United States Nuclear Regulatory Commission Official Hearing Exhibit

In the Matter of: Progress Energy Florida, Inc.
(Levy County Nuclear Power Plant, Units 1 and 2)

ASLBP #: 09-879-04-COL-BD01
Docket #: 05200029 | 05200030
Exhibit #: NRC001C-00-BD01
Identified: 10/31/2012
Admitted: 10/31/2012
Withdrawn:
Rejected:
Stricken:
Other:

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1941, Vol. 3

Environmental Impact Statement for Combined Licenses (COLs) for Levy Nuclear Plant Units 1 and 2

Final Report

Appendices

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United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1941, Vol. 3

Environmental Impact Statement for Combined Licenses (COLs) for Levy Nuclear Plant Units 1 and 2

Final Report

Appendices

Manuscript Completed: March 2012
Date Published: April 2012

Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Regulatory Division
Jacksonville District
U.S. Army Corps of Engineers
Jacksonville, Florida 32232-0019

US Army Corps of Engineers®

Abstract

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Progress Energy Florida, Inc. (PEF) for combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the PEF application are (1) NRC issuance of COLs for two new power reactor units at the Levy Nuclear Plant (LNP) site in Levy County, Florida, and (2) U.S. Army Corps of Engineers (USACE) issuance of a permit to perform certain construction activities on the site. The USACE is participating in preparing this EIS as a cooperating agency and participates collaboratively on the review team (which comprises NRC staff, contractor staff, and USACE staff).

This EIS includes the review team's analysis that considers and weighs the environmental impacts of constructing and operating two new nuclear units at the LNP site and at alternative sites, and mitigation measures available for reducing or avoiding adverse impacts.

The Federal Water Pollution Control Act (Clean Water Act) requires that the USACE apply the criteria set forth in the 404(b)(1) Guidelines in evaluating projects that propose to discharge dredged or fill material into waters of the United States. The USACE must also determine through its Public Interest Review (PIR) whether the proposed project is contrary to the public interest. The USACE permit decision, including its evaluation under the 404 Guidelines and the PIR, will be documented in the USACE Record of Decision, which will be issued following the issuance of this EIS.

After considering the environmental aspects of the proposed action, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by PEF; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public scoping and draft EIS comments; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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Executive Summary

By letter dated July 28, 2008, the U.S. Nuclear Regulatory Commission (NRC or the Commission) received an application from Progress Energy Florida, Inc. (PEF) for combined construction permits and operating licenses (combined licenses or COLs) for Levy Nuclear Plant (LNP) Units 1 and 2 located in southern Levy County, Florida. The review team's evaluation is based on the October 2009 Environmental Report revision to the application, October 2011 Final Safety Analysis Review revision to the application, responses to requests for additional information, and supplemental letters.

The proposed actions related to the LNP Units 1 and 2 application are (1) NRC issuance of COLs for construction and operation of two new nuclear units at the LNP site, and (2) U.S. Army Corps of Engineers (USACE) issuance of a permit pursuant to Section 404 of the Federal Water Pollution Control Act, (Clean Water Act) and Section 10 of the Rivers and Harbors Act to perform certain construction activities on the site. The USACE is participating with the NRC in preparing this environmental impact statement (EIS) as a cooperating agency and participates collaboratively on the review team, which consists of NRC staff, contractor staff, and USACE staff. The reactor design specified in the application is Revision 19 of the Westinghouse Electric Company, LLC, AP1000 certified design.

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA) directs that an EIS be prepared for major Federal actions that significantly affect the quality of the human environment. The NRC has implemented Section 102 of NEPA in Title 10 of the Code of Federal Regulations (CFR) Part 51. Further, in 10 CFR 51.20, the NRC has determined that the issuance of a COL under 10 CFR Part 52 is an action that requires an EIS.

The purpose of PEF's requested NRC action – issuance of the COLs – is to obtain licenses to construct and operate two new nuclear units. These licenses are necessary but not sufficient for construction and operation of the units. A COL applicant must also obtain and maintain permits from other Federal, State, Tribal, and local agencies and permitting authorities. Therefore, the purpose of the NRC's environmental review of the PEF application is to determine if two nuclear units of the proposed design can be constructed and operated at the LNP site without unacceptable adverse impacts on the human environment. The purpose of PEF's requested USACE action is to obtain a permit to perform regulated activities that would affect waters of the United States.

Upon acceptance of the PEF application, NRC began the environmental review process described in 10 CFR Part 51 by publishing in the *Federal Register* a Notice of Intent to prepare an EIS and conduct scoping. On December 4, 2008, the NRC held two public meetings in Crystal River, Florida, to obtain public input on the scope of the environmental review. The staff

reviewed the oral testimony and written comments received during the scoping process and contacted Federal, State, Tribal, regional, and local agencies to solicit comments.

To gather information and to become familiar with the sites and their environs, the NRC and its contractors visited the Dixie, Putnam, and Highlands alternative sites in October 2008. In December 2008, the review team visited the LNP site and Crystal River alternative site. During the December 2008 site visit, the review team also conducted a site audit and met with PEF staff, public officials, and members of the public. During the scoping process, and after the draft EIS was published, the NRC and USACE staff contacted Federal, State, Tribal, regional, and local agencies and the public to solicit comments. All comments received were reviewed and responses are included in Appendix E.

Included in this EIS are (1) the results of the NRC staff's analyses, which consider and weigh the environmental effects of the proposed action; (2) potential mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's recommendation regarding the proposed action.

To guide its assessment of the environmental impacts of a proposed action or alternative actions, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance found in 40 CFR 1508.27. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels – SMALL, MODERATE, and LARGE:

> SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

In preparing this EIS, the review team reviewed the application, including the Environmental Report (ER) submitted by PEF; consulted with Federal, State, Tribal, and local agencies; and followed the guidance set forth in NRC's NUREG-1555, *Environmental Standard Review Plan – Standard Review Plans for Environmental Reviews for Nuclear Power Plants* and a Staff Memorandum on *Addressing Construction and Preconstruction, Greenhouse Gas Issues, General Conformity Determinations, Enviromental Justice, Need for Power, Cumulative Impact Analysis, and Cultural/Historical Resources Analysis Issues in Environmental Impact Statements*. In addition, the NRC staff considered the public comments related to the environmental review received during the scoping process. Comments within the scope of the environmental review are included in Appendix D of this EIS.

The NRC staff's recommendation to the Commission related to the environmental aspects of the proposed action is that the COLs be issued as requested. This recommendation is based on (1) the application, including the ER submitted by PEF; (2) consultation with other Federal, State, Tribal, and local agencies; (3) the staff's independent review; (4) the staff's consideration of public comments; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. The USACE will issue its Record of Decision based, in part, on this EIS.

A 75-day comment period began on the date of publication of the U.S. Environmental Protection Agency Notice of Availability of the filing of the draft EIS to allow members of the public and agencies to comment on the results of the environmental review. During this period, the NRC and USACE staff conducted a public meeting near the LNP site to describe the results of the environmental review, respond to questions, and accept public comments. All comments received during the comment period are included in Appendix E.

The NRC staff's evaluation of the site safety and emergency preparedness aspects of the proposed action will be addressed in the NRC's Safety Evaluation Report anticipated to be published in 2012.

Abbreviations

7Q10	the lowest average flow over a period of 7 consecutive days that occurs once every 10 years, on average
µS	micro Siemens
AADT	annual average daily traffic
ac	acre(s)
ACHP	Advisory Counsel of Historic Preservation
ACS	American Community Survey
ADAMS	Agencywide Documents Access and Management System
ADM	average daily membership
ADT	average daily traffic
AEA	Atomic Energy Act of 1954
AFUDC	allowance for funds used during construction
ALARA	as low as reasonably achievable
a.m.	ante meridian
AO	archaeological occurrence
AP1000	Westinghouse Electric Company, LLC AP1000 pressurized water reactor
APE	Area of Potential Effect
APP	Avian Protection Plan
APT	Aquifer Performance Testing
AQCR	Air Quality Control Region
AQI	Air Quality Index
ASLB	Atomic Safety and Licensing Board
BA	biological assessment
BACT	Best Available Control Technologies
BDS	blowdown system
BEA	Bureau of Economic Analysis
BEBR	Bureau of Economic Business Research
BEIR	Biological Effects of Ionizing Radiation
bgs	below ground surface
BLS	U.S. Bureau of Labor Statistics
BMP	best management practice
BP	Before Present
Bq	becquerel(s)
BRA	Biological Research Associates
BRC	Bureau of Radiation Control (of the State of Florida Department of Health) or Blue Ribbon Commission on America's Nuclear Future
Btu	British thermal unit(s)
°C	degree(s) Celsius

CAA	Clean Air Act
CDC	U.S. Centers for Disease Control and Prevention
CDF	core damage frequency
CEQ	Council on Environmental Quality
CESQG	conditionally exempt small quantity generator
CFBC	Cross Florida Barge Canal
cfm	cubic foot (feet) per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGP	Construction General Permit
CH2M HILL	CH2M Hill Nuclear Business Group
CHARTS	(Florida's) Community Health Assessment Resource Tool Set
Ci	curie(s)
cm	centimeter(s)
cm^3	cubic centimeter(s)
cm/s	centimeter(s) per second
CO	carbon monoxide
CO_2	carbon dioxide
COD	chemical oxygen demand
COL	combined construction permit and operating license or combined license
CORMIX	Cornell Mixing Zone Expert System
Corps	U.S. Army Corps of Engineers
CP	construction permit
CPUE	catch per unit effort
CPI	Consumer Price Index
CR	County Road
CRDC	Crystal River Discharge Canal
CREC	Crystal River Energy Complex
CWA	Clean Water Act (aka Federal Water Pollution Control Act)
CWIS	cooling-water intake structure
CWS	circulating-water system
d	day(s)
DA	Department of Army
dB	decibel(s)
dBA	decibel(s) (acoustic)
DBA	design basis accident
DCD	Design Control Document
DHS	(Florida) Department of Human Services
DO	dissolved oxygen
DOE	U.S. Department of Energy
DOF	(Florida) Department of Forestry
DOT	U.S. Department of Transportation
D/Q	deposition values or factors
DSM	demand-side management

DTS	demineralized water-treatment system
DWRM2	District-Wide Regulation Model, Version 2
E	endangered
EE	energy efficiency
E&SCP	Erosion and Sediment Control Plan
EA	environmental assessment
EAB	exclusion area boundary
EDG	emergency diesel generator
EFH	essential fish habitat
EIA	Energy Information Administration or Economic Impact Area
EIS	environmental impact statement
ELF	extremely low frequency
EMF	electromagnetic field
EMS	emergency management services
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
EPRI	Electric Power Research Institute
EPU	Extended Power Uprate
EPZ	emergency planning zone
ER	Environmental Report
ERP	Environmental Resource Permit
ESA	U.S. Endangered Species Act of 1973, as amended
ESO	Environmental Support Organization
ESP	early site permit
ESRP	Environmental Standard Review Plan
ESWEMS	Essential Service Water Emergency Makeup System
ESWS	Essential Service Water System
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FAS	Floridan Aquifer System
FDA	U.S. Food and Drug Administration
FDACS	Florida Department of Agriculture and Consumer Service
FDCA	Florida Department of Community Affairs
FDEP	Florida Department of Environmental Protection
FDOE	Florida Department of Education
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FES	Final Environmental Statement
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission
FGT	Florida Gas Transmission Company

FIRM	Flood Insurance Rate Maps
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FMP	fishery managemen plan
FNAI	Florida Natural Areas Inventory
fps	foot (feet) per second
FPSC	Florida Public Service Commission
FR	Federal Register
FRCC	Florida Reliability Coordinating Council
FS	Florida Statutes
FSAR	Final Safety Analysis Report
FSER	Final Safety Evaluation Report
ft	foot/feet
ft^2	square foot/feet
ft^3	cubic foot/feet
FTE	full-time equivalent (employee)
FVCOM	Finite Volume Community Ocean Model
FWDS	Fire Water Distribution System
FWPCA	Federal Water Pollution Control Act (aka Clean Water Act)
FWRI	Fish and Wildlife Research Institute
FWS	U.S. Fish and Wildlife Service
g	gram(s)
gal	gallon(s) (3)
GBq	gigabecquerel
GCC	global climate change
GCN	Greatest Conservation Need
GCRP	U.S. Global Change Research Program
GEIS	Generic Environmental Impact Statement
GHG	greenhouse gas
GI-LLI	gastrointestinal lower large intestine
GIS	geographic information system
gpd	gallon(s) per day
gph	gallon(s) per hour
gpm	gallon(s) per minute
gps	gallon(s) per second
GW(e)	gigawatt(s) electric
GWh	gigawatthour(s)
Gy	gray(s)
ha	hectare(s)
HAPC	Habitat Areas of Particular Concern
HAZMAT	hazardous material
HBS	historic basin storage
HDPE	high-density polyethylene
HLW	high-level waste

hr	hour(s)
hr/yr	hour(s) per year
HVAC	heating, ventilation, and air conditioning
Hz	hertz
I	Interstate
IAEA	International Atomic Energy Agency
IAQCR	Interstate Air Quality Control Region
IBA	Important Bird Area
ICRP	International Council on Radiological Protection
IEA	International Energy Agency
IGCC	integrated gasification combined cycle
in.	inch(es)
in./s	inch(es) per second
INEEL	Idaho National Engineering and Environmental Laboratory
IRP	integrated resource planning
IRWST	in-containment refueling water storage tank
ISFSI	independent spent fuel storage installation
IWHRS	Integrated Wildlife Habitat Ranking System
K-8	kindergarten through 8th grade
K–12	kindergarten through 12th grade
kcfs	thousand cubic feet per second
kg	kilogram(s)
kg/ha/mo	kilogram(s) per hectare per month
kg/ha/yr	kilogram(s) per hectare per year
KH	Kimley-Horn
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
kV	kilovolt(s)
kVA	kilovolt-ampere(s)
kW	kilowatt(s)
kWh	kilowatt-hour(s)
kW(e)	kilowatt electric
L	liter(s)
L/hr	liter(s) per hour
L/m	liter(s) per minute
lb	pound(s)
LC50	the concentration that is lethal to 50 percent of the sample population
LCFS	the transmission-line corridor from the proposed LNP to Central Florida South substation
LCR	the transmission-line corridor from the proposed LNP to the CREC 500-kV switchyard

Ld	daytime average noise levels
Ldn	day-night average noise level
LEDPA	least environmentally damaging practicable aternative
LLW	low-level waste
Ln	nighttime average noise levels
LNP	Levy Nuclear Plant
LNG	liquefied natural gas
LOAEL	Lowest Observed Adverse Effect Level
LOCA	loss-of-coolant accident
LOS	level of service
LPC	the transmission-line corridor from the proposed LNP to the proposed Citrus substation
Lpm	liter(s) per minute
LPZ	low population zone
LWA	limited work authorization
LWR	light water reactor
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mA	milliampere(s)
MACCS(2)	Melcor Accident Consequence Code System
MBq	megabecquerel(s)
MBTA	Migratory Bird Treaty Act
µg	microgram(s)
mg	milligram(s)
MCL	maximum contaminant level
MEI	maximally exposed individual
MFL	minimum flows and levels
Mgd	million gallons per day
mG	milliGauss
mGy	milliGray(s)
MHW	mean high water
mi	mile(s)
mi^2	square mile(s)
MIT	Massachusetts Institute of Technology
ml	milliliter(s)
MLU	Multi-Layer Unsteady state (model)
MMBtu	a thousand thousand British thermal units
mo	month
MOU	Memorandum of Understanding
mph	mile(s) per hour
mR	milliroentgen
mrad	millirad
mrem	millirem

MSA	Metropolitan Statistical Area
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSGP	Multi-Sector Generic Permit
msl	mean sea level
mSv	millisievert(s)
MSW	municipal solid waste
MT	metric ton(nes)
MTU	metric ton(nes) uranium
MW	megawatt(s); also monitoring well
MW(e)	megawatt(s) electric
MWh	megawatt-hour(s)
MW(t)	megawatt(s) thermal
MWd	megawatt-day(s)
N_2	nitrogen
NA	not applicable or data not available
NAAQS	National Ambient Air Quality Standards
NaCl	sodium chloride
NAGPRA	National American Graves Protection and Repatriation Act
NAVD88	Northern American Vertical Datum of 1988
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection and Measurements
ND	no data
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSR	New Source Review
NUREG	U.S. Nuclear Regulatory Commission technical document
NWR	National Wildlife Refuge
OCA	Owner-Controlled Area
ODCM	Offsite Dose Calculation Manual
OECD	Organization for Economic Cooperation
OFW	Outstanding Florida Water(s)
OMHD	Office of Minority Health & Health Disparities

