November 10, 2008

MEMORANDUM TO: William Burton, Branch Chief
Environmental Projects Branch 1
Division of Site and Environmental Reviews
Office of New Reactors

FROM: H. Brent Clayton, Branch Chief ***/RA/***
Environmental Technical Support Branch
Division of Site and Environmental Reviews
Office of New Reactors

SUBJECT: TRIP REPORT – JULY 28-30, 2008, READINESS ASSESSMENT VISIT FOR A COMBINED LICENSE APPLICATION AT THE TURKEY POINT NUCLEAR PLANT, UNITS 6 AND 7

This report summarizes the staff's July 28-30, 2008, pre-application/readiness assessment (C-1) visit related to the environmental portion of a future combined license (COL) application for the Turkey Point Nuclear Plant Site. Florida Power and Light Company (FPL) has indicated its intent to submit a COL application for this site. FPL selected the AP1000 design for the proposed new nuclear station.

The purpose of this visit was to acquaint the review staff with the nuclear station site, focusing on potential locations for siting Units 6 and 7 and its associated facilities and those areas likely to be impacted by its proposed construction and operation. The staff was also assessing the applicant's readiness and its progress toward submitting a COL application. The visit took place at the site located in Homestead, Florida, approximately 25 miles south of Miami, Florida. The nearest city limits are Florida City, approximately 8 miles to the west and Homestead, approximately 9 miles northwest of the site. Enclosure 1 provides a list of attendees. Enclosure 2 is the agenda used during the visit. Enclosure 3 is a summary of the more significant issues that were discussed during the visit.

The staff participated in general sites tours and discipline-specific tours to understand the site-specific issues and concerns related with this proposed action. General site tours covered the proposed location of Units 6 and 7 containment/power block and cooling tower, location of the existing meteorological towers, and Units 1 through 4 cooling canal systems. Additionally, the aquatic and terrestrial ecology staffs toured the canal system, the proposed transmission corridors, onsite wetlands, and the adjacent Biscayne National Park.

CONTACT: Tomeka Terry, NRO/DSER/RAP1
301-415-1488

In summary, the staff did not identify any issues that would indicate that FPL would not be ready by the planned date of application. However, this was not a formal or comprehensive staff review and additional issues could be identified during the staff's formal review after the application is submitted. The staff is planning a C-3 Records and Products Assessment during the week of December 15-19, 2008.

Project No. 763

Enclosures: As stated

cc: Bill Maher
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408

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DISTRIBUTION:

SCoffin	MMasnik	TTerry
BSandusky, PNNL		EHickey,PNNL

ADAMS ACCESSION NUMBER: ML082880307 *See previous concurrences

OFFICE	PM:DSER:RAP1:NRO	LA:DSER:RAP1:NRO	PM:DSER:RENV:NRO	BC:DSER:RENV:NRO
NAME	*TTerry ***/tlt/***	*GHawkins /***gdh/***	MMasnik	HBClayton
DATE	10/20/08	10/17/08	11/10/08	11/10/08

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List of Attendees – Turkey Point C-1 Readiness Assessment Visit
Location: Turkey Point Nuclear Plant Site, Homestead, Florida
July 28-30 2008

Name	Affiliation
Michael T. Masnik	U.S. Nuclear Regulatory Commission (NRC)
Tomeka Terry	NRC
Laura Quinn	NRC
Jessie Muir	NRC
Barry Zalcman	NRC
Peyton Doub	NRC
Harriet Nash	NRC
Hosung Ahn	NRC
Alicia Williamson	NRC
William Sandusky	Pacific Northwest National Laboratory (PNNL)
Kathy Pryor	PNNL
Michael Smith	PNNL
Michael Sackschewsky	PNNL
Lance Vail	PNNL
Darby Stapp	PNNL
Vince Vermeul	PNNL
Julia Flaherty	PNNL
Michelle Niemeyer	PNNL
Jeff Ward	PNNL
Van Ramsdell	PNNL
Rick Orthen	Florida Power and Light Company (FPL)
Bill Maher	FPL
George Madden	FPL
Paul Jacobs	FPL
Thomas Cognetti	FPL
Mike Turbak	FPL
Duke Wheeler	FPL
Matt Raffenberg	FPL
Ray Burski	FPL
Steve Franzone	FPL
Jim Lindsay	FPL
Barbara Linkiewicz	FPL
David Weda	FPL
Steve Routh	Bechtel Power Corporation (Bechtel)
Dena (Belschner) Volovar	Bechtel
Masrur Khan	Bechtel
Y.J. Lin	Bechtel
Matthew White	Bechtel
Ken Jha	Bechtel
Dave Wagnez	Bechtel
Randy Kies	Bechtel
Yifan Zheng	Bechtel

