion that, because we lack ratemaking authority over these utilities, we are prohibited from establishing goals that might put upward pressure on rates. Ratemaking for public utilities is governed under Sections 366.06 and 366.07, F.S. Pursuant to Section 366.02(2), F.S., municipal and cooperative electric utilities are specifically excluded from the definition of public utility, and thus, we do not have ratemaking jurisdiction over these utilities. We believe that adopting conservation goals, or approving conservation programs, pursuant to FEECA is not ratemaking within the meaning of Chapter 366, F.S. We believe that the setting of conservation goals under FEECA for municipal electric utilities, therefore, does not infringe upon the municipal electric utilities' governing boards' authority to set rates.

At this time, it would be difficult to ascertain what affect, if any, the approved conservation goals would actually have upon OUC and JEA's rates. Given the multitude of variables which also place upward and downward pressure on rates, we believe that OUC and JEA's assertions that conservation goals alone would add upward pressure on rates is speculative at best. In the instant case, we believe that the proposed conservation goals for OUC and JEA should not apply upward pressure on the rates of OUC and JEA's customers, especially

---

[12] The language of Section 366.82(1)(a), F.S., was amended in 1996 by the Legislature to exclude municipal electrics and Rural Cooperatives with annual sales less than 2,000 gigawatt hours. See s. 81, Ch. 96-321, Laws of Florida.

[13] See Order No. PSC-93-1305-FOF-EG, issued September 8, 1993, in Docket Nos. 930553-EG, 930554-EG, 930555-EG, 930556-EG, 930557-EG, 930558-EG, 930559-EG, 930560-EG, 930561-EG, 930562-EG, 930563-EG, 930564-EG, In re: Adoption of Numeric Conservation Goals and Consideration of National Energy Policy Act Standards (Section 111) by City of Gainesville, City of Jacksonville Electric Authority, Kissimmee Electric Authority, City of Lakeland, Ocala Electric Authority, Orlando Utilities Commission, City of Tallahassee, Clay Electric Cooperative, Lee County Electric Cooperative, Sumter Electric Cooperative, Talquin Electric Cooperative, Withlacoochee River Electric Cooperative (hereinafter, 1993 FEECA Municipal DSM Goals Proceedings), at 5.

EXHIBIT 33

considering that the approved goals are based upon the conservation programs that OUC and JEA are currently implementing.

With regard to Order No. PSC-95-0461-FOF-EG, issued April 10, 1995, cited by OUC and JEA, the Commission stated:

> We believe that as a guiding principle, the RIM test is the appropriate test to rely upon at this time. The RIM test ensures that goals set using this criteria would result in rates lower than they otherwise would be. All the municipal and cooperative utilities, with the exception of Tallahassee, stipulated to cost-effective demand and energy savings under the RIM test. However, Tallahassee's stipulated goals are higher than that cost-effective under RIM. . . . The Commission does not have rate setting authority over municipal and cooperative utilities. Therefore, we find it suitable to allow the governing bodies of these utilities the latitude to stipulate to the goals they deem appropriate regardless of cost-effectiveness.

Id. at 4-5 (Emphasis added) In 1995, this Commission recognized the RIM test as a "guiding principle" for setting goals for municipal and cooperative electric utilities, but the 2008 Legislative changes to FEECA have superseded this "guiding principle" consideration. We are now required to establish goals for all FEECA utilities pursuant to the requirements of Section 366.82(3), F.S., as amended and previously discussed.

Moreover, the order cited by OUC and JEA is distinguishable from the instant case because this Commission did not "set goals" for OUC and JEA but merely approved stipulated goals for these two utilities. The stipulated goals resulted from a settlement between OUC and JEA and the Florida Department of Community Affairs (DCA).[14] Here, the goals being proposed for these utilities are not stipulated goals but are proposed goals following a full evidentiary hearing.

Conclusion

We have the authority to adopt conservation goals for all electric utilities under the jurisdiction of FEECA. OUC and JEA come within the meaning of utility as defined by FEECA. Developing, establishing, and adopting conservation goals is a regulatory activity exclusively granted to this Commission by FEECA and is not ratemaking within the meaning of Chapter 366, F.S. Therefore, we find that we have the authority to develop, establish, and adopt conservation goals for OUC and JEA as required by Section 366.82, F.S.

---

[14] See Order No. PSC-95-0461-FOF-EG, issued April 10, 1995, In re: 1993 FEECA Municipal DSM Goals Proceedings. The DCA intervened in the 1993 DSM Goals Proceedings on behalf of the Governor of Florida. All the municipal and cooperative electric utilities who were parties to the 1993 DSM Goals Proceedings reached joint stipulations with DCA regarding conservation goals.

EXHIBIT 33

Based on the foregoing, it is

ORDERED by the Florida Public Service Commission that Florida Power & Light Company's residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Florida Power & Light Company's commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Progress Energy Florida, Inc.'s residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Progress Energy Florida, Inc.'s commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Gulf Power Company's residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Gulf Power Company's commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Tampa Electric Company's residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Tampa Electric Company's commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Florida Public Utilities Company's residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that Florida Public Utilities Company's commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that OUC's residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

EXHIBIT 33

ORDERED that OUC's commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that JEA's residential winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that JEA's commercial/industrial winter demand, summer demand, and annual energy conservation goals for the period 2010-2019 are hereby approved as set forth herein. It is further

ORDERED that within 90 days of the issuance of this Order, each utility shall file a demand-side management plan designed to meet the utility's approved goals. It is further

ORDERED that these dockets shall be closed if no appeal is filed within the time period permitted for filing an appeal of this Order.

By ORDER of the Florida Public Service Commission this 30th day of December, 2009.

Ann Cole
ANN COLE
Commission Clerk

(S E A L)

KEF

EXHIBIT 33

NOTICE OF FURTHER PROCEEDINGS OR JUDICIAL REVIEW

The Florida Public Service Commission is required by Section 120.569(1), Florida Statutes, to notify parties of any administrative hearing or judicial review of Commission orders that is available under Sections 120.57 or 120.68, Florida Statutes, as well as the procedures and time limits that apply. This notice should not be construed to mean all requests for an administrative hearing or judicial review will be granted or result in the relief sought.

Any party adversely affected by the Commission's final action in this matter may request: 1) reconsideration of the decision by filing a motion for reconsideration with the Office of Commission Clerk, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, within fifteen (15) days of the issuance of this order in the form prescribed by Rule 25-22.060, Florida Administrative Code; or 2) judicial review by the Florida Supreme Court in the case of an electric, gas or telephone utility or the First District Court of Appeal in the case of a water and/or wastewater utility by filing a notice of appeal with the Office of Commission Clerk, and filing a copy of the notice of appeal and the filing fee with the appropriate court. This filing must be completed within thirty (30) days after the issuance of this order, pursuant to Rule 9.110, Florida Rules of Appellate Procedure. The notice of appeal must be in the form specified in Rule 9.900(a), Florida Rules of Appellate Procedure.