OSHA	Occupational Safety and Health Administration
OWR	Old Withlacoochee River
oz	ounce(s)
PAM	primary amoebic meningoencephalitis
PARS	Publicly Available Records System
PCB	polychlorinated biphenyl
pCi	picocurie(s)
PCR	polymer chain reaction
PEF	Progress Energy Florida, Inc.
PEST	Model-Independent Parameter Estimation (code)
PHP	the transmission-line corridor from the Kathleen substation in Polk County to the Griffin substation in Hillsborough County and terminating at the Lake Tarpon substation in Pinellas County
PIR	Public Interest Review
PK	preschool
PK-12	preschool through 12th grade
p.m.	post meridian
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PMF	probable maximum flood
ppm	parts per million
PMP	probable maximum precipitation
PNNL	Pacific Northwest National Laboratory
ppm	part(s) per million
PPSA	Power Plant Siting Act
ppt	part(s) per thousand
PRA	probabilistic risk assessment
PSD	Prevention of Significant Deterioration
pss	practical salinity scale
psu	practical salinity unit
PWS	potable water system
R	roentgen(s)
RAI	Request for Additional Information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCS	reactor coolant system
rem	roentgen equivalent man (a special unit of radiation dose)
REMP	radiological environmental monitoring program
RFAI	Reservoir Fish Assemblage Index
RIMS	Regional Input-Output Modeling System
RLE	Required Local Effort
RM	river mile
ROD	Record of Decision

ROI	region of influence or region of interest
ROW	Right(s)-of-way
RSICC	Radiation Safety Information Computational Center
RV	recreational vehicle
Ryr	reactor-year
RWS	raw water system
μS	microsievert(s)
s or sec	second(s)
SACTI	Seasonal/Annual Cooling Tower Impact (prediction code)
SAMA	severe accident mitigation alternatives
SAMDA	severe accident mitigation design alternatives
SAR	Safety Analysis Report
SAS	surficial aquifer system
SCA	Site Certification Application
SCL	straight carpace length
SCR	selective catalytic reduction
SDS	sanitary drainage system
SER	Safety Evaluation Report
SERC	Southeastern Electric Reliability Council
SFWMD	South Florida Water Management District
SG	steam generator
SHGW	seasonal high groundwater
SHPO	State Historic Preservation Office or Officer
SHWL	seasonal high-water level
SJRWMD	St. Johns River Waste Management District
SMZ	Streamside Management Zone
SO_2	sulfur dioxide
SOx	sulfur oxides
SPCC	spill prevention, control, and countermeasures
SQG	small quantity generator
SR	State Route
SRWMD	Suwannee River Water Management District
SSC	structures, systems, or components or species of special concern
SU	Standard Unit
Sv	sievert(s)
SWA	Small Wild Area
SWAPP	Source Water Assessment and Protection Program
SWFWMD	Southwest Florida Water Management District
SWMM	Storm Water Management Model
SWPPP	stormwater pollution prevention plan
SWS	service-water system
T	ton(s) or threatened
Tarmac	Tarmac America, LLC

TBD	to be determined
TBq	terabecquerel(s)
T&E	threatened and endangered
TCP	traditional cultural property
TDS	total dissolved solids
TEDE	total effective dose equivalent
TIGER	Topologically Integrated Geographic Encoding and Referencing
TLSA	Transmission Line Siting Act
TMDL	Total Maximum Daily Load
TN	total nitrogen
TP	total phosphorus
TRAGIS	Transportation Routing Analysis Geographical Information System
TRU	transuranic (elements)
TSS	total suspended solids
µm	micrometer(s) or micron(s)
U-235	uranium-235
U-238	uranium-238
U_3O_8	triuranium octoxide (“yellowcake”)
UF_6	uranium hexafluoride
UFA	Upper Floridan Aquifer
UHS	ultimate heat sink
UMAM	Uniform Mitigation Assessment Methodology
UMTRI	University of Michigan Transportation Research Institute
UO_2	uranium dioxide
US	U.S. Highway
U.S.	United States
USACE	U.S. Army Corps of Engineers (or Corps)
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	volatile organic compound
Westinghouse	Westinghouse Electric Company, LLC
WHO	World Health Organization
WIC	(Citrus County) Women-Infant-Children (Program)
WMA	Wildlife Management Area
WRB	wastewater-retention basin
WTE	waste-to-energy (plant)
WWS	wastewaster system

χ/Q	atmospheric dispersion factor(s); annual average normalized air concentration value(s)
XOQDOQ	computer program for the meteorological evaluation of routine effluent releases at nuclear power plants
yd	yard(s)
yd^3	cubic yard(s)
yr	year(s)

Appendix A

Contributors to the Environmental Impact Statement

Appendix A

Contributors to the Environmental Impact Statement

The overall responsibility for the preparation of this environmental impact statement was assigned to the Office of New Reactors, U.S. Nuclear Regulatory Commission (NRC). The statement was prepared by members of the Offices of New Reactors with assistance from other NRC organizations, the U.S. Army Corps of Engineers, Pacific Northwest National Laboratory, and Information Systems Laboratories.

Name	Affiliation	Function or Expertise
	NUCLEAR REGULATORY COMMISSION	
Douglas Bruner	Office of New Reactors	Project Manager
Jessie Muir	Office of New Reactors	Project Support
Laura Quinn	Office of New Reactors	Project Support
Sarah Lopas	Office of New Reactors	Project Support
Mallecia Sutton	Office of New Reactors	Project Support
Robert Schaaf	Office of New Reactors	Site Layout and Plant Description, Nonradiological Waste Systems, and Radiological Impacts
Donald Palmrose	Office of New Reactors	Assistant Project Manager, Alternatives, Site Layout/Plant Description, Radiological Impacts
Michelle Moser[(a)]	Office of New Reactors	Assistant Project Manager, Cultural Resources, Land Use, Cumulative Effects
Jack Cushing	Office of New Reactors	Cultural Resources
Michelle Hart	Office of New Reactors	Severe and Design Basis Accidents
Mohammed Haque	Office of New Reactors	Surface Water Hydrology
Dan Barnhurst	Office of New Reactors	Groundwater Hydrology
Kevin Quinlan	Office of New Reactors	Meteorology, Air Quality
David Sisk[(a)]	Office of New Reactors	Demography
Henry Jones	Office of New Reactors	Groundwater and Surface Water Hydrology Lead
Nebiyu Tiruneh	Office of New Reactors	Surface Water Hydrology
Mark McBride	Office of New Reactors	Groundwater Hydrology
Gerry Stirewalt	Office of New Reactors	Geology

Name	Affiliation	Function or Expertise
Michael Masnik	Office of New Reactors	Aquatic Ecology and Terrestrial Ecology, Alternative Site Selection/Evaluation, Transmission Lines, Biological Assessments and Essential Fish Habitat
Peyton Doub	Office of New Reactors	Terrestrial Ecology, Land Use, Biological Assessment
Daniel Mussatti	Office of New Reactors	Socioeconomics, Environmental Justice, Benefit-Cost, Need for Power
Michael Purdie	Office of New Reactors	Socioeconomics, Environmental Justice, Benefit-Cost, Need for Power
Ed Roach	Office of New Reactors	Occupational Health Physics
John Fringer	Office of New Reactors	Nonradiological Health and Waste, Need for Power, and Benefit-Cost
Steven Schaffer	Office of New Reactors	Radioactive Waste Management, Health Physics
Richard Emch	Office of New Reactors	Health Physics, Radioactive Waste Management, Nonradiological Health, Decommissioning, Uranium Fuel Cycle
Andrew Kugler	Office of New Reactors	Nonradiological Waste Management, Alternative System Designs, Alternative Sites, Energy Alternatives
Malcolm Patterson	Office of New Reactors	Severe Accident Mitigation Alternatives (SAMA)
Keith Tetter[a]	Office of New Reactors	SAMA
Stan Echols	Office of Nuclear Materials, Safety, and Safeguards	Fuel Cycle
John Cook	Office of Nuclear Materials, Safety, and Safeguards	Transportation
Kevin Witt	Office of Nuclear Materials, Safety, and Safeguards	Transportation
James Shepherd	Office of Federal and State Materials and Environmental Management Programs	Decommissioning
Bruce Watson	Office of Federal and State Materials and Environmental Management Programs	Decommissioning
U.S. ARMY CORPS OF ENGINEERS		
Gordon Hambrick	Regulatory Branch	Project Manager
PACIFIC NORTHWEST NATIONAL LABORATORY[b]		
Michael Smith		Task Leader, Decommissioning
Robert Scherplez[d]		Task Leader, Decommissioning
Ann Miracle		Task Leader, Aquatic Ecology, Biological Assessment, Essential Fish Habitat

Name	Affiliation	Function or Expertise
Ellen Kennedy[(d)]		Deputy Task Leader
Kimberly Leigh		Deputy Task Leader
Beverly Miller		Deputy Task Leader
Terri Miley		Comment Database, Task Management Support
Joanne Duncan		Task Management Support, References
Craig Allwardt		Comment Database
Van Ramsdell		Severe and Design Basis Accidents
Linda Fassbender		Alternatives, Land Use, Transmission Lines
Bruce McDowell		Alternatives
Eva Eckert-Hickey		Radiological Health
Amoret Bunn		Nonradiological Health and Waste
Lara Aston		Nonradiological Health and Waste, Terrestrial Ecology
Kristi Branch		Socioeconomics and Environmental Justice
Michael Sackschewsky[(d)]		Terrestrial Ecology, Biological Assessment
Tara O'Neil		Cultural Resources
Doug McFarland[(d)]		Cultural Resources
Amanda Stegen		Terrestrial Ecology
Larry Berg		Meteorology, Air Quality
David Anderson		Need for Power
Vince Vermeul		Groundwater Use and Quality, Hydrology
Rajiv Prasad		Surface Water Use and Quality, Hydrology
Robert Bryce		Site Layout and Plant Description, Alternative Plant Systems
Nancy Kohn		Site Layout and Plant Description, Hydrology
Lance Vail		Surface Water and Groundwater Use and Quality, Hydrology
Steve Maheras		Transportation
Duane Ward		Geographic Information Systems
Susan Ennor		Technical Editing
Denice Carrothers		Technical Editing
Mike Parker		Document Design
Kathy Neiderhiser		Document Design
Sharon Johnson		References
Tomiann Parker		References
Susan Gulley		References

Name	Affiliation	Function or Expertise
	INFORMATION SYSTEMS LABORATORIES	
Bill Baber	ICF International[c]	Terrestrial Ecology, Biological Assessment
Polly Quick	ICF International[c]	Socioeconomics, Environmental Justice
Bill Mendez	ICF International[c]	Nonradiological Health
Ralph Grismala	ICF International[c]	Nonradioactive Waste, Fuel Cycle
Joseph Porrovecchio	SC&A[c]	Health Physics, Radioactive Waste Management

(a) Staff member is no longer with the NRC Office of New Reactors.
(b) Pacific Northwest National Laboratory is operated by Battelle for the U.S. Department of Energy.
(c) ICF International and Sandy Cohen & Associates (SC&A) are subcontractors to Information Systems Laboratories
(d) Staff member is no longer with the Pacific Northwest National Laboratory.

Appendix B

Organizations Contacted

Appendix B

Organizations Contacted

The following Federal, State, regional, Tribal, and local organizations were contacted during the course of the U.S. Nuclear Regulatory Commission staff's independent review of potential environmental impacts from the construction and operation of two new nuclear units, Levy Nuclear Plant (LNP) Units 1 and 2, at the LNP site in Levy County, Florida:

Advisory Council on Historic Preservation, Washington, D.C.

AF Knotts Public Library, Yankeetown, Florida

Bronson City Council, Bronson, Florida

Bronson Public Library, Bronson, Florida

Chassahowitzka National Wildlife Refuge, Crystal River, Florida

Citrus County Commission, Inverness, Florida

Citrus County Environmental Health Division, Inverness, Florida

Citrus County School District, Inverness, Florida

Coastal Region Library, Crystal River, Florida

Dixie County Environmental Health Division, Cross City, Florida

Dunnellon Branch Library, Dunnellon, Florida

Florida Department of Environmental Protection, Tallahassee, Florida

Florida Department of Revenue, Tallahassee, Florida

Florida Department of Transportation, Tallahassee, Florida

Florida Division of Historical Resources, Office of Cultural and Historical Programs, Tallahassee, Florida

Florida Fish and Wildlife Conservation Commission, North Central Region, Lake City, Florida

Florida Fish and Wildlife Conservation Commission, Headquarters, Tallahassee, Florida

Florida Department of Transportation, District 7, Tampa, Florida

Florida Public Services Commission, Tallahassee, Florida

Gilchrist County Administration, Trenton, Florida

Goethe State Forest, Crystal River, Florida

Highlands County Children's Services, Sebring, Florida

Highlands County Cooperative Extension Service, Sebring, Florida

Highlands County Environmental Health Division, Sebring, Florida

Highlands County Human Services, Sebring, Florida

Inglis Town Commission, Inglis, Florida

Lafayette County Board of Commissioners, Mayo, Florida

Levy County School District, Bronson, Florida

Levy County Tax Collector, Bronson, Florida

National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, Florida

Marion County School District, Ocala, Florida

Miccosukee Tribe, Miami, Florida

Muscogee Nation of Florida, Bruce, Florida

Perdido Bay Tribe of Lower Muscogee Creeks, Pensacola, Florida

Putnam County Environmental Health Division, Palatka, Florida

Seminole Nation of Oklahoma, Wewoka, Oklahoma

Seminole Tribe of Florida, Hollywood, Florida

Southwest Florida Water Management District, Brooksville, Florida

Taylor County Economic Development Department, Perry, Florida

U.S. Army Corps of Engineers, Jacksonville District, Panama City, Florida

U.S. Environmental Protection Agency, Region 4, Atlanta, Georgia

U.S. Fish and Wildlife Service, Jacksonville Field Office, Jacksonville, Florida

Appendix C

NRC and USACE Environmental Review Correspondence

Appendix C

NRC and USACE Environmental Review Correspondence

This appendix contains a chronological list of correspondence between the U.S. Nuclear Regulatory Commission (NRC) or the U.S. Army Corps of Engineers (USACE) and Progress Energy Florida, Inc. (PEF). Other correspondence related to the environmental review of PEF's application for combined licenses (COLs) and a USACE permit at the Levy Nuclear Plant (LNP) site in Levy County, Florida, is also included.

All documents, with the exception of those containing proprietary information, are available electronically from the Public Electronic Reading Room found on the Internet at the following web address: www.nrc.gov/reading-rm.html. From this website, the public can gain access to the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The ADAMS accession number or *Federal Register* citation for each document is included below.

June 30, 2008	Letter from Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, to Mr. John Hunter, Progress Energy Florida, regarding Department of the Army Permit to Construct a Barge Slip, Boat Ramp, Access Road, and Bridge to Connect the Slip/Ramp to County Road 40 (Accession No. ML090610068).
July 28, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Application for Combined License for Levy Nuclear Power Plant Units 1 and 2, NRC Project Number 756 (Package Accession No. ML082260278).
July 28, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Supplemental Meteorological Data in Support of Combined License Application for Levy Nuclear Power Plant Units 1 and 2 (Accession No. ML082260278).
August 8, 2008	Letter from Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Corps Request to Serve as a Cooperating Agency with the NRC as the Lead Agency in the Preparation of the EIS for the Levy Project (Accession No. ML082380171).