ENCLOSURE 1

Name	Affiliation
Mustafa Samad	Bechtel
Jerry McLane	Bechtel
Randy Kloberdant	Tetra Tech (TT)
Kathy Roxlan	TT
Katie Conrad	TT
Chuck Conrad	TT
Kristin Sutherlin	TT
Robin Henderson	TT
Shauna Stotter-Hardy	TT
Philip Young	TT
Kara Wimble	TT
Jeff Zimmerly	TT
David Watkins	TT
Larry Bryan	TT
Philip Moore	TT
Daniel Theisen	TT
Kennard Kosy	Golden Associates

Turkey Point C-1 Environmental Review Meeting Agenda
July 28-30, 2008

Monday, July 28, 2008

1900 hrs Meet in the lobby of the Ramada Inn Florida City, FL for a brief meeting

Tuesday, July 29, 2008

0800 – 0830 hrs Welcome and introductory remarks (Keys Gate Golf and Country Club Homestead, FL).

- Opening Remarks
- Introductions

0830 – 1200 hrs Presentations

- FPL Organization
- Alternative Sites and Selection Process
- COLA Monitoring Programs Status
- Federal, State and Local Agency Interactions
- Transmission Lines
- Cooling System

1200 - 1300 hrs Lunch

- ES&H Orientation

1300 – 1530 hrs Site Tour

1530 – 1630 hrs Return and begin breakout sessions

1630 – 1700 hrs NRC closed-door session

1700 - 1745 hrs Briefing to FPL regarding visit progress and preliminary findings

Wednesday, July 30, 2008

0800 – 1200 hrs Continue breakout sessions and specialized tours

- Aquatic and Terrestrial Ecology
- Hydrology, Water Use
- Meteorology, Air Quality, Accident Analysis
- Radiation Protection, Radioactive Systems, Radioactive Waste
- Alternative Sites
- Socioeconomics, Environmental Justice
- Land Use, Transmission
- Need for Power, Cost-Benefit, Non-Radioactive Waste
- Cultural Resources

ENCLOSURE 2

1200 - 1300 hrs Lunch

1300 - 1400 hrs Breakout Sessions and Specialized Tours (continued)

1400 - 1500 hrs NRC closed-door session

1500 -1530 hrs NRC closeout with FPL

1530 hrs Adjourn

Additional Information Summarizing the Turkey Point Nuclear Plant
Readiness Assessment Visit (C-1)
Location: Turkey Point Nuclear Plant Site, Homestead, Florida
July 28-30, 2008

Overall, Florida Power and Light Company (FPL) appears to be on track for gathering most, if not all, of the needed data that will allow it to submit an environmental report (ER) in support of a combined license application (COLA). During the site visit, several issues were identified that warrant attention by FPL. The following sections, listed by discipline, describe the results of the U.S. Nuclear Regulatory Commission (NRC) staff visit.

Transmission Lines

FPL is the transmission system operator for all of the transmission lines and substations. The Clearsky switchyard is located in the northwest portion of the proposed site, and Units 6 and 7 will feed two new 500 kV lines to the Levee Substation that will be routed along an existing 230 kV transmission corridor. A single 230 kV line will also feed the Levee substation and then be extended to the Pennsuco Substation. The actual routing from Levee to Pennsuco has yet to be determined. The new transmission lines would be located within existing rights-of-way and easements that FPL holds. Some of the right-of-way would have to be widened, or even initially cleared, to allow installation of the new transmission lines. One new line would head west from the site, turn north once it is west of Florida City/Homestead and connect to a substation northwest of Miami. FPL owns rights-of-way for the entire length but part of the route is now within the Everglades National Park. FPL is negotiating a land swap with the Everglades National Park in order to run transmission lines along an existing canal on the Western border of the park. NRC staff was informed by the FPL representative that the National Park Service (NPS) is in agreement with the proposed land swap. Moving the park boundary to accommodate the land swap requires Congressional approval. These transmission lines will be routed through some heavily urban areas and the proposed eastern corridor appears to be particularly congested.

Another set of 230 kV lines will follow the current route of existing 230 kV lines that head generally northwest from the site. This route would not need to be widened to support the new lines. A portion of this right-of-way could be used for the water intake pipeline if the reclaimed water option is used for cooling tower makeup.

Land Use

The soil overlay bedrock within the construction area is very poor quality muck. FPL plans to remove the muck above bedrock and replace it with high quality fill dirt. At this point the disposal location for the muck that is removed from the site has not been identified and there is a question as to whether a permit would be required. One proposal is to mound the excavated muck onto the berms in the cooling canal system. If this option is chosen, there is a potential for erosion into the canals and it affecting critical American crocodile *(crocodylus acutus)* habitat. It is also unclear where the fill material would come from. A significant amount would have to be secured from either a local source or potentially a location on the west side of the State. Issues related to land use will be covered in the Site Certification Application (SCA) to the Florida Department of Environmental Protection (FDEP).

Meteorology and Air Quality

The primary (60 m) meteorological tower for Turkey Point, Units 3 and 4 is located about 7 miles south of the plant and about one half mile south of the Turkey Point cooling canals. FPL intends to use this tower (tower data for the application for Units 6 and 7 has been reviewed several times by NRC staff). The tower has the usual meteorological instrumentation, wind speed and direction at 10 and 60 m, temperature at 10 and 60 m, humidity at 10 m, and precipitation near ground level. The statement was made that stability class is determined by subtraction of temperatures obtained at the 10 and 60 m levels rather than by a separate delta- temperature system. The system also calculates sigma theta, a representation of wind horizontal turbulence. Data from this tower are used for climatological purposes and for quarterly and annual reports. Near the 60 m tower there is also a 10 m tower that has a more rugged wind sensor for use during high winds (tropical storms and hurricanes).

There is a separate10 m meteorological tower located about one half mile south of Units 3 and 4 (very near the proposed location of Units 6 and 7) that provides wind speed and direction to the control rooms of the existing nuclear units for use during emergencies (Reg Guide 1.97). This system will also provide wind speed and direction to the Units 6 and 7 control rooms. This system is the primary emergency response system and is a backup to the 60 m wind systems for climatological and reporting applications. The 10 m wind instruments at the 60 m tower provide backup wind data for emergency response applications. According to FPL, it is likely that the 10 m tower near the plant will be moved prior to construction of Units 6 and 7.

Hydrology

FPL identified two potential sources of cooling water system makeup for Units 6 and 7. The two alternatives are municipal wastewater or reclaimed water from south Dade County or water withdrawn from radial infiltration wells located along the eastern edge of the site. Cooling system blow-down would be to a deep confined aquifer located about 3000 feet below the surface.

The NRC does have some previous experience with subsurface radial infiltration wells at the Grand Gulf Nuclear Plant Site. The use of infiltration wells and or reclaimed water and deep well injection of the blow-down would effectively eliminate impacts associated with the more traditional surface water intake and discharge system.

Deep well injection for the disposal of the station blow-down has been used in the past in Florida for the disposal of large volumes of water. NRC regulatory guidance for the disposal of liquid effluents needs to be reviewed to understand the regulatory requirements applicable to deep well injection of cooling system blow-down.

Terrestrial Ecology

Most of the land where the new plants will be constructed is covered with sparse, somewhat weedy, wetland vegetation. The entire area appears “wet” and much of the site may qualify as jurisdictional wetlands. The only portion of the site that likely would not be considered wetlands are the berms along the edge and the access roads. At the time of the staff’s visit FPL had completed the identification of wetlands on-site and was in the process of flagging the transmission line wetlands. FPL was following US Army Corps of Engineers (USACE) and FDEP procedures for wetlands delineation.