September 12, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Levy Nuclear Plant Units 1 and 2 (LNP), NRC Project Number 756, LNP COLA Supplemental Information (Accession No. ML082660675).
September 15, 2008	Letter from Brian Anderson, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Acknowledgment of Receipt of the Combined License Application for Levy County Nuclear Plant Units 1 and 2 and Associated Federal Register Notice (Accession No. ML082460287).
October 6, 2008	Letter from Brian Anderson, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Acceptance Review for the Levy County Nuclear Power Plant Units 1 and 2 Combined License Application (Accession No. ML082760222).
October 6, 2008	*Federal Register* Notice of Acceptance for Docketing of An Application For Combined License for Levy County Nuclear Power Plant Units 1 and 2 Docket Nos. 52-029 and 52-030 (Accession No. ML082760254).
October 10, 2008	Letter from Scott C. Flanders, NRC, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Request to Cooperate with the Nuclear Regulatory Commission on the Environmental Impact Statement for the Levy Nuclear Plant, Units 1 and 2 Combined License Application (Accession No. ML082490566).
October 14, 2008	Letter from Douglas Bruner, NRC, to Ms. Lesa Ehlers, Coastal Region Library, Citrus County, regarding Maintenance of Reference Materials at the Coastal Region Library Related to the Environmental Review of the Levy Nuclear Plant Combined License Application (Accession No. ML082401332).
October 14, 2008	Letter from Douglas Bruner, NRC, to Ms. Ann Fenton, Dunnellon Branch Library, regarding Maintenance of Reference Materials at the Dunnellon Branch Library Related to the Environmental Review of the Levy Nuclear Plant Combined License Application (Accession No. ML082401350).
October 14, 2008	Letter from Douglas Bruner, NRC, to Ms. Sandy Moseley, Bronson Public Library, Levy County, regarding Maintenance of Reference Materials at the Bronson Public Library Related to the Environmental Review of the Levy Nuclear Plant Combined License Application (Accession No. ML082480634).

October 17, 2008	Letter from Andy Campbell, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Notice of Intent to Prepare and Environmental Impact Statement and Conduct Scoping Related to a Combined License Application for Levy Nuclear Plant, Units 1 and 2 (Accession No. ML082830024).
October 20, 2008	Memorandum to U.S. Army Corps of Engineers, Jacksonville District, from CH2M Hill/Progress Energy, regarding Clean Water Act Jurisdictional Determination of Wetlands Located on Levy Nuclear Plant Site, Levy County, Florida (Accession No. ML090760467).
October 24, 2008	*Federal Register* Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process for Levy Nuclear Power Plant, Units 1 and 2, Combined License Application and Limited Work Authorization (Accession No. ML083010028).
November 5, 2008	Letter from Gregory P. Hatchett, NRC, to Mr. Frederick Gaske, Director, Division of Historical Resources, State Historic Preservation Officer, Office of Cultural and Historical Programs, regarding Request for Participation in the Scoping Process for the Proposed Levy County Nuclear Plant, Units 1 and 2, Combined License Application Review (Accession No. ML082740519).
November 5, 2008	Letter from Gregory P. Hatchett, NRC, to The Honorable Chairman Billy Cypress, Miccosukee Tribe, regarding Request for Participation in the Scoping Process for the Environmental Review of the Levy County, Units 1 and 2, Combined License Application (Accession No. ML082740531).
November 5, 2008	Letter from Gregory P. Hatchett, NRC, to The Honorable Chairman Mitchell Cypress, Seminole Tribe of Florida, regarding Request for Participation in the Scoping Process for the Environmental Review of the Levy County, Units 1 and 2, Combined License Application (Accession No. ML082740536).
November 5, 2008	Letter from Gregory P. Hatchett, NRC, to Mr. David Bernhart, Assistant Regional Administrator for Protected Resources, National Marine Fisheries Service, Southeast Regional Office, regarding Request for Participation in the Environmental Scoping Process and a List of Protected Species Within the Area Under Evaluation for the Levy Nuclear Plant, Units 1 and 2, Combined License Application Review (Accession No. ML082750414).

November 5, 2008	Letter from Gregory P. Hatchett, NRC, to Mr. Jay Herrington, U.S. Fish and Wildlife Service, Jacksonville Field Office, regarding Request for Participation in the Environmental Scoping Process and a List of Protected Species Within the Area Under Evaluation for the Levy Nuclear Plant, Units 1 and 2, Combined License Application Review (Accession No. ML082750418).
November 6, 2008	Letter from Gregory P. Hatchett, NRC, to Mr. Don Klima, Office of Federal Agency Programs, Advisory Council on Historic Preservation, regarding Request for Participation in the Scoping Process for the Proposed Levy County Nuclear Plant, Units 1 and 2, Combined License Application Review (Accession No. ML082740502).
November 6, 2008	Letter from Gregory P. Hatchett, NRC, to Mr. Rolando Garcia, Regional Director North Central Region, Florida Fish and Wildlife Conservation Commission, regarding Request for Participation in the Scoping Process and List of State Listed Protected Species for the Environmental Review for the Levy Nuclear Plant, Units 1 and 2, Combined License Application Review (Accession No. ML082750434).
November 6, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Request for Withholding of Proprietary Information Related to Shearon Harris Nuclear Power Plants Units 2 and 3 and Levy Nuclear Power Plants Units 1 and 2 (Accession No. ML083240398). Note: Contains proprietary information and is not publicly available.
November 14, 2008	NRC Memorandum regarding Notice of Public Meeting to Discuss Environmental Scoping Process for the Levy Nuclear Plant, Units 1 and 2, Combined License Application (Accession No. ML082961065).
November 18, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Supplemental Information for Hydrology Audit – Calculation Native Files, Levy Nuclear Power Plant Units 1 and 2 (Accession No. ML083300261).
November 24, 2008	Email correspondence from Mr. Mark Sramek, National Oceanic and Atmospheric Administration, to Michael Masnik, NRC, regarding Essential Fish Habitat Requirements for Species Managed by the Gulf of Mexico Fishery Management Council: Ecoregion 2, Tarpon Springs to Pensacola Bay, Florida, Levy Nuclear Plant Application (Package Accession No. ML091180050).

December 10, 2008	Email from Mr. Steve Terry, NAGPRA & Section 106 Coordinator for Mr. Fred Dayhoff, NAGPRA & Section 106 Representative, Miccosukee Tribe, to Jessie Muir, NRC, regarding Knowledge Cultural Resources Located in the Area of the Two New Proposed Nuclear Power Units (Accession No. ML090120781).
December 11, 2008	Email correspondence from Mr. Robert Hoffman, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Endangered Species Branch, to NRC, regarding NRC's November 5, 2008 Letter Requesting a List of Protected Species Within the Area Under Evaluation for the Levy Nuclear Plant, Units 1 and 2, Combined License Application Review (Accession No. ML083510905).
December 11, 2008	Letter from Mr. Frederick Gaske, Director and State Historic Preservation Officer, Division of Historical Resources, Florida Department of State, to Mr. Gregory Hatchett, NRC, regarding Response to Possible Impacts to Historic Properties Listed, or Eligible for Listing, in the National Register of Historic Properties, DHR No.: 2008-07149, Proposed Levy County Nuclear Plant, Unit 1 and 2, Levy County (Accession No. ML090650566).
December 17, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Supplemental Information for Levy Environmental Audit – Geographic Information System Data (Accession No. ML090260730).
December 17, 2008	Email from Ms. Shelley Norton, National Oceanic and Atmospheric Association, to Ann Miracle, PNNL/NRC, regarding Marine Mammal Strandings Information (Accession No. ML090120793).
December 18, 2008	Memorandum on Summary of August 21, 2008 Public Meeting on Levy County Combined License (Accession No. ML083510263).
December 19, 2008	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Supplemental Information for Environmental Audit – Calculation Native Files (Accession Nos. ML083650409 and ML090210290).
December 19, 2008	Letter from Mr. Heinz J. Mueller, Chief, U.S. Environmental Protection Agency, to NRC, regarding Scoping Process Comments for the Levy Nuclear Plant Units 1 and 2 (Accession No. ML090400336).
December 23, 2008	NRC Memorandum on Summary of Public Scoping Meetings Related to the Combined Licenses Application Review for Levy Nuclear Plant, Units 1 and 2 (Accession No. ML083460121).

December 23, 2008	Letter from Ms. Mary Olson, Nuclear Information and Resource Service, to NRC, regarding Request for Extension of Public Comment Period and Scoping Comments (Accession No. ML090060933).
December 24, 2008	Letter from Douglas Bruner, NRC, to Ms. Linda Cohan, AF Knotts Public Library, regarding Maintenance of Reference Materials at the AF Knotts Public Library Related to the Environmental Review of the Levy Nuclear Plant Combined License Application (Accession No. ML083580064).
January 16, 2009	Letter from Scott Flanders, NRC, to Ms. Mary Olson, Southeast Regional Coordinator, Nuclear Information and Resource Service, regarding Request for an Extension of the Comment Period Associated with the Levy Nuclear Plant Environmental Scoping Process (Package Accession No. ML090080566).
January 16, 2009	Public Notice from the U.S. Army Corps of Engineers regarding Elimination of the Inglis Lock Structure for Safety Concerns, Permit Application No. SAJ-2008-04617 (IP-SEG) (Accession No. ML090610055).
January 16, 2009	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Supplemental Information for Environmental Audit – Information Needs with Attachments (Package Accession No. ML090750823).
February 3, 2009	Letter from Mr. Jamie Hunter, Progress Energy Florida, to Mr. Gordon Hambrick, U.S. Army Corps of Engineers, regarding No Permit Required Request for Roller Compacted Test Pad (Accession No. ML090610058).
February 4, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Shearon Harris Nuclear Power Plant, Units 2 and 3, and Levy Nuclear Power Plant, Units 1 and 2, Contracts for Disposal of High-Level Radioactive Waste (Accession No. ML090400618).
February 5, 2009	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. Jamie Hunter, Progress Energy Florida, regarding Request for Confirmation that a Department of the Army Permit Would not be Required for the Construction of a “Roller Compacted Concrete Test Pad” at the Proposed Levy Nuclear Plant Site, SAJ-2007-490 (NPR-GAH) (Accession No. ML090610047).

February 9, 2009	Letter from Ms. Charlene Vaughn, Advisory Council on Historic Preservation, to Gregory P. Hatchett, NRC, Notification and Request for Consultation and Participation in the Scoping Process for the Units 1 and 2 COL review for Levy County Nuclear Plant near Inglis, Florida (Accession No. ML090620074).
February 9, 2009	Letter from Mr. Dave L. Hankla, U.S. Fish and Wildlife Service, to Gregory P. Hatchett, NRC, regarding Request for Scoping Comments During the Scoping Comment Period and Information on Federally-Listed Species and Critical Habitat that may be in the Vicinity of the Project Site, the Associated Transmission Line Rights-of-Way, and the Alternative Sites (Accession No. ML090720063).
February 18, 2009	Letter from Brian C. Anderson, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Levy County Nuclear Power Plant Units 1 and 2 Combined License Application Review Schedule (Accession No. ML090350045).
February 24, 2009	Letter from Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy, regarding Request for Additional Information Regarding the Environmental Review of the Combined License Application for the Levy Nuclear Power Plant, Units 1 and 2 (Package Accession No. ML090500782).
March 13, 2009	Letter from Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Addendum to Request for Additional Information Regarding the Environmental Review of the Combined License Application for the Levy Nuclear Power Plant, Units 1 and 2 (Package Accession No. ML090610163).
March 16, 2009	Letter from Mr. James Scarola, Progress Energy Carolinas, to NRC, regarding Submittal of Site Selection Study in Accordance with 10 CFR 2.390 (Accession No. ML090830375). Note: Contains proprietary information and is not publicly available.
March 16, 2009	Public Notice, U.S. Army Corps of Engineers, Public Notice Describing the Levy Project and State and Federal Agency Responsibilities, Permit Application No. SAJ-2008-490 (IP-GAH) (Accession No. ML090890419).
March 17, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Meteorological Data in Support of Combined License Application – Second Year of Data, Levy Nuclear Power Plant, Units 1 and 2 (Accession No. ML090830690).

March 17, 2009	Email correspondence from Florida Fish and Wildlife Conservation Commission, Division of Law Enforcement responding to U.S. Army Corps of Engineers Public Notice, Permit Application No. SAJ-2008-490 (IP-GAH) (Package Accession No. ML091230009).
March 23, 2009	Letter from Mr. Miles M. Croom, National Marine Fisheries Service, to Colonel Paul L. Grosskruger, District Engineer, Panama City Regulatory Office, Jacksonville District, U.S. Army Corps of Engineers, regarding U.S. Army Corps of Engineers Public Notice, Permit Application No. SAJ-2008-490 (IP-GAH) (Accession No. ML091230014).
March 27, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Information for Environmental Review: Native Files – Cooling Tower Plume and Thermal Plume Modeling (Package Accession No. ML090910125).
March 27, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to U.S. Army Corps of Engineers Request for Additional Information Regarding the Environmental Review (Accession No. ML091320050).
March 27, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to U.S. Army Corps of Engineers Request for Additional Information Regarding the Environmental Review (Accession No. ML090920287).
March 31, 2009	Letter from Mr. Harold R. Ross, President, Ross Hammock Ranch, to Mr. Gordon Hambrick, U.S. Army Corps of Engineers, regarding Response to Corps Public Notice for the Levy Nuclear Plant Project, SAJ-2008-00490 (IP-GAH) (Accession No. ML091230015).
April 1, 2009	Email to/from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to/from Mr. and Mrs. Vaughn, regarding Response, Comment Letters and Emails Received during the Corps Public Notice Period for the Levy Nuclear Plant Project, Progress Energy Florida, SAJ-2008-00490 (IP-GAH) (Accession No. ML091230010).
April 2, 2009	Email from Mr. James Scarola, Progress Energy Carolinas, to Mr. Gordon Hambrick, U.S. Army Corps of Engineers, regarding Proprietary Submittal of Siting Study to U.S. Army Corps of Engineers transmitting Letter regarding Submittal of Site Selection Study; Declaration of Trade Secretes, Commercial and Financial Records Under 32 CFR 518.139d) (Accession No. ML091910709).

April 9, 2009	Letter from Ms. Mary Ann Poole, Florida Fish and Wildlife Conservation Commission, to Colonel Paul L. Grosskruger, U.S. Army Corps of Engineers, regarding U.S. Army Corps of Engineers Public Notice, Permit Application No. SAJ-2008-490 (IP-GAH) (Accession No. ML091070009).
April 13, 2009	Letter to/from the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, regarding Request for an Extension of the Comment Period for the Corps Public Notice for the Levy Nuclear Plant Project, Progress Energy Florida, Levy Nuclear Plant, SAJ-2008-00490 (IP-GAH) (Accession No. ML091230011).
April 13, 2009	Letter from David S. Hobbie, Chief, Regulatory Division, Jacksonville District, U.S. Army Corps of Engineers, to Mr. Frank E. Mathews, Hopping Green & Sams, regarding Potential Extent of Federal Jurisdiction on a Parcel Located at the Site of the Proposed Levy Nuclear Plant in Section 13, Township 16 South, Range 16 East, Inglis, Levy County, Florida (Accession No. ML091070118).
April 14, 2009	Limited Appearance Statement from Harold R. Ross, President, Ross Hammock Ranch, Inc., to NRC, regarding letter sent to the Department of the Army in Response to a Public Notice, Permit Application No. SAJ-2008-490 (IP-GAH), regarding the Progress Energy Levy County Florida Application (Accession No. ML091060221).
April 17, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Meteorological Data in Support of Combined License Application – Two Year Chi Over Q Data (Package Accession No. ML091130410).
April 23, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Information in Support of combined License Application – Purpose and Need Statement, Levy Nuclear Plant, Units 1 and 2 (Accession No. ML091180670).
April 23, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Information in Support of Combined License Application Environmental Review, Levy Nuclear Plant, Units 1 and 2 (Package Accession No. ML091260523).

April 29, 2009	Email from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Douglas Bruner, NRC, regarding Response, Comment Letters, and Emails Received during the Corps Public Notice Period for the Levy Nuclear Plant Project, Progress Energy Florida, Levy Nuclear Plant, SAJ-2008-00490 (IP-GAH) (Accession No. ML091230008).
April 30, 2009	Letter from Scott C. Flanders, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Progress Energy Corporation – Request for Withholding of Proprietary Information Related to Shearon Harris Nuclear Power Plant Units 2 and 3 and Levy Nuclear Power Plant Units 1 and 2 (Accession No. ML091040203).
May 1, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Notification to Withdraw Request for a Limited Work Authorization, Levy Nuclear Plant, Units 1 and 2 (Accession No. ML091250350).
May 4, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Submittal of Site Selection Study – Redacted Version, Levy Nuclear Plant, Units 1 and 2 (Package Accession No. ML091340502).
May 6, 2009	Email from Doug Bruner, NRC, to Mr. Paul Gagliano and Heinz Mueller, U.S. Environmental Protection Agency, regarding Withdrawal of LWA-Levy Nuclear Plant (Package Accession No. ML091320700).
May 6, 2009	Letter from Mr. Miles M. Croom, National Marine Fisheries Service, to Colonel Paul L. Grosskruger, District Engineer, Jacksonville District, U.S. Army Corps of Engineers, regarding National Marine Fisheries Comments to U.S. Army Corps of Engineers Public Notice, Permit Application No. SAJ-2008-490 (IP-GAH) (Package Accession No. ML091320681).
May 12, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Request for Additional Information Regarding the Environmental Review, Water Quality Sampling Data (Package Accession No. ML091380294).
May 13, 2009	Letter from Mr. James D. Giattina, Director, Water Protection Division, Region 4, U.S. Environmental Protection Agency, to Colonel Paul Grosskruger, District Commander, Jacksonville District, U.S. Army Corps of Engineers, regarding response to U.S. Army Corps of Engineers Public Notice, SAJ-2008-490 (IP-GAH) (Package Accession No. ML091350064).

May 28, 2009	Scoping Summary Report Related to the Environmental Scoping Process for the Levy Nuclear Power Plant, Units 1 and 2 Combined License Application (Accession No. ML091260469).
June 5, 2009	Letter from Mr. James D. Giattina, Director, Water Protection Division, Region 4, U.S. Environmental Protection Agency, to Colonel Paul Grosskruger, District Commander, Jacksonville District, U.S. Army Corps of Engineers, regarding response to U.S. Army Corps of Engineers Public Notice, SAJ-2008-490 (IP-GAH) (Package Accession No. ML091660065).
June 8, 2009	Letter from Robert G. Schaaf, NRC, to Mr. Harold Ross, Ross Hammock Ranch, Inc., regarding Mr. Ross' comments to NRC in response to the U.S. Army Corps of Engineers Public Notice dated March 16, 2009 (Accession No. ML091340646).
June 12, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Request for Additional Information Regarding the Environmental Review (Package Accession No. ML091740487).
June 23, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review, Serial NPD-NRC-2009-107 – Supplemental Information for Environmental Audit Calculation Native Files (Accession No. ML091760672).
June 23, 2009	Letter from Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Supplemental Request for Additional Information Regarding the Environmental Review, (Package Accession No. ML091560119).
June 26, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Request for Additional Information Letter No. ER-U.S. Army Corps of Engineers-RAI Addendum Related to the Environmental Review, Serial NPD-NRC-2009-125 – Response for RAI USACE-11 (Package Accession No. ML091830462).
July 17, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review- Native Figure Files (Package Accession No. ML092240693).

July 20, 2009	Letter from Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding Progress Energy Corporation – Request for Withholding of Proprietary Information Related to Levy Nuclear Power Plant Units 1 and 2 (Package Accession No. ML091770185).
July 20, 2009	Email correspondence from Ms. Cindy Mulkey, Florida Department of Environmental Protection, to Linda Fassbender, PNNL/NRC, regarding coastal zone consistency (Accession No. ML092290072).
July 22, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review- USACE RAI-12 and USACE RAI-13 (Accession No. ML092080076).
July 22, 2009	Letter from Mr. Robert Kitchen, Progress Energy Carolinas, to NRC, regarding Update of Responses to Request for Additional Information Letter (Accession No. ML092050071).
July 24, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplement 2 to Response to Request for Additional Information Regarding the Environmental Review (Accession No. ML092100297).
July 24, 2009	NRC Memorandum regarding Summary of the Environmental Site Audit and Alternative Sites Visit Related to the Review of the Combined License Application for Levy Nuclear Plant, Units 1 and 2 (Accession No. ML091250294).
July 29, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplement 3 to Response to Request for Additional Information Regarding the Environmental Review (Package Accession No. ML092240661).
July 29, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review- Hydrology 5.3.2.1-2 (Accession No. ML092150337).
July 29, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review- Water Quality Sampling Data-Spring 2009 (Accession No. ML092150336).

August 12, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Response 3 to Supplemental Request for Additional Information Regarding the Environmental Review- Hydrology 4.1.1-1 (Package Accession No. ML092260771).
August 25, 2009	Letter from Robert G. Schaaf, NRC, to Mr. Steve Terry, Miccosukee Tribe, regarding Response to Scoping Comments to Support the Environmental Review of the Levy County, Units 1 and 2, Combined License Application (Accession No. ML092120229).
August 26, 2009	Letter from Mr. Robert Kitchen, Progress Energy Carolinas, to NRC, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review- Replacement Fast Web Viewable Figures (Package Accession No. ML092240694).
August 31, 2009	Letter from Robert G. Schaaf, NRC, to Chief Micco Bobby Johns Bearheart, Perdido Bay Tribe, Southeastern Lower Muscogee Creek Indians, regarding Request for Information for the Environmental Review of the Levy County, Units 1 and 2, Combined License Application (Accession No. ML092120271).
August 31, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplement 7 to Request for Additional Information Regarding the Environmental Review (Package Accession No. ML092460206).
August 31, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Information Related to Environmental Review - Figure Native Files and CREC 1993/1994 Annual Salt Drift Report (Accession No. ML092470545).
September 3, 2009	Letter from Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding the Summary of Teleconferences Related to Supplemental RAIs for the Environmental Review (Accession No. ML092240046).
September 3, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Supplement 7 to Request for Additional Information Regarding the Environmental Review (Package Accession No. ML092570297).
September 8, 2009	Letter from Mr. Michael Halpin, Florida Department of Environmental Protection, to Dr. Stuart Santos, U.S. Army Corps of Engineers, regarding Levy Nuclear Plant PA08-51 Water Quality Certification. (Package Accession No. ML12073A194).

September 25, 2009	Letter from Mr. Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy regarding Supplemental Request for Additional Information Regarding the Environmental Review of the Combined License Application for the Levy Nuclear Power Plant, Units 1 and 2 (Package Accession No. ML092650231).
October 2, 2009	Letter from Mr. Garry Miller, Progress Energy Carolinas, to NRC, regarding Progress Energy Florida's Submittal of COL Application, Revision 1 (Accession No. ML092860397).
October 5, 2009	Letter from David Hobbie, Chief, Regulatory Division, U.S. Army Corps of Engineers, to Progress Energy Florida, regarding SAJ-2008-00490 (JD2-GAH) Jurisdictional Verification "Approved" and "Preliminary" (Accession No. ML092890651).
October 9, 2009	Letter from Mr. Garry. Miller, Progress Energy Carolinas, to NRC, regarding Supplemental Request for Additional Information Regarding the Environmental Review – Hydrology 4.1.1-1 (Package Accession No. ML092920466).
October 12, 2009	Letter from Mr. Robert Kitchen, Progress Energy Florida, to NRC, regarding Roadmap of Changes in Combined License Application, Rev. 1 (Accession No. ML092890169).
October 13, 2009	Letter from Mr. Robert Kitchen, Progress Energy Florida, to NRC, regarding Schedule for Response to Environmental RAIs, Serial NPD-NRC-2009-217 (Accession No. ML092890091).
October 22, 2009	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplemental Information Related to Environmental Review - Figure Native Files (Package Accession No. ML093010543).
October 22, 2009	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplemental Information – Water Quality Sampling Data- Summer 2009 (Accession No. ML093010265).
October 26, 2009	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Gordon Hambrick, U.S. Army Corps of Engineers, regarding Progress Energy Florida, SAJ-2008-490 (IP-GAH) (Accession No. ML093070175).
November 23, 2009	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplement 6 to Response to Request for Additional Information Regarding the Environmental Review (Accession No. ML093380309).

December 2, 2009	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review- Hydrology 4.1.1-1 (Package Accession No. ML093441135).
December 3, 2009	Letter from Douglas Bruner, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding the Summary of Teleconferences Discussing Responses to Requests for Additional Information for the Environmental Review of the Levy Nuclear Power Plant Combined License Application (Package Accession No. ML092860080).
December 14, 2009	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Response to Supplemental Request for Additional Information Regarding Environmental Review (Package Accession No. ML093620182).
January 20, 2010	Letter from Mr. Frank Akstulewicz, NRC, to Mr. James Scarola, Progress Energy Carolinas, regarding the Levy County Nuclear Power Plant Units 1 and 2 Combined License Application Revised Environmental Review Schedule (Accession No. ML100070638).
January 29, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplement 1 to Response to Supplemental Request for Additional Information Regarding Environmental Review (Package Accession No. ML100470895).
January 29, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplement 7 to Response to Request for Additional Information Regarding Environmental Review (Accession No. ML100470867).
January 29, 2010	Letter from Mr. John Elnitsky, Progress Energy, to NRC, regarding Supplement 7 to Response to Request for Additional Information Regarding Environmental Review (Accession No. ML100470867).
January 29, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplemental Information Related to Environmental Review – Figure Native Files (Accession No. ML100470866).
February 16, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplement 2 to Response to Supplemental Request for Additional Information Regarding the Environmental Review (Accession No. ML100500662).

February 22, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplement 3 to Response to Supplemental Request for Additional Information Regarding Environmental Review (Accession No. ML100560115).
March 5, 2010	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. John Elnitsky, Progress Energy Florida, regarding USACE Response to Progress Energy's Section 404(b)(1) Guidelines Analysis for LNP (Accession No. ML100750229).
March 11, 2010	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. John Elnitsky, Progress Energy Florida, regarding Correction to USACE Response to Progress Energy's Section 404(b)(1) Guidelines Analysis for LNP (Accession No. ML100750229).
March 31, 2010	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. James Scarola, Progress Energy Carolinas, Regarding USACE Response to Progress Energy Carolinas on Confidentiality Request for Levy Alternative Sites (Accession No. ML100900218).
April 12, 2010	Letter from Mr. John Elnitsky, Progress Energy, to NRC, regarding Supplement 8 to Response to Request for Additional Information Regarding the Environmental Review (Accession No. ML101050114).
April 29, 2010	Letter from Mr. Robert Kitchen, Progress Energy Florida, to NRC, regarding Levy Units 1 and 2, Notification of Modification Submitted for LNP SCA (Accession No. ML101230331).
May 11, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Supplemental Response to Supplemental Request for Additional Information Regarding the Environmental Review – Hydrology 5.3.2.1-2 (Accession No. ML101410224).
May 27, 2010	Letter from Mr. Robert Schaaf, NRC, to Chief Leonard Harjo, Principal Chief, Seminole Nation of Oklahoma, regarding Request for Comment on the Environmental Review of the Levy Nuclear Plant Units 1 and 2 Combined License Application (Accession No. ML101310622).
May 27, 2010	Letter from Mr. Robert Schaaf, NRC, to Ms. Anne Tucker, Chairwoman, Muscogee Nation of Florida, regarding Request for Comment on the Environmental Review of the Levy Nuclear Plant Units 1 and 2 Combined License Application (Accession No. ML101370530).

June 14, 2010	Letter from Mr. Douglas Bruner, NRC, to Mr. John Elnitsky, Progress Energy Florida, regarding Summary of Teleconferences to Discuss Requests for Additional Information Regarding the Environmental Review of the Combined License Application for Levy Nuclear Plant Units 1 and 2 (Package Accession No. ML100960539).
June 17, 2010	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. Paul Snead, Progress Energy, regarding Summary of Corps Meeting with Progress Energy on June 9, 2010 (Accession No. ML101860001).
June 30, 2010	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Gordon Hambrick, U.S. Army Corps of Engineers, regarding Response to Comments Received on the Levy Nuclear Units 1 and 2 Section 404(b)(1) Alternatives Analysis, Revision 3 (Accession No. ML101930607).
July 16, 2010	Letter from Mr. Douglas Bruner, NRC, to Mr. John Elnitsky, Progress Energy Florida, regarding Proprietary Review of Sections of the Draft Environmental Impact Statement Associated with Alternative Sites for Levy Nuclear Power Plant Units 1 and 2 (Accession No. ML101940176).
July 20, 2010	Letter from Mr. Robert Kitchen, Progress Energy Florida, to NRC, regarding Proprietary Review of Sections of the Draft Environmental Impact Statement Associated with Alternative Sites for Levy Nuclear Plant (Accession No. ML102030028).
August 5, 2010	Letter from Scott C. Flanders, NRC, to Mr. John Elnitsky, Progress Energy Florida, regarding Notice of Availability of the Draft Environmental Impact Statement for the Combined Licenses for Levy Nuclear Plant Units 1 and 2 (Accession No. ML101960105).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Mr. John M. Fowler, Advisory Council on Historic Preservation, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Proposed Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101960003).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Mr. Frederick P. Gaske, Division of Historical Resources, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101980006).

August 5, 2010	Letter from Robert G. Schaaf, NRC, to The Honorable Mitchell Cypress, Chairman, Seminole Tribe of Florida, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Proposed Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101980004).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Chief Bobby Johns Bearheart, Perdido Bay Tribe, Southeastern Lower Muscogee Creek Indians, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Proposed Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101980005).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Chief Leonard Harjo, Seminole Nation of Oklahoma, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Proposed Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101980002).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to The Honorable Ann D. Tucker, Chairwoman, Muscogee Nation of Florida, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Proposed Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101980003).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Mr. Steve Terry, NAGPRA & Section 106 Representative, Miccosukee Tribe, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the Levy Nuclear Plant Units 1 and 2 Combined Licenses Application Review (Accession No. ML101970275).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Ms. Mimi Drew, Florida Department of Environmental Protection, regarding Notification of the Issuance of and Request for Comments on the Draft Environmental Impact Statement for the Levy Nuclear Plant Units 1 and 2 Combined License Application Review (Accession No. ML102000649).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Ms. Linda Walker, U.S. Fish and Wildlife Service, regarding Request for Comments on the Draft Environmental Impact Statement and Biological Assessment Related to the Review of the Combined License Application for the Levy Nuclear Plant Units 1 and 2 (Accession No. ML102020483).

August 5, 2010	Letter from Robert G. Schaaf, NRC, to Mr. David Bernhart, National Marine Fisheries Service, regarding Request for Comments on the Draft Environmental Impact Statement, Essential Fish Habitat, and Biological Assessment Related to the Review of the Combined License Application for the Levy Nuclear Plant Units 1 and 2 (Accession No. ML102020516).
August 5, 2010	Letter from Robert G. Schaaf, NRC, to Mr. Rolando Garcia, Florida Fish and Wildlife Conservation Commission, regarding Notification of the Issuance of and Request for Comments on the Draft Environmental Impact Statement for the Levy Nuclear Plant Units 1 and 2 Combined License Application Review (Accession No. ML102000616).
August 6, 2010	Letter from Scott C. Flanders, NRC, to U.S. Environmental Protection Agency, Office of Federal Activities, EIS Filing Section, regarding Submittal of the Draft Environmenatal Impact Statement for the Levy Nuclear Plant Units 1 and 2 Combined License Application (Accession No. ML101960008).
August 11, 2010	Letter from Douglas Bruner, NRC, to Ms. Linda Cohan, AF Knotts Public Library, regarding Maintenance of Reference Materials at the AF Knotts Public Library for the Levy Nuclear Plant Units 1 and 2 Combined License Application Review (Accession No. ML102000185).
August 11, 2010	Letter from Douglas Bruner, NRC, to Ms. Sandy Moseley, Bronson Public Library, Levy County, regarding Maintenance of Reference Materials at the Bronson Public Library for the Levy Nuclear Power Plant Units 1 and 2 Combined License Application Review (Accession No. ML102000223).
August 11, 2010	Letter from Douglas Bruner, NRC, to Ms. Lesa Ehlers, Coastal Region Library, Citrus County, regarding Maintenance of Reference Materials at the Coastal Region Library for the Levy Nuclear Power Plant Units 1 and 2 Combined License Application Review (Accession No. ML102000249).
August 11, 2010	Letter from Douglas Bruner, NRC, to Ms. Ann Fenton, Dunnellon Branch Library, regarding Maintenance of Reference Materials at the Dunnellon Branch Library for the Levy Nuclear Plant Units 1 and 2 Combined License Application Review (Accession No. ML102000410).
September 3, 2010	Letter from Mr. Miles M. Croom, National Marine Fisheries Service, to Colonel Alfred A. Pantano, U.S. Army Corps of Engineers, regarding Request for a 30-Day Extension for Submission of Comments on Levy Nucler Plant Draft Environmental Impact Statement (Accession No. ML110070856).