As part of the state approval process, FPL will need to coordinate with the USACE and FDEP on wetland issues and permits before the COLA is submitted.

FPL is also proposing to clear a mangrove-dominated area adjacent to the existing units for use as laydown and construction support. There may also be a new construction access road built, partially following the transmission corridor to the west of the site. Additional construction support areas may be needed as well. None of these areas has been well characterized to date.

American crocodiles are the most apparent federal threatened or endangered species on site. The southern portion of the site has been designated "critical habitat" for the American crocodile. Consultation with the U.S. Fish and Wildlife Service will be required. American crocodiles are not known to regularly occur within the main construction site, support areas, or the transmission lines, but there are numerous nests within the cooling canal system, including some directly across the return canal on the south side of the construction site. Numerous crocodiles and a wide variety of bird life were observed during a tour of the site. The staff also observed microchip implantation in juvenile crocodile in FPL's environmental lab, crocodile nesting sites within cooling canal and crocodile habitat mitigation sites, including areas designed to encourage nesting. Other protected species in the area include the eastern indigo snake, wood stork, and roseate tern.

FPL has performed pedestrian surveys for wildlife at the construction site, and construction staging areas. The specific focus of these surveys was wetlands and terrestrial ecology species and was purely incidental for other species. The wildlife surveys occurred during August and November 2007 and June 2008. It was noted that this method would not be likely to detect indigo snakes if they were present. FPL did do a wetland functional assessment using the FDEP "WATER" method and found very low functionality. They identified no State or Federally listed plant species on the actual site or in the laydown area.

Aquatic Ecology

The site is dominated by the existing cooling system for Units 1 through 4 is a massive canal system that is 5 miles long and between 0.5 and 1.5 miles wide. The cooling canal system is not hydrologically connected to the Atlantic Ocean but does receive shallow groundwater recharge. A portion of the canal system, as well as a portion of the proposed location for the new reactors is critical habitat for the American crocodile. Over the past few decades, the cooling canal has become hypersaline (>50 ppth). As a result, only salt-tolerant species currently exist in the system (e.g. killifish, *(family cyprinidontidae)*, sheepshead minnow *(cyprinodon variegates)*. The water crossings for the proposed transmission line corridors appear to be in areas where construction will not adversely affect aquatic resources. FPL is currently conducting a fish sampling study south of the cooling canal system in the event that the subsurface radial well infiltration system proves impractical and a surface intake for a source of station cooling water is necessary. According to FPL, the study began in February-March of 2008 and will be completed prior to the submission of the ER. Barging of components and modules during construction across Biscayne Bay National Park waters is expected to be a concern. Barge wash can affect benthic organisms.

Socioeconomics/Environmental Justice

The FPL contractor has based the region of interest (Dade County) on the existing workforce. Most of their data is based on the 2000 census data and there appears to be some reluctance to using updated numbers. The estimated in-migration value of 50 percent will be used for both construction and operation workers. FPL is assessing housing impacts using the 2000 census data but they plan on speaking with reliable local sources. It is uncertain whether or not FPL will incorporate results of the outreach activity in the ER. FPL is currently developing a transportation plan that could support the increase of construction workers at the site. A traffic study is being conducted to support the SCA, and results will be incorporated into the ER when completed. FPL is currently in the process of speaking with local officials to collect information on school capacities. The entire Dade County is a single school district and is the 4th largest school district in the country. FPL has not looked into the current capacity of private schools yet but said they would consider it to see if there would be an impact. FPL has been compiling data on the types of industries, top employers and per capita income. The taxes will go to the county but for a county of the size of Dade, the impacts are not projected to be significant. FPL plans on looking at impacts on public services at the city level. The FPL contractor is in the process of gathering data on large recreational areas in the Miami portion of Dade County specifically within the vicinity of Turkey Point. Since there are five operating plants at the site and they are located only several miles from the Headquarters and Visitors Center for Biscayne National Park, light, noise and aesthetics are expected to be issues. FPL has been identifying minority and low income population using block census data. They also plan on making local contacts to identify any pre-existing health conditions, subsistence living and how this group will be impacted.