September 13, 2010	Letter from Colonel Alfred A. Pantano, U.S. Army Corps of Engineers, to Mr. Miles M. Croom, National Marine Fisheries Service, regarding Request for a 30-Day Extension to the Public Notice Period for Department of the Army application SAJ-2008-00490 (IP-GAH) (Accession No. ML110070856).
September 20, 2010	Letter from Mr. Scott M. Stroh, State Historic Preservation Officer, Florida Department of State, Division of Historical Resources, to NRC, regarding Review of the Levy Nuclear Plant Draft Environmental Impact Statement (Accession No. ML102740568).
September 29, 2010	Letter from Mary Ann Poole, Commenting Program Administrator, Florida Fish and Wildlife Commission, to Mr. Mike Halpin, Siting Coordination Office, Florida Department of Environmental Protection, regarding Comments and Recommendations on the Levy Nuclear Plant Draft Environmental Impact Statement (Accession No. ML102730869).
October 4, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Submittal of COL Application, Revision 2, for Levy Nuclear Plant Units 1 and 2 (Accession No. ML102870982).
October 6, 2010	Letter from Mr. James J. Golden Lead Planner, South Florida Water Management District, to NRC, regarding Comments on the Progress Energy Levy Nuclear Plant Units 1 and 2 Draft Environmental Impact Statement Combined License Application Review (Accession No. ML102980009).
October 25, 2010	Letter from Mr. Robert Kitchen, Manager – Nuclear Plant Licensing, Progress Energy Florida, to NRC, regarding Comments on Draft Environmental Impact Statement for the Levy Nuclear Plant Units 1 and 2 (Accession No. ML103010056).
October 26, 2010	Letter from Mr. Miles M. Croom, Assistant Regional Administrator, Habitat Conservation Division, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, to Ms. Cindy Bladely, NRC, and Colonel Alfred A. Pantano Jr., U.S. Army Corps of Engineers, regarding Review of the Levy Nuclear Plant Draft Environmental Impact Statement and Essential Fish Habitat Assessment (Accession No. ML103080057).
October 26, 2010	Letter from Mr. Heinz J. Mueller, NEPA Program Office, Office of Policy and Management, Region 4, U.S. Environmental Protection Agency, to NRC, regarding Comments on Draft Environmetal Impact Statement for Levy Nuclear Plant Units 1 and 2 (Accession No. ML103080058).

October 26, 2010	Letter from Mr. Gregory Hogue, Regional Environmental Officer, United States Department of the Interior, Office of Environmental Policy and Compliance, to NRC, regarding Comments on the Levy Draft Environmental Impact Statement and Biological Assessments, and Consultation (Accession No. ML102990091).
October 26, 2010	Letter from Dr. Sydney T. Bacchus, to Don Hambrick, U.S. Army Corps of Engineers, and Douglas Bruner, NRC, regarding Request for 60-Day Extension to Submit Comments and Preliminary Comments on Draft Environmental Impact Statement (DEIS) of Proposed Combined Licenses for Levy Nuclear Plant Units 1 and 2 (Accession No. ML103050063).
October 26, 2010	Email from Ms. Mary Olson, Nuclear Information and Resource Service, to Douglas Bruner and Jody Martin, NRC, regarding Broad Request for Extension of Levy DEIS Comment Period – From Undersigned Groups (Accession No. ML103120446).
November 2, 2010	Letter from Robert G. Schaaf, NRC, to Ms. Mary Olson, Nuclear Information and Resource Service, regarding Request for an Extension of the Comment Period Associated with the Levy Nuclear Plant (LNP) Draft Environmental Impact Statement (Accession No. ML103000009).
November 2, 2010	Email from Douglas Bruner, NRC, to Mr. Craig Tepper, Seminole Tribe of Florida, regarding Inquiry on Tribal Comments for the Levy Draft Environmental Impact Statement (Accession No. ML103370719).
November 5, 2010	Email from Mr. Craig Tepper, Seminole Tribe of Florida, to Douglas Bruner, NRC, regarding Inquiry on Tribal Comments for the Levy Draft Environmental Impact Statement (Accession No. ML103370721).
November 10, 2010	Letter from Robert G. Schaaf, NRC, to Dr. Sydney T. Bacchus, from NRC, regarding Response to Request from Dr. Bacchus to Extend Comment Period on Levy Nuclear Plant Draft Environmental Impact Statement (Accession No. ML103080027).
November 15, 2010	Email from Don Hambrick, U.S. Army Corps of Engineers, to Dr. Sydney T. Bacchus, regarding Request for Extension and Preliminary Comments on proposed Levy Nuclear Plant Units 1 and 2 (Accession No. ML103370361).

November 26, 2010	Letter from Dr. Roy Crabtree, National Marine Fisheries Service (NMFS), to Mr. Robert G. Schaaf, NRC, and Mr. Gordon A. Hambrick, III, U.S. Army Corps of Engineers, regarding National Marine Fisheries Service (NMFS) Reply to Letter Initiating Joint Consultation between the NRC, USACE, and NMFS Pursuant to Section 7 of the Endangered Species Act (Accession No. ML103370190).
November 27, 2010	Letter from Dr. Sydney Bacchus to Don Hambrick, U.S. Army Corps of Engineers, and Douglas Bruner, NRC, regarding Supplemental Comments on the Levy DEIS and Renewed Request to Extend the Public Comment Period (Accession No. ML103340103).
December 2, 2010	Email from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Douglas Bruner, NRC, regarding Initiating Consultation with Miccosukee Tribe on Levy Project (Accession No. ML103370545).
December 10, 2010	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. Miles Croom, National Marine Fisheries Service, regarding Interim Response to Essential Fish Habitat Conservation Recommendations Regarding the Proposed Levy Nuclear Plant Units 1 and 2, and Associated Facilities (Accession No. ML110120632).
December 14 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Process for Scheduling Acceptance Reviews of New Reactor Licensing Applications and Process for Determining Budget Needs for Fiscal Year 2013 – Shearon Harris Units 2 and 3 and Levy Units 1 and 2 (Accession No. ML103500241).
December 20, 2010	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Response to Request for Additional Information for Crystal River Plant Manatee Protection Plan (Accession No. ML103610254).
December 22, 2010	Letter from Robert G. Schaaf, NRC, to Dr. Sydney Bacchus, regarding Renewed Request by Dr. Sydney Bacchus to Extend the Public Comment Period on the Levy DEIS (Accession No. ML103420004).
December 22, 2010	Letter from Scott C. Flanders, NRC, to Mr. Miles Croom, National Marine Fisheries Service, regarding Response to Essential Fish Habitat Conservation Recommendations for the Proposed Levy Nuclear Plant Units 1 and 2 (Accession No. ML103190723).

January 3, 2011	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. Jamie Hunter, Progress Energy Florida, regarding Jurisdictional Verification of Blowdown Pipeline Route 2 (Accession No. ML110060190).
January 10, 2011	Letter from Ms. Amy C. Dierolf, Progress Energy Florida, to Mr. Doug Bruner, NRC, Ms. Stefanie Barrett, U.S. Fish and Wildlife Service, and Mr. Al Bagozo, U.S. Fish and Wildlife Service, regarding Letter Response from Progress Energy Florida: "Letter from Jamie Hunter (PEF) to U.S. Army Corps of Engineers, dated June 1, 2010, Subject: Levy Nuclear Plant Transmission Line Submittals (Accession No. ML110700543).
January 25, 2011	Letter from Michael P. Halpin, Florida Department of Environmental Protection, to John Hunter, Progress Energy Florida, regarding Progress Energy Florida Levy Nuclear Project Units 1 and 2, Modification to Conditions of Certification, Alteration of Pipeline and Haul Road Corridors. (Accession No. ML110340074).
February 3, 2011	Letter from Ms. Amy C. Dierolf, Progress Energy Florida, to Mr. Doug Bruner, NRC, Ms. Stefanie Barrett, U.S. Fish and Wildlife Service, and Mr. Al Bagozo, U.S. Fish and Wildlife Service, regarding CDs of GIS Shape Files for Transmission Line Corridors; Transmission Lines preferred Right of Way; Permitting Support Information for the Brooksville-Brooksville West (BBW) Preferred Right of Way and Crystal River Energy Complex (Accession No. ML110700676).
February 10, 2011	Letter from Ms. Amy C. Dierolf, Progress Energy Florida, to Mr. Doug Bruner, NRC, Ms. Stefanie Barrett, U.S. Fish and Wildlife Service, and Mr. Al Bagozo, U.S. Fish and Wildlife Service, regarding Response from Progress Energy Florida: CDs Containing the Permitting Support Files for the Citrus to Brookridge Project (Accession No. ML110700560).
February 14, 2011	Letter from Scott C. Flanders, NRC, to Mr. Gregory Hogue, U.S. Department of the Interior, regarding Response to Comments Received on the Biological Assessment for Proposed Levy Nuclear Plant Units 1 and 2 (Accession No. ML110200098).
February 15, 2011	Letter from D. Palmrose for Robert G. Schaaf, NRC, to Mr. Heinz Mueller, U.S. Environmental Protection Agency, regarding Response to Environmental Protection Agency Request for Cross Florida Barge Canal and Withlacoochee River Survey and Monitoring Plan. Levy Nuclear Plant Units 1 and 2 (Accession No. ML110400476).

February 18, 2011	Letter from Mr. Michael Halpin, Florida Department of Environmental Protection, to Dr. Stuart Santos, U.S. Army Corps of Engineers, regarding Levy Nuclear Plant PA08-51C Water Quality Certification (Package Accession No. ML12073A194).
March 1, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding the Submittal of Information Under Oath and Affirmation for the Transmission Line Corridors, Substations, and Blowdown Route to Include Jurisdictional Dertermination Notebooks and GIS Data Files (Accession No. ML110800381).
March 2, 2011	Letter from Donald W. Kinard, U.S. Army Corps of Engineers, to Mr. John J. Hunter, Progress Energy Florida, regarding the Approved Jurisdictional Verification, Progress Energy Florida Levy Nuclear Plant Site – North, South and Access Parcels (Accession No. ML110660224).
March 17, 2011	Letter from Allen H. Fetter, NRC, to Mr. John Elnitsky, Progress Energy Florida, regarding Transmittal of Figures for Habitat Surveys Along Transmission Line Corridors, Levy Nuclear Plant Units 1 and 2 (Accession No. ML110750563).
March 25, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding NRC Request for FLUCCS Dataset Used to Evaluate Land Use in the Preferred Transmission ROWs (Accession No. ML110960336).
April 12, 2011	Letter from Allen H. Fetter, NRC, to Mr. Craig D. Tepper, Seminole Tribe of Florida, regarding Transmittal of Figures for Habitat Surveys Along Transmission Line Corridors, Levy Nuclear Plant Units 1 and 2 (Accession No. ML110970624).
April 12, 2011	Letter from Allen H. Fetter, NRC, to Mr. Ted Hoehn, Florida Fish and Wildlife Conservation Commission, regarding Transmittal of Figures for Habitat Surveys Along Transmission Line Corridors, Levy Nuclear Plant Units 1 and 2 (Accession No. ML110970593).
April 12, 2011	Letter from Allen H. Fetter, NRC, to Mr. Willard Steele, Seminole Tribe of Florida, regarding Transmittal of Figures for Habitat Surveys Along Transmission Line Corridors, Levy Nuclear Plant Units 1 and 2 (Accession No. ML110970618).

April 25, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Annie Dziergowski, U.S. Fish and Wildlife Service, regarding Follow-up to the April 6, 2011 Meeting and Reports for Listed Species Assessments for Transmission Lines and Substation Projects for Levy Nuclear Plant Units 1 and 2 (Accession No. ML111790029).
May 13, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Ms. Laura Kammerer, Florida Division of Historical Resources, regarding Levy Nuclear Plant Units 1 and 2 Cultural Resources (Accession No. ML111990144).
May 16, 2011	Letter from Douglas W. Bruner, NRC, to Mr. John Elnitsky, Progress Energy Florida, regarding Supplemental Request for Additional Information Regarding the Environmental Review of the Combined License Application for Levy Nuclear Plant Units 1 and 2 (Accession No. ML111240419).
May 24, 2011	Email from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Mr. Willlard S. Steele, Seminole Tribe of Florida, regarding Transmittal of Progress Energy Florida's Cultural Resources Work Plan for the Proposed Levy Nuclear Power Plant Project, Levy, Citrus, Marion, Hernando, Sumter, Polk, Hillsborough, and Pinellas Counties, Florida (Accession No. ML111721679).
May 24, 2011	Letter from Mr. Gordon Hambrick, U.S. Army Corps of Engineers, to Ms. Anne Mullins and Mr. Elliott York, Seminole Tribe of Florida, regarding Transmittal of Progress Energy's Cultural Resources Work Plan for the Proposed Levy Nuclear Power Plant Project, Levy, Citrus, Marion, Hernando, Sumter, Polk, Hillsborough, and Pinellas Counties, Florida (Accession No. ML11172A220).
May 31, 2011	Letter from Robert Kitchen, Progress Energy Florida, to Annie Dziergowski, U.S. Fish and Wildlife Service, regarding Follow-up to Progress Energy Florida April 25, 2011 Letter, Serial: NPD-MISC-2011-007, Levy Nuclear Plant Units 1 and 2 (Accession No. ML111680330).
June 10, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to Douglas Bruner, NRC, regarding Supplemental Request for Additional Information Regarding the Levy Environmental Review – Thermal Plume Analysis, Levy Nuclear Plant Units 1 and 2 (Accession No. ML11171A294).

June 20, 2011	Letter from Mr. Willard Steele, Seminole Tribe of Florida, Tribal Historic Preservation Office, to Gordon Hambrick, U.S. Army Corps of Engineers, regarding Progress Energy Florida's Transmittal Letter and Cultural Resources Survey Plan (Accession No. ML11172A221).
June 23, 2011	Letter from Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, to Mr. John Elnitsky, Progress Energy Florida, regarding U.S. Army Corps of Engineers Position Letter for a Department of Army Permit for the Levy Nuclear Power Plant Site (Accession No. ML111751496).
July 22, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Response to U.S. Army Corps of Engineers Position Letter for a Department of Army Permit for the Levy Nuclear Plant Site (Accession No. ML112200023).
August 12, 2011	Letter from Mr. Robert Kitchen, Progress Florida, to Mr. Gordon Hambrick, U.S. Army Corps of Engineers, regarding Levy Nuclear Plant Project – Transmission Line Wetland Jurisdictional Submittal SAJ-2008-4490 (Accession No. ML11277A183).
September 7, 2011	Email from Mr. Douglas Bruner, NRC, to Mr. Paul Snead, Progress Energy Florida, regarding Socioeconomics Request for Levy Nuclear Plant Units 1 and 2 (Accession No. ML11292A211).
September 9, 2011	Letter from Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, to Mr. John Elnitsky, Progress Energy Florida, regarding Response to July 22, 2011 Progress Energy Letter and Request for Additional Information (Accession No. ML112790415).
September 14, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Ms. Annie Dziergowski, U.S. Fish and Wildlife Service, regarding Follow-up to the May 31, 2011 Progress Energy Letter, Serial: NPD-MISC-2011-008, Proposed Levy Nuclear Plant Units 1 and 2 (Accession No. ML112760086).
September 20, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Response #1 to Corps Position Letter Dated June 23, 2011, Levy Nuclear Plant Units 1 and 2 (Accession No. ML113070715).
October 4, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Submittal of COL Application, Revision 3, Levy Nuclear Plant Units 1 and 2 (Accession No. ML11308A011).