Cultural Resources

The FPL has not begun work in this impact category and the utility did not provide any presentation materials on cultural resources. Biscayne National Park is located adjacent to the site. During a visit to the park and exhibits, it was determined that there were shipwrecks within the park but no known prehistoric archaeological remains. FPL has not made any contacts with Indian Tribes in the area regarding construction of the proposed units or the Florida State Historic Preservation Officer.

Radiological Evaluations

Radiological Environmental Monitoring Program plans to support the COLA are not known at this time including whether the new plant would be integrated with the existing one for Units 3 and 4. FPL plans to dispose cooling tower blowdown via deep-well injection into a non-potable aquifer. FPL's permitting expert stated that he has discussed the concept in generic terms with the State FDEP. The permitting process for deep-well injection will begin with FPL's submittal of an SCA to the State in early 2009. The FPL contractor stated that the State makes a decision based partially on whether the effluent is hazardous or nonhazardous by Resource Conservation and Recovery Act definitions (which excludes radionuclides from consideration). Apparently, the FDEP has no past experience regulating the injection of radiological effluents and would apply excursion monitoring requirements used for other industrial and municipal effluents. Specific regulations are covered by Florida Administrative Code 62.528. FPL intends to demonstrate financial assurance for decommissioning per 10 CFR 50.75(b) (1) and 10 CFR 50.33(k).

FPL will be following the approach in 10 CFR 51.51(a) Table S-3, and ER section 5.7 will follow ESRP 5.7 regarding the uranium fuel cycle. There is nothing unusual about the site or the units that differs substantially from the NRC model assumptions for light water reactors. FPL will include a discussion or demonstration of impacts being bounded if applicable, and will scale up from the Table S-3 values. FPL will follow Environmental Standard Review Plan (ESRP) 3.5 in preparing the radiological waste systems section of the ER. A preliminary draft has been completed, and the systems descriptions are based on the AP1000 Design Control Document. There is currently no description of mobile radiological waste systems to be employed. The description will include the release points and external sources (e.g. Independent Spent Fuel Storage Installation, waste storage/disposal). Source descriptions for liquid and gaseous effluents will also be included.

Transportation

FPL expects to meet the conditions in 10 CFR 51.52(a) (1-5), and will use Table S-4 values. There is nothing unusual expected in this analysis. The AP1000 is outside of the 10 CFR 51.52 criteria for burnup and percent U-235. The ER in this area will follow the ESRP Sections 3.8 and 7.4 for transportation and transportation accidents and these sections will be prepared by their contractor. The RADTRAN v5.6 modeling is completed and the V&V for RADTRAN v5.6 was recently completed. FPL will also complete their own generic 2000-mile fresh fuel analysis with three alternative evaluations (four runs with two being very similar in TRAGIS).

Accidents

The accident analyses will need to contain coherent discussions regarding the logic behind the conclusions. The Design Basis Accident (DBA) analysis will be based on a ratio of site-specific X/Q to DCD X/Q. FPL will include the isotopic source terms but it will be important to check that the doses from the isotopic source term are the same as those obtained from the ratio calculation. FPL should also include a specific statement of the worst two-hour period for a DBA that extends more than two hours in duration and that the isotopic source term used in the accident analysis represent that for the worst two-hour period.

The MACCS2 analyses for severe accidents will use the same meteorological data set that is used for the DBA X/Q calculations. The population data set will be consistent with the socioeconomic population data.

The evaluation of Severe Accident Mitigation Design Alternatives (SAMDAs) and Severe Accident Mitigation Alternatives (SAMAs) was discussed. The ER should include a discussion and evaluation of SAMDAs because the AP1000, Rev 16 is not yet a certified design. FPL stated that this is not the correct time for a SAMA review. A general statement should be included that discusses the maximum averted costs versus benefit for SAMAs.