October 4, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Response #2 to Corps Position letter dated June 23, 2011, Levy Nuclear Plant Units 1 and 2 (Accession No. ML113010133).
October 7, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Response to Email from Douglas Bruner (NRC) to Paul Snead (PEF), Dated September 7, 2011, "Socioeconomics Request – Levy" (Accession No. ML11285A240).
October 10, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to NRC, regarding Roadmap of Changes in Combined License Application, Revision 3, Levy Nuclear Plant Units 1 and 2 (Accession No. ML11286A085).
October 20, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Response #3 to Corps Position Letter Dated June 23, 2011, Levy Nuclear Plant Units 1 and 2 (Accession No. ML113010076).
October 20, 2011	Letter from Mr. Allen Fetter, NRC to Ms. Cara Campbell, Ecology Party of Florida, regarding Response to the Ecology Party of Florida Request for GIS Shape Files Associated With the Proposed Levy Nuclear Plant Project (Accession No. ML112900062).
November 1, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Response #4 to Corps Position letter dated June 23, 2011, Levy Nuclear Plant Units 1 and 2 (Accession No. ML11314A025).
November 1, 2011	Letter from Mr. Donald W. Kinard, U.S. Army Corps of Engineers, to Mr. Robert Kitchen, Progress Energy Florida, regarding Approved Jurisdictional Verification, Levy Nuclear Plant – Transmission Lines (Accession No. ML113080018).
November 4, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Annie Dziergowski, U.S. Fish and Wildlife Service, regarding Follow-up to September 14, 2011 Letter, Summary of Fall Federal Listed Plants Survey, Levy Nuclear Plant Units 1 and 2 (Accession No. ML113080814).

November 7, 2011	Letter from Mr. Scott Flanders, NRC, to Mr. John Elnitsky, Progress Energy Florida, regarding the Status of the Environmental Review for Levy Nuclear Plant Units 1 and 2 Combined License Application (Accession No. ML11280A202).
November 14, 2011	Letter from Mr. John Elnitsky, Progress Energy Florida, to NRC, regarding Status of the Environmental Review for Levy Nuclear Plant Units 1 and 2 Combined License Application (Accession No. ML11321A201).
December 1, 2011	Letter from Ms. Annie Dziergowski, U.S. Fish and Wildlife Service, to NRC, regarding Biological Opinion for Levy Nuclear Power Plant Units 1 and 2, Application for Combined Licenses (COLs) for Construction Permits and Operating Licenses, (NUREG-1941) (Accession No. ML113530504).
December 13, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Wetland Mitigation Plan Implementation on Government Lands, Levy Nuclear Plant Units 1 and 2 (Accession No. ML12013A435).
December 14, 2011	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Ms. Laura Kammerer, Division of Historical Resources, Florida Department of State, regarding Cultural Resources Assessment Survey reports, Levy Nuclear Plant Units 1 and 2 (Accession No. ML113530213).
January 31, 2012	Letter from Ms. Laura Kammerer, Division of Historical Resources, Florida Department of State, to Mr. Robert Kitchen, Progress Energy Florida, regarding Cultural Resource Assessment Survey of the Progress Energy Florida Accessory Parcels, Levy County, Florida (Accession No. ML12045A090).
February 2, 2012	Letter from Mr. James Scarola, Progress Energy, to NRC, regarding Submittal of COL Application, Revision 4 (Accession No. ML120460974).
February 8, 2012	Letter from Mr. Donald Kinard, U.S. Army Corps of Engineers, to Mr. Willard Steele, Seminole Tribe of Florida, Tribal Historic Preservation Office, regarding Progress Energy Florida/Levy Nuclear Plant permit application (Accession No. ML12039A198).
February 8, 2012	Letter from Mr. Robert Kitchen, Progress Energy, to NRC, regarding Roadmap of Changes in Combined Licensce Application, Revision 4 (Accession No. ML12045A492).

February 20, 2012	Letter from Mr. John Elnitsky, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Groundwater Withdrawal for Plant Operations – Proposed Special Conditions (Accession No. ML12055A418).
February 27, 2012	Letter from Mr. Robert Kitchen, Progress Energy Florida, to Mr. Osvaldo Collazo, U.S. Army Corps of Engineers, regarding Response to Corps Position Letter Checklist Provided for January 19, 2012 Meeting (Accession No. ML12072A114).

Appendix D

Scoping Comments and Responses

Appendix D

Scoping Comments and Responses

On October 24, 2008, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process in the *Federal Register* (73 FR 63517). The Notice of Intent notified the public of the staff's intent to prepare an environmental impact statement (EIS) and conduct scoping for the combined construction permits and operating licenses (COL) application received from Progress Energy Florida, Inc. (PEF) for two units, identified as Units 1 and 2, to be located at the Levy Nuclear Plant (LNP) site. The LNP site is located approximately 4 mi north of the Levy-Citrus County border, 7.9 mi east of the Gulf of Mexico, and 30.1 mi west of Ocala, Florida. The NRC invited the applicant; Federal, Tribal, State, and local government agencies; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meeting and/or submitting written suggestions and comments no later than December 23, 2008.

D.1 Overview of the Scoping Process

The scoping process provides an opportunity for public participants to identify issues to be addressed in the EIS and highlight public concerns and issues. The Notice of Intent identified the following objectives of the scoping process:

- Define the proposed action that is to be the subject of the EIS.
- Determine the scope of the EIS and identify significant issues to be analyzed in depth.
- Identify and eliminate from detailed study those issues that are peripheral or that are not significant.
- Identify any environmental assessments and other EISs that are being prepared or will be prepared that are related to, but not part of, the scope of the EIS being considered.
- Identify other environmental review and consultation requirements related to the proposed action.
- Identify parties consulting with the NRC under the National Historic Preservation Act, as set forth in 36 CFR 800.8(c)(1)(i).
- Indicate the relationship between the timing of the preparation of the environmental analyses and the Commission's tentative planning and decision-making schedule.

- Identify any cooperating agencies and, as appropriate, allocate assignments for preparation and schedules for completing the EIS to the NRC and any cooperating agencies.
- Describe how the EIS will be prepared and include any contractor assistance to be used.

Two public scoping meetings were held at the Florida National Guard Armory in Crystal River, Florida, on December 4, 2008. Approximately 100 people attended the afternoon scoping meeting, and approximately 90 attended the evening session. The scoping meetings began with NRC staff members providing a brief overview of the COL process and the NEPA process. After the NRC's prepared statements, the meeting was open for public comments. Fifty-two attendees provided either oral comments or written statements that were recorded and transcribed by a certified court reporter. In addition to the oral and written statements provided at the public scoping meeting, 4 letters and 30 emails were received during the scoping period.

Transcripts for both the afternoon and evening scoping meetings can be found in the NRC Agencywide Document Access and Management System (ADAMS) under accession numbers ML083520102 and ML083520105, respectively. ADAMS is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams/web-based.html (in the Public Electronic Reading Room; note: the URL is case-sensitive). Additional comments received later in letters or emails are also available. A meeting summary memorandum (ML083460121) was issued December 23, 2008.

At the conclusion of the scoping period, the NRC staff reviewed the scoping meeting transcripts and all written material received during the comment period and identified individual comments. These comments were organized according to topic within the proposed EIS or according to the general topic if outside the scope of the EIS. Once comments were grouped according to subject area, the staff determined the appropriate response for the comment. The staff made a determination on each comment that it was one of the following:

- a comment that was actually a question and introduced no new information
- a comment that was either related to support or opposition of combined licensing in general (or specifically the LNP COL) or made a general statement about the COL process. In addition, it provided no new information and did not pertain to 10 CFR Part 52.
- a comment about an environmental issue that
  - provided new information that would require evaluation during the review
  - provided no new information.
- a comment that was outside the scope of the COL, which included, but was not limited to
  - a comment on the safety record of the applicant.

Preparation of the EIS has taken into account the relevant issues raised during the scoping process. The comments received on the draft EIS will be considered in the preparation of the final EIS. The final EIS, along with the staff's Safety Evaluation Report (SER), will provide much of the basis for the NRC's decision on whether to grant the LNP COL.

The comments related to this environmental review are included in this appendix. They were extracted from the *Levy Nuclear Plant Combined License Scoping Summary Report (ML091260469)* and are provided for the convenience of those interested specifically in the scoping comments applicable to this environmental review. The comments that are outside the scope of the environmental review for the proposed LNP site are not included in this appendix. These include comments related to the following:

- safety
- emergency preparedness
- NRC oversight for operating plants
- security and terrorism
- support or opposition to the licensing action, licensing process, nuclear power, hearing process, or the applicant.

More detail regarding the disposition of general or out-of-scope comments can be found in the Scoping Summary Report. To maintain consistency with the Scoping Summary Report, the comment source identification (ID) and comment number along with the name of the commenter used in that report are retained in this appendix.

Table D-1 identifies, in alphabetical order, the individuals who provided comments during the scoping period, their affiliation (if given), and the ADAMS accession number that can be used to locate the correspondence. Although all commenters are listed, the comments presented in this appendix are limited to those within the scope of the environmental review. Table D-2 lists the comment categories in alphabetical order and commenter names and comment numbers for each category. The balance of this appendix presents the comments themselves with NRC staff responses organized by topic category.

Table D-1. Individuals Providing Comments During Scoping Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Albert, Pamela		Meeting Transcript (ML083520105)	0015
Arnason, Deb		Email (ML090060934)	0039
Barnwell, Martha	Progress Energy Florida	Meeting Transcript (ML083520102)	0014
		Meeting Transcript (ML083520105)	0015
Berger, Betty		Meeting Transcript (ML083520105)	0015
Berger, Sarah		Email (ML083640014)	0020
Bullock, Wade		Email (ML083510834)	0013
Burrell, Troy	Burrell Engineering	Meeting Transcript (ML083520102)	0014
Cannon, Renate		Meeting Transcript (ML083520102)	0014
Casey, Emily	Environmental Alliance of North Florida	Meeting Transcript (ML083520105)	0015
Cheek, Ken		Meeting Transcript (ML083520102)	0014
Cox, Lesley		Email (ML083640026)	0029
Craig, Avis		Email (ML090060936)	0035
Damato, Dennis		Meeting Transcript (ML083520105)	0015
Davis, Suellyn		Email (ML083470118)	0009
Dickinson, Josh		Email (ML083470113)	0006
Dickinson, Sally		Email (ML083470113)	0006
Douglas, Amanda	Nature Coast Business Development Council	Meeting Transcript (ML083520102)	0014
Edison, Jeff	Levy County Schools	Meeting Transcript (ML083520102)	0014
Eppes, Thomas		Meeting Transcript (ML083520102)	0014
		Letter (ML090480055)	0043
Foreman, Patricia		Email (ML090060937)	0036
		Meeting Transcript (ML083520102)	0014
Frink, Ken	Burrell Engineering	Meeting Transcript (ML083520102)	0014
Garvin, Bill		Email (ML083640012)	0018
Haghighat, Alireza		Email (ML083470108)	0005
Harris, Mac		Meeting Transcript (ML083520102)	0014
Hernandez, Michael		Meeting Transcript (ML083520102)	0014
		Meeting Transcript (ML083520105)	0015
Heywood, Harriet		Email (ML083640013)	0019
Highsprings, Jojo		Email (ML083640019)	0023

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Hilliard, Dan		Meeting Transcript (ML083520102)	0014
Hodges, Alan	University of Florida	Meeting Transcript (ML083520105)	0015
Hollins, Dixie	Hollinswood Ranch	Meeting Transcript (ML083520105)	0015
Hopkins, Norman	Unnamed environmental organizations	Meeting Transcript (ML083520102)	0014
		Meeting Transcript (ML083520105)	0015
Horgan, Wendy		Email (ML083640024)	0028
Johannesen, Francine	Marion County Building Industry Association	Letter (ML083500251)	0010
Jones, Art		Meeting Transcript (ML083520102)	0014
Karson, Annabeth		Email (ML083640030)	0031
Kirk, Susan	City of Crystal River	Meeting Transcript (ML083520102)	0014
Klutho, Mark		Meeting Transcript (ML083520105)	0015
Latimer, Al	Enterprise Florida	Meeting Transcript (ML083520102)	0014
Lewis, Maloni		Meeting Transcript (ML083520105)	0015
Maidhof, Gary	Citrus County Department of Development	Meeting Transcript (ML083520102)	0014
		Meeting Transcript (ML083520105)	0015
Malwitz-Jipson, Merrillee		Email (ML083640018)	0006
		Email (ML083640018)	0042
Marmish, John	United Way of Citrus County	Meeting Transcript (ML083520102)	0014
Marraffino, Paul		Meeting Transcript (ML083520102)	0014
McCray-Holly, Katrice	Community Action Foundation of Citrus County	Meeting Transcript (ML083520105)	0015
Medlin, Ted		Email (ML083460103)	0040
Michaels, Edward		Email (ML083640016)	0021
Miller, Joan		Email (ML083640011)	0017
Miller, Ron		Email (ML083640011)	0017
Moore, Brian		Meeting Transcript (ML083520105)	0015
Mucci, Matt	Advocacy for the Tampa Bay Partnership	Meeting Transcript (ML083520102)	0014
Mueller, Heinz J	Environmental Protection Agency	Letter (ML090400336)	0044
Murphy, Joe	Gulf Restoration Network	Meeting Transcript (ML083520105)	0015
Musser, Marcie		Email (ML083470117)	0008
Nelson, Tami		Email (ML083640023)	0027
Olson, Mary		Email (ML090060933)	0038
Pernu, Dorothy	Seven Rivers Regional Medical Center	Meeting Transcript (ML083520105)	0015

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Peters, Michael		Meeting Transcript (ML083520105)	0015
Renfro, E. E.	Meadowcrest Community Association	Email (ML090060935)	0034
Roberts, Preston		Meeting Transcript (ML083520102)	0014
Roff, Rhonda		Email (ML083640028)	0030
Russell, John	Self	Meeting Transcript (ML083520102)	0014
Slaback, Laura	Levy County Public Education Foundation	Meeting Transcript (ML083520102)	0014
Smith, Bobbie	Levy County Schools Foundation	Meeting Transcript (ML083520102)	0014
Smith, Robert		Meeting Transcript (ML083520102)	0014
Stewart, Anita		Meeting Transcript (ML083520105)	0015
Sullivan, Jennifer		Meeting Transcript (ML083520105)	0015
Terry, Steve	Miccosukee Tribe	Email (ML090120781)	0037
Towles Ezell, Joy		Email (ML083640022)	0026
Tulenko, James		Letter (ML083500252)	0011
		Meeting Transcript (ML083520102)	0014
Tyler, Janice		Meeting Transcript (ML083520102)	0014
Vianello, Mark	Marion Technical Institute	Meeting Transcript (ML083520102)	0014
Waldron, Theresa	Nature Coast Sierra Group	Meeting Transcript (ML083520102)	0014
		Email (ML083640010)	0016
Walther, Robert	Clean and Safe Energy Coalition	Meeting Transcript (ML083520102)	0014
		Meeting Transcript (ML083520105)	0015
Wapner, Howard		Email (ML083640021)	0006
Welker, Randy	Economic Development Council for Citrus County	Meeting Transcript (ML083520102)	0014
Wheeler, Leonard		Email (ML083640020)	0024
Whiteley, Naomi		Email (ML083470116)	0007
Wilansky, Laura Sue		Email (ML083640031)	0032
Williamson, John	Environmental Radiation Section of the Florida Department of Health, Bureau of Radiation Control	Meeting Transcript (ML083520105)	0015

Table D-2. Comment Categories with Associated Commenters and Comment ID Numbers

Comment Category	Commenter (Comment ID Number)
Accidents – Severe	• Cox, Lesley (0029-3) • Davis, Suellyn (0009-4) • Heywood, Harriet (0019-8) • Musser, Marcie (0008-12) • Olson, Mary (0038-12) • Wilansky, Laura Sue (0032-12)
Alternatives – Energy	• Arnason, Deb (0039-2) (0039-7) (0039-9) • Barnwell, Martha (0014-7) (0014-10) (0015-13) (0015-14) • Berger, Betty (0015-94) • Cox, Lesley (0029-5) (0029-6) • Davis, Suellyn (0009-5) • Dickinson, Josh (0006-4) (0006-11) • Dickinson, Sally (0006-4) (0006-11) • Eppes, Thomas (0014-73) (0014-75) (0014-76) (0014-77) (0014-78) (0014-79) • Foreman, Patricia (0036-3) • Frink, Ken (0014-38) • Haghighat, Alireza (0005-2) • Hernandez, Michael (0014-135) • Heywood, Harriet (0019-10) • Highsprings, Jojo (0023-1) • Hopkins, Norman (0014-57) (0014-58) (0014-59) (0015-111) • Horgan, Wendy (0028-5) • Klutho, Mark (0015-44) • Malwitz-Jipson, Merrillee (0006-4) (0006-11) (0042-2) • Mucci, Matt (0014-105) • Mueller, Heinz J (0044-2) • Musser, Marcie (0008-2) (0008-4) (0008-13) • Olson, Mary (0038-6) (0038-7) (0038-18) • Roberts, Preston (0014-94) (0014-95) (0014-96) (0014-97) • Roff, Rhonda (0030-10) • Russell, John (0014-68) • Stewart, Anita (0015-79) (0015-80) • Sullivan, Jennifer (0015-58) • Towles Ezell, Joy (0026-2) (0026-8) • Tulenko, James (0014-20) • Waldron, Theresa (0016-2) • Walther, Robert (0014-109) (0014-110) (0015-47) • Wapner, Howard (0006-4) (0006-11) • Welker, Randy (0014-29) • Whiteley, Naomi (0007-2) • Wilansky, Laura Sue (0032-10)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Alternatives – Sites	• Albert, Pamela (0015-54) • Barnwell, Martha (0014-12) • Casey, Emily (0015-31) • Jones, Art (0014-147) (0014-152) (0014-155) • Mueller, Heinz J (0044-1) • Peters, Michael (0015-96) • Towles Ezell, Joy (0026-3) • Tyler, Janice (0014-158)
Benefit – Cost Balance	• Barnwell, Martha (0014-11) (0015-15) • Davis, Suellyn (0009-2) • Dickinson, Josh (0006-8) • Dickinson, Sally (0006-8) • Eppes, Thomas (0043-1) (0043-3) (0043-4) (0043-5) • Foreman, Patricia (0036-1) • Heywood, Harriet (0019-1) (0019-3) (0019-4) • Hodges, Alan (0015-69) • Hopkins, Norman (0014-56) (0015-110) • Malwitz-Jipson, Merrillee (0006-8) • Miller, Joan (0017-1) • Miller, Ron (0017-1) • Moore, Brian (0015-104) • Musser, Marcie (0008-3) • Olson, Mary (0038-19) • Roberts, Preston (0014-98) • Tulenko, James (0011-6) • Wapner, Howard (0006-8) • Wilansky, Laura Sue (0032-1) (0032-11) (0032-13)
Cumulative Impacts	• Barnwell, Martha (0015-10) • Casey, Emily (0015-32) • Dickinson, Josh (0006-2) • Dickinson, Sally (0006-2) • Hilliard, Dan (0014-185) • Horgan, Wendy (0028-2) • Malwitz-Jipson, Merrillee (0006-2) • Murphy, Joe (0015-114) • Olson, Mary (0038-2) (0038-21) • Peters, Michael (0015-98) • Smith, Robert (0014-34) • Towles Ezell, Joy (0026-5) • Wapner, Howard (0006-2)
Decommissioning	• Russell, John (0014-66) • Wilansky, Laura Sue (0032-9)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Ecology – Aquatic	• Cox, Lesley (0029-10) • Davis, Suellyn (0009-3) • Dickinson, Josh (0006-7) • Dickinson, Sally (0006-7) • Hopkins, Norman (0014-55) (0015-109) • Malwitz-Jipson, Merrillee (0006-7) • Murphy, Joe (0015-116) • Musser, Marcie (0008-10) (0008-11) • Wapner, Howard (0006-7)
Ecology – Terrestrial	• Casey, Emily (0015-29) • Marraffino, Paul (0014-115) (0014-179) • Murphy, Joe (0015-113) (0015-122) • Smith, Robert (0014-35)
Health – Non-Radiological	• Marraffino, Paul (0014-117) (0014-118) (0014-183) • Medlin, Ted (0040-5) • Sullivan, Jennifer (0015-64)
Health – Radiological	• Cannon, Renate (0014-128) • Cox, Lesley (0029-7) • Dickinson, Josh (0006-5) • Dickinson, Sally (0006-5) • Hopkins, Norman (0014-54) (0015-106) (0015-107) • Malwitz-Jipson, Merrillee (0006-5) • Marraffino, Paul (0014-119) (0014-181) • Olson, Mary (0038-20) (0038-23) • Roberts, Preston (0014-93) • Roff, Rhonda (0030-1) (0030-6) • Wapner, Howard (0006-5) • Williamson, John (0015-4) (0015-5)
Historic and Cultural Resources	• Terry, Steve (0037-1)
Hydrology – Groundwater	• Berger, Betty (0015-93) • Berger, Sarah (0020-3) • Casey, Emily (0015-25) (0015-27) (0015-28) (0015-30) (0015-33) • Cox, Lesley (0029-9) • Hopkins, Norman (0014-53) (0015-105) • Olson, Mary (0038-10) (0038-13) • Roberts, Preston (0014-92) • Roff, Rhonda (0030-3) (0030-5) (0030-9) • Tyler, Janice (0014-156) • Waldron, Theresa (0014-165) (0014-166) (0014-167) (0014-168) (0014-172) • Wilansky, Laura Sue (0032-3)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Hydrology – Surface Water	• Arnason, Deb (0039-5) • Barnwell, Martha (0015-16) • Berger, Betty (0015-91) • Berger, Sarah (0020-2) • Cannon, Renate (0014-126) • Casey, Emily (0015-24) (0015-26) • Cox, Lesley (0029-8) • Dickinson, Josh (0006-6) • Dickinson, Sally (0006-6) • Frink, Ken (0014-41) • Hilliard, Dan (0014-184) (0014-186) • Hopkins, Norman (0015-108) • Jones, Art (0014-148) (0014-149) (0014-153) • Malwitz-Jipson, Merrillee (0006-6) • Marraffino, Paul (0014-116) (0014-182) • Moore, Brian (0015-103) • Murphy, Joe (0015-115) (0015-119) • Musser, Marcie (0008-9) • Olson, Mary (0038-8) (0038-14) (0038-16) • Roff, Rhonda (0030-2) (0030-4) (0030-8) • Wapner, Howard (0006-6) • Wilansky, Laura Sue (0032-2) (0032-4)
Land Use – Site and Vicinity	• Craig, Avis (0035-2) • Medlin, Ted (0040-1) (0040-8) • Welker, Randy (0014-27)
Land Use – Transmission Lines	• Albert, Pamela (0015-88) • Barnwell, Martha (0015-17) • Marmish, John (0014-143) • Peters, Michael (0015-97)
Need for Power	• Barnwell, Martha (0014-6) (0014-8) (0015-11) (0015-12) • Bullock, Wade (0013-1) • Craig, Avis (0035-5) • Foreman, Patricia (0014-50) • Johannesen, Francine (0010-2) (0010-3) • Jones, Art (0014-154) • Maidhof, Gary (0014-131) (0015-1) • Mucci, Matt (0014-103) • Olson, Mary (0038-15) • Pernu, Dorothy (0015-8) • Walther, Robert (0014-108) (0015-46) (0015-48)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Process – COL	• Cheek, Ken (0014-138) • Hilliard, Dan (0014-187) • Mueller, Heinz J (0044-3) • Murphy, Joe (0015-112)
Process – NEPA	• Cannon, Renate (0044-127) • Olson, Mary (0038-1) • Murphy, Joe (0015-118) (0038-1) • Terry, Steve (0037-2)
Site Layout and Design	• Berger, Betty (0015-92) • Jones, Art (0014-151)
Site Redress	• Mueller, Heinz J (0044-4)
Socioeconomics	• Arnason, Deb (0039-8) • Barnwell, Martha (0014-13) (0014-14) (0015-18) • Berger, Sarah (0020-4) • Bullock, Wade (0013-3) • Cheek, Ken (0014-139) • Douglas, Amanda (0014-61) • Edison, Jeff (0014-1) (0014-3) (0014-4) • Foreman, Patricia (0014-46) (0014-48) (0014-49) (0036-2) • Frink, Ken (0014-37) (0014-40) (0014-44) • Garvin, Bill (0018-1) • Haghighat, Alireza (0005-5) • Hernandez, Michael (0015-52) • Hodges, Alan (0015-66) (0015-67) (0015-68) (0015-70) (0015-71) (0015-72) • Hollins, Dixie (0015-86) • Hopkins, Norman (0014-52) • Klutho, Mark (0015-42) • Latimer, Al (0014-80) (0014-82) (0014-84) • Marmish, John (0014-145) • Medlin, Ted (0040-2) (0040-3) (0040-6) • Michaels, Edward (0021-1) (0021-3) (0021-4) (0021-5) • Mucci, Matt (0014-102) (0014-104) • Murphy, Joe (0015-117) (0015-120) (0015-121) • Musser, Marcie (0008-8) • Pernu, Dorothy (0015-9) • Russell, John (0014-63) (0014-64) • Smith, Robert (0014-36) • Stewart, Anita (0015-77) • Sullivan, Jennifer (0015-55) (0015-63) (0015-78) • Tulenko, James (0011-8) (0014-25) • Tyler, Janice (0014-160) • Vianello, Mark (0014-88) (0014-176)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Waldron, Theresa (0014-169) (0014-171) • Walther, Robert (0014-112) (0015-49) • Welker, Randy (0014-26) (0014-30)
Transportation	• Medlin, Ted (0040-7) • Wilansky, Laura Sue (0032-7)
Uranium Fuel Cycle	• Arnason, Deb (0039-4) • Cannon, Renate (0014-125) (0014-130) • Cox, Lesley (0029-2) (0029-4) • Dickinson, Josh (0006-3) (0006-9) • Dickinson, Sally (0006-3) (0006-9) • Eppes, Thomas (0014-71) (0014-72) (0043-2) • Heywood, Harriet (0019-5) • Horgan, Wendy (0028-3) • Klutho, Mark (0015-37) • Malwitz-Jipson, Merrillee (0006-3) (0006-9) • Moore, Brian (0015-102) • Musser, Marcie (0008-5) (0008-14) • Olson, Mary (0038-3) (0038-5) (0038-9) (0038-11) • Russell, John (0014-67) • Sullivan, Jennifer (0015-61) • Towles Ezell, Joy (0026-7) • Waldron, Theresa (0014-162) • Wapner, Howard (0006-3) (0006-9) • Wilansky, Laura Sue (0032-6) (0032-8)

D.2 In-Scope Comments and Responses

The in-scope comment categories are listed in Table D-3 in the order that they are presented in this EIS. In-scope comments and responses are included following the table. Parenthetical numbers shown after each comment refer to the Comment ID number (document number-comment number) and the commenter name.

Table D-3. Comment Categories in Order as Presented in this Report

D.2.1	Comments Concerning Process – COL
D.2.2	Comments Concerning Process – NEPA
D.2.3	Comments Concerning Site Layout and Design
D.2.4	Comments Concerning Land Use – Site and Vicinity
D.2.5	Comments Concerning Land Use – Transmission Lines

Table D-3. (contd)

D.2.6	Comments Concerning Hydrology – Surface Water
D.2.7	Comments Concerning Hydrology – Groundwater
D.2.8	Comments Concerning Ecology – Terrestrial
D.2.9	Comments Concerning Ecology – Aquatic
D.2.10	Comments Concerning Socioeconomics
D.2.11	Comments Concerning Historic and Cultural Resources
D.2.12	Comments Concerning Health – Nonradiological
D.2.13	Comments Concerning Health – Radiological
D.2.14	Comments Concerning Accidents
D.2.15	Comments Concerning the Uranium Fuel Cycle
D.2.16	Comments Concerning Transportation
D.2.17	Comments Concerning Decommissioning
D.2.18	Comments Concerning Site Redress
D.2.19	Comments Concerning Cumulative Impacts
D.2.20	Comments Concerning the Need for Power
D.2.21	Comments Concerning Alternatives – Energy
D.2.22	Comments Concerning Alternatives – Sites
D.2.23	Comments Concerning Benefit-Cost Balance

D.2.1 Comments Concerning Process – COL

Comment: I trust that the NRC and Progress Energy will bring us a responsible design. (**0014-138** [Cheek, Ken])

Comment: For these reasons I have rendered this presentation. I find these apparent inconsistencies unsettling. I do not object to the proposed project in a conceptual sense. However, I pointedly request the various agencies involved in this process hold the State and Applicant to strict interpretation of Federal Statutes and exercise due diligence in this review. The State's determined need for this project is met by a real need to preserve resources in this region. They are very interdependent issues. (**0014-187** [Hilliard, Dan])

Comment: The Gulf Restoration Network (GRN) has deep and profound concerns about the potential environmental impacts that could result from this project being permitted. We strongly urge all local, State, and Federal agencies involved in any and all levels or aspects of permitting this project to fully and completely analyze all potential environmental risks from this project and deny permitting if any environmental review demonstrates a potential threat to Florida's natural resources or regional water systems, supply, or hydrogeology (both in terms of quality and quantity). (**0015-112** [Murphy, Joe])

Response: *The licensing process for combined license (COL) applications is specified in Title 10 CFR Part 52. The environmental review process associated with new reactor licensing includes a detailed review of an applicant's COL application to determine the environmental effects of building and operating the nuclear power facility for up to 40 years. After review of the application against the regulations and regulatory guidance, a mandatory hearing or optional contested hearing will be held where the decision is made about whether or not it is appropriate to grant the license. Safety issues as well as environmental issues will be evaluated before a decision is reached on an application.*

Comment: EPA also has questions about the approval process of certain construction activities mentioned in LNP's Limited Work Authorization (LWA) and Site-Redress Plan. It is our understanding that the LWA may be approved by the NRC prior to all (or most) environmental permits being obtained. Approval of the LWA could therefore potentially authorize site development and deep/shallow foundation construction for the LNP site, to include all or some of the following tasks:

- Installing waterproofing beneath the mud mat under the nuclear islands.
- Installing rebar in the nuclear island concrete foundations.
- Erecting safety-related concrete placement forms.
- Installing Turbine Building foundation drilled shafts.
- Installing Annex Building foundation drilled shafts.
- Installing Radwaste Building foundation drilled shafts.
- Installing circulating water piping between the cooling tower basins and the entrance point to the turbine building condensers. Installing the raw water system intake structure and make-up line to the cooling tower basin.

It is our understanding that the NRC could grant approval of the LWA for the above work prior to approval of the following applications and permits:

- Approval of the application to the NRC for a COL;
- Approval of the application to the State of Florida for site certification;
- Approval of any required National Pollutant Discharge Elimination Permit(s) (NPDES) for water discharge;
- Approval of the Prevention of Significant Deterioration (PSD) air permit;
- Approval of a 316(b) demonstration for the proposed cooling water intake;
- Approval of the U.S. Army Corps of Engineers (USACE) Section 404 and Section 10 permits to construct structures in wetlands and regulated waterways;

- Approval of hazardous waste management and disposal plans;
- Approval of the determination of consistency under the requirements of the Coastal Zone Management Act to ensure the LNP is consistent with existing federal and state coastal zone management plans.