Need for Power

FPL has historically experienced a 500-600 MW load growth annually, but that rate has been lower during the current year. FPL predicts the growth rate will again be lower next year but is expected to return to the historical rate in the 2010 time frame. Their base load is primarily residential with the peak occurring during the summer season. The summer reserve margin is currently a limiting factor that is now met through the purchase of 930 MW and 380 MW from the Southern Company (Southern) and Jacksonville Power Authority (JPA), respectively. The Southern contract ends in 2015, at which time Southern will likely require the 930 MW for their customers The JPA contract runs through 2022 and it is unknown if that resource will be available in the future. There is more power available for purchase beyond Georgia but transmission line congestion limits its availability.

FPL is in the process of constructing 110 MW of renewable generation (solar) but only 35 MW will be new capacity from sites in Desoto and Brevard Counties. FPL also has an active Demand Side Management Program ($150-170 M/Yr) based on both energy efficiency and direct load control options that offsets up to 370 MW of generation. However, FPL feels they are near the maximum amount achievable given their residential load base and climatic conditions in their service territory.

The state of Florida has established a mandate to reduce CO_2 emissions by 2017, which effectively discourages building new coal-fired plants. FPL feels it cannot achieve the emission targets for new generation plants without the nuclear power option.

Cost-Benefit

FPL filled a Determination of Need with the Florida Public Service Commission (PSC) in October 2007 (Docket # 070650-E1) and received approval in April 2008. That approval also allows FPL to recover costs associated with construction of planned additional power generation. This filing was specifically for the Turkey Point Site and the PSC approved Turkey Point Nuclear Units 6 and 7 as the most cost-effective option. However, the cost effectiveness must be demonstrated on an annual basis. Because the cost of constructing a new nuclear unit is not known with great certainty, FPL used a cost differential model to analyze different scenarios using nuclear, combined cycle, and integrated gasification combined cycle technologies. Their analysis considers the environmental and fuel costs, and excluded any capital costs. The filling in October 2007 indicated the break-even point for IGCC and CC was greater than that for nuclear power, thus the nuclear option was considered more cost effective. In May of each year, FPL is required to go back to the PSC and file a new cost analysis report under the PSC Nuclear Cost Recovery Rule, so it can recover cost on a yearly basis instead of waiting until the first unit comes online. FPL expects to have contracts in place within the next year with a reactor supplier, which should provide better cost information and narrow the anticipated range of construction per MW produced.

Alternatives

The site selection study was initiated in 2006. This study pre-dated the most recent revision to NUREG-1555, Section 9.3. The study used a multi-step process and the selection criteria were taken from the Electric Power Research Institute (EPRI) Siting Guide. The goal of the site selection study was to comply with the requirements of the National Environmental Policy Act (NEPA), FDEP and the NRC, as well as meet FPL business requirements.

The primary region of interest was defined as an area slightly larger than FPL's service territory. Twenty-three potential sites were initially identified in this area – 12 existing power sites, 3 FPL owned Greenfield Sites and 8 Greenfield Sites that were available for purchase. The second step in the selection process was to apply exclusion area criteria regarding land availability, transmission feasibility and water availability. Eight of the potential sites were eliminated based on these criteria. The remaining 15 sites were screened using a more detailed set of screening criteria taken from the EPRI Siting Guide, Section 4.2. These criteria included cooling water sources, flooding, hazardous land use, ecology, and wetlands. This step resulted in the elimination of seven sites from further consideration. The eight remaining sites were evaluated using the criteria set in Section 3 of the EPRI Siting Guide, which resulted in elimination of three additional sites. The remaining five sites were subject to a detailed issue-specific evaluation. The sites were rated on a scale of 1 to 3, and Turkey Point was selected as the top site.

Assessment of Readiness

The team found that FPL and its contractors have a good understanding of the requirements for submitting an ER in support of a COLA. The FPL team has prior experience in preparing ERs, and has been monitoring RAIs submitted in conjunction with other COL applications. However, FPL has a significant amount of work to complete before they can submit an ER but are making good progress. Several open issues will impact the preparation of an acceptable ER including the method of obtaining adequate amount of cooling water, uncertainties related to the proposal to use deep-well injection to dispose of liquid effluents, providing a strong justification regarding the site selection process, completion of several onsite surveys, and finalization of the land swap with NPS.