The EIS should clarify whether approval of the LWA can actually occur before most, or all, of the applications and permits mentioned above are approved. (**0044-3** [Mueller, Heinz J])

Response: *By letter to the NRC dated May 1, 2009, Progress Energy provided notification to withdraw their request for a LWA.*

D.3 Comments Concerning Process – NEPA

Comment: After the survey is completed, please continue to consult with us as this project develops. Thank you for consulting with the Miccosukee Tribe. (**0037-2** [Terry, Steve])

Response: *The NRC has initiated consultation with the Miccosukee Tribe in accordance with Section 106 of the National Historic Preservation Act of 1966 and NEPA and will continue to do so throughout the EIS process.*

Comment: I understand that Progress Energy says it is collaborating with local agencies to ensure the plant has no significant adverse impacts on resources or nearby wells. I would like to know which local agencies. (**0014-127** [Cannon, Renate])

Response: *Interactions between Progress Energy and local agencies is outside the purview of NRC's environmental review of the COL application. The NRC has initiated informal consultation with a variety of Federal and State agencies during the environmental review in accordance with the National Environmental Policy Act (NEPA). A list of agencies and organizations contacted will be provided in Appendix B of the EIS. Adverse impacts on surface water and groundwater resources will be addressed in Chapters 4 and 5 of the EIS.*

Comment: In recognition of the Holiday season and the fact that the Progress Energy proposal is in a league of its own - the only "green fields" site not previously licensed for nuclear construction - NIRS asks the Commission to extend the comment period by a minimum of 30 days. We regret that we have not made this request sooner, however it is in the interests of the provisions of the National Environmental Policy Act that affected parties be able to participate in this process fully. The fact that more than half of this comment period falls in the range of Thanksgiving and Christmas/Chanukah/Buddha's Enlightenment/Winter Solstice (NIRS members, including those in Florida, do celebrate across this spectrum) means that people have had to either forgo family celebration or forgo participation in this process. If extension is

granted we would appreciate a direct notice of this fact (828-675-1792/ nirs@main.nc.us) and we will notify NIRS members and members of the public with whom we are in contact in Florida. (**0038-1** [Olson, Mary])

Response: *The commenter requests an extension to the scoping comment period. The NRC established the time period for comments on the scope of the environmental review for new licenses to balance the Commission's goal of ensuring openness in the regulatory processes, with its goal of ensuring that the NRC's actions are effective, efficient, realistic, and timely. While the NRC staff believes that the 60 days provided were sufficient for the comment period, the NRC also considered additional comments that were submitted after the scoping period ended to the extent practicable.*

Comment: Please conduct a full consultation with the National Marine Fisheries Service, the Gulf of Mexico Fisheries Management Council, and the Florida Fish and Wildlife Conservation Commission. (**0015-118** [Murphy, Joe])

Response: *In accordance with NEPA, the NRC has initiated informal consultation with a variety of Federal and State agencies during the environmental review. Agencies with which NRC is consulting include the US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the Florida Fish and Wildlife Conservation Commission (FFWCC). Impacts on the aquatic environment will be addressed in Chapters 4 and 5 of the EIS.*

D.4 Comments Concerning Site Layout and Design

Comment: I believe that the plant is way too big. I mean, Progress Energy hasn't built any nuclear plants in over thirty years, there's just been nothing built in this country. So if you are going to start building nuclear plants again let's start out with something really small. (**0014-151** [Jones, Art])

Response: *The NRC staff will review the need for power and alternatives analyses for the proposed LNP Units 1 and 2 and these analyses will be discussed in Chapters 8 and 9 of the EIS. The external appearance of the proposed facility will be addressed in Chapter 3 of the EIS.*

Comment: Progress Energy states they will barge building supplies up the Barge Canal. A barge has never been able to use the canal due to the twelve-foot depth and the available width. It was one tried it half loaded and it went aground. So I don't understand how they figured this if they didn't know about the barge in April that went aground. (**0015-92** [Berger, Betty])

Response: *Plant construction, including transportation of materials, will be described in Chapter 3 of the EIS.*

D.5 Comments Concerning Land Use – Site and Vicinity

Comment: We the undersigned, are opposed to the Progress Energy railroad line being placed on the old abandoned railroad bed at the south end of The Villages of Rainbow Springs. (**0040-1** [Medlin, Ted])

Comment: We feel the railroad spur in its proposed location will have an irreversible negative impact on our environment, on our property values and on the quality of our lives. (**0040-8** [Medlin, Ted])

Response: *Progress Energy filed a Notice of Amendment on November 26, 2008, to the State of Florida Site Certification Application (SCA), to amend the SCA to withdraw all of those sections of the SCA which addresses the proposed 13-mile corridor in Levy and Marion Counties, Florida. Additionally, the Progress Energy response to information need CR-5, by letter dated January 16, 2009 to NRC, states that the rail line has been removed from the plan.*

Comment: I was the President of the Community Reuse Organization for the Fernald Feed Plant that was a uranium processing plant in Ohio. And, as you know, we've dismantled most of those plants. And this past summer if you go to this plant you will see a field in an area that is truly wildlife oriented. It is completely returned to its use. Now, is that something we would like to always happen with our power plants in the future? And I would say no, we would like to be able to use these as long as we can and continue to use them so that they are productive and whatever. But I think it does answer the question: Can we return certain sites to pristine conditions, and I would argue yes as we saw there. Again, my background is also in brownfield redevelopment, and I've seen the successful redevelopment of sites that are dirty from what we have done in industry and we've been able to accomplish those tasks. (**0014-27** [Welker, Randy])

Response: *Should the Levy Plant be built, the NRC will require decommissioning of the facility when it permanently ceases operation. Land-use impacts of plant construction will be discussed in Chapter 4 of the EIS, and land-use impacts of plant operation will be discussed in Chapter 5.*

Comment: The site is as well suited to accommodate the proposed use in an area of sparse population. (**0035-2** [Craig, Avis])

Response: *Land use impacts of construction and operation of proposed LNP Units 1 and 2 will be discussed in Chapters 4 and 5 of the EIS.*

D.6 Comments Concerning Land Use – Transmission Lines

Comment: I have also had the opportunity to participate on the community working group which was composed of community and business leaders and local citizens. Our task was to find a route for the transmission lines through Citrus County. And many other counties have similar groups meeting, whether it be Levy, or Hernando I believe had them. And we all worked in conjunction, trying to figure out the best route for these transmission lines. We all voted for everything to be buried below the ground so we didn't have to look at them. That didn't work. That was a very expensive alternative. But we all concluded that the best routes were probably the present routes that we have going through the county, and maybe to tie that in with those lines and with the Suncoast Parkway that's coming up through the county. And the purpose was we wanted to see less impact on to our established communities so that the lines did not disrupt that. (**0014-143** [Marmish, John])

Comment: This site also works well with our transmission facilities like the ones we have existing in our plant facility to help bring this generation to our other customers in our thirty-five counties, as well as serving our customers here in Levy and Citrus. (**0015-17** [Barnwell, Martha])

Comment: All we ask, I think, is that you keep us informed as far as the environmental audit to see impacts on our property. Right now it shows the lines will be going about through our living room. So a good share of our five acres may become transmission lines. I don't know. But anyway, all we ask is that you, you know, keep us informed and best of luck to you. (**0015-88** [Albert, Pamela])

Comment: What we are looking at, folks, is the largest land grab via eminent domain for the new distribution network, which I believe is probably unneeded, in the history of the state. Levy County has had multiple county officials formally involved in ruling on the zoning and other issues involving this plant indicted for bribery at the Federal level most recently. (**0015-97** [Peters, Michael])

Response: *Environmental impacts associated with construction and operation of any planned new transmission line rights-of-way will be addressed in Chapters 4 and 5 of the EIS. The analysis will address any potential impacts associated with upgrades to the existing lines if required. The NRC does not have any regulatory authority regarding the implementation of Federal, State, or local guidelines in siting, constructing, or operating transmission lines. The EIS will address any known or proposed activities that could impact the site or transmission corridor environmental conditions and proposed mitigation measures, as appropriate.*

D.7 Comments Concerning Hydrology – Surface Water

Comment: The vast amounts of water consumed in cooling would make a mockery of State efforts to conserve water. These plants would consume our personal drinking water at an unsustainable rate. (**0006-6** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: I worked for the Texas Water Development Board. Bringing me to another point. The agency was not called Water Commission. We had that, too. It said development, meaning there wasn't enough around. And Florida is heading in the right direction, the same direction at an alarming rate. (**0014-126** [Cannon, Renate])

Comment: I am confused by the assertion that the Withlacoochee River does not contribute to the CFBC by the applicant. Within the SCA is a veritable treasure trove of hydrological information, including many pages of data gleaned from USGS stations regarding system flows in the river. There are two engineered discharge points at Lake Rousseau. One is the Inglis Bypass Spillway, which contributes all flows to the Lower Withlacoochee River. It typically provides an average of slightly more than 1,000 CFS to that outstanding Florida water. The second is the Inglis Dam located on the southwest portion of the lake. It provides for water level management on the lake by allowing SWFWMD to discharge excessive water into the CFBC through the upper segment of the Lower Withlacoochee River during high rainfall events. Due to documented leakage there is a contribution of a minimum additional flow of 70 CFS to the segment of the river which discharges in the CFBC and this is a continuous contribution. Within the SCA the applicant has clearly identified contributions to the CFBC for a 35 year period, which during one event exceeded 6,000 CFS (SCA Table 2.3-6 sheets 1 & 2). Monthly mean contributions to the CFBC over the Inglis Dam are in the range of 400 CFS per the applicant's submission. (**0014-186** [Hilliard, Dan])

Comment: We [Progress Energy] have chosen Levy County as our preferred site for several reasons. And one of those is a sufficient supply of cooling water, a critical factor in the operation of a nuclear plant. The preferred site was chosen because it has ample water supply to support the plant without affecting other water usage and requirements in the area. The cooling water for the plant will be supplied by salt water intake coming from the Gulf of Mexico. (**0015-16** [Barnwell, Martha])

Comment: Just like with the economy the world is beginning to realize that we are now experiencing the starting point of a global water crisis. People are slowly cutting back on unnecessary water usage and are starting to make wise choices on when and where to consume water. Globally people are suffering from the lack of clean and fresh water and there is no government that can bail us out of this crisis. Everyone is learning that we cannot continue with business as usual. All over the world people are having to make difficult choices concerning how much water they can obtain for food, cleanliness, health, and industry needs.

The choices made today will affect the future of not only many generations of humans to come but the health of all our ecological systems on this planet. This country is in an important period where change does need to occur. (**0015-24** [Casey, Emily])

Comment: The vast amounts of water consumed in cooling would make a mockery of State efforts to conserve water. (**0029-8** [Cox, Lesley])

Comment: And frankly, we need the water that would be used by these plants for other purposes in our state, which already experiences regular droughts, and employs extensive water use restrictions throughout much of the year. (**0032-4** [Wilansky, Laura Sue])

Comment: Given the likelihood that we are entering a period of reduced availability of fresh water - NRC must project not only the environmental impact of such sacrifice of fresh water - but also the human impact in terms of the whole fresh water system in the area, and the economic impact. Is it possible that the profit margin on that freshwater could in only a decade or two actually be greater for a corporation like Progress? (**0038-14** [Olson, Mary])

Comment: [P]lease enlist a climate crisis expert to help you with the assumptions you use when you project water availability. (**0038-16** [Olson, Mary])

Comment: This proposed sacrifice (and approval of an activity that will likely garner public subsidy) must be weighed against a full disclosure of the methodology of projecting supply of cooling water over the course of the license period. A disclosure of the ways in which climate change has or has not been factored and an explanation of either choice. (**0038-8** [Olson, Mary])

Comment: [Nuclear energy] evaporates millions of gallons of water PER DAY. (**0039-5** [Arnason, Deb])

Response: *The construction and operation of a nuclear plant involves the consumption of water. The staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply resulting from climate variability and climate change. While NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.*

Comment: The Waccasassa River Drainage Basin is a precious resource; the presence of nuclear power reactors within the basin could seriously jeopardize its well-being. Water withdrawal and discharge will cause hydrological alterations in surrounding freshwater streams, lakes, the Cross Florida Barge Canal, groundwater, and the Gulf of Mexico. (**0008-9** [Musser, Marcie])

Comment: [W]e love our water here in Crystal River. Kings Bay is made up of over thirty freshwater springs and it is a manatee sanctuary here in the winter. Anything that has any danger of interrupting the flow of fresh water into those springs is something that we are absolutely opposed to. (**0014-148** [Jones, Art])

Comment: I think the plant, the location of this plant is just in a bad, bad, bad location. As Mr. Hopkins pointed out, it's at the top of the -- what was the word he used -- point true metric concentric circles that brings water down. So it is one of the highest points in this area and the water flows south into Crystal River. And then you have Rainbow River right next to it over in Marion County. (**0014-149** [Jones, Art])

Comment: Mr. Hopkins was talking about tritium going into the environment and tritium into the water. I mean, it just doesn't make sense. I think that the Rainbow Springs, and Kings Bay, and Crystal River, and this whole area around here in the water is absolutely priceless. (**0014-153** [Jones, Art])

Comment: In the SCA it is stated by the applicant that the project will be consistent with the Coastal Zone Management Act as administered by the State's CZMP. It is stated there are no known federal permits required that do not have comparable state permit requirements. While such programs may be properly administered by the State as part of the Act, it is necessary that diligent Federal oversight be administered. I say this because the Federal Government has a vested interest in preserves located nearby such at the Big Bend Sea Grasses Preserve. A component parcel, the Waccasassa Bay State Preserve, is a National Natural Landmark. My concerns are precipitated by assertions made by the applicant which seem unfounded or in conflict with elements of Florida Administrative Code which relate to the State's Coastal Zone Management Program. It is stated in Volume 5 of the SCA, Appendix 10.2.2:

- That the CREC (Crystal River Energy Complex) discharge canal is a Class III surface water and that discharge from the proposed Levy County project will integrate water discharge with that of the CREC.
- That the expected LNP discharge will be cooler than the existing CREC discharge.
- Also in Volume 5, that the Withlacoochee River is not contributing to the CFBC.
- In Volume 8 of the SCA are found depictions of thermal plume models which clearly delineate expansive distribution of heated water from these discharges.

Copies of these extracted assertions are submitted with this presentation. What concerns me, and I admit freely that I simply may not have found reference within the volumes of the application, is this: The waters beyond the discharge canal have a higher classification under Florida Administrative Code and this does not appear to be recognized in the applicant's submission. The impact of their discharge cannot reasonably be considered only in context of the discharge canal. This is certainly a matter for the state to resolve, yet if I understand our purpose here today, oversight of the process is a Federal responsibility.

62-302.400 (FAC) Classification of Surface Waters, Usage, Reclassification, Classified Waters

Class II Coastal Waters - From the southern side of the Cross Florida Barge Canal southward to the Hernando County line, with the exception of Crystal River (from the southern shore at the mouth of Cedar Creek to Shell Point to the westernmost tip of Fort Island), Salt River (portion generally east and southward along the eastern edge of the islands bordering the Salt River and Dixie Bay to St. Martins River), and St. Martins River from its mouth to Greenleaf Bay. (**0014-184** [Hilliard, Dan])

Comment: [I]t is my understanding also there is a very serious concern about the impact upon the nearby waters in the Gulf of Mexico, just in the act of construction. (**0015-103** [Moore, Brian])

Comment: My second concern is with regard to the cooling waters for the plant. It is clear from Progress Energy literature that most water used at any new plant on the Levy County site will cycle between the Cross Florida Barge Canal and the Gulf at between 100 and 130 million gallons per day, together with a million gallons a day drawn from the freshwater aquifer. It is estimated that 60% of barge canal water would go to the Gulf with 40% released to the atmosphere. Heat, tritium and other pollutants would thus be vented to the air and directly into Withlacoochee Bay and Gulf coastal waters. (**0015-108** [Hopkins, Norman])

Comment: What are the impacts to coastal wetlands habitat, estuaries, and seagrass beds from degraded water quality in the region and from this project (discharges of high temperature water, etc.)? What are the impacts to the Withlacoochee River, coastal wetlands habitats, estuaries, and seagrass beds from reduced fresh water flows resulting from changes in hydrologic patterns and increased groundwater pumping related to this project that lead to less fresh water reaching the coastal ecosystems? How will reduced fresh water flows resulting in high salinity impact these systems? What will the combined impact of reduced flow/higher salinity and increased temperatures via plant discharges do to surrounding natural systems? (**0015-115** [Murphy, Joe])

Comment: What will the cumulative impact of this project be on the surrounding state sovereign submerged lands along the coast, and the public lands in the greater region (Goethe State Forest, Waccasssa Bay State Preserve, etc.) How will those publicly owned lands be potentially negatively impacted in terms of reduced recreational use, habitat loss, changes in hydrologic patterns regionally, lessened economic contributions to the region, and overall reduced ecological function? How will reduced freshwater flows to the coast (leading to higher salinity), and potentially degraded water quality of waters reaching the coast impact the Big Bend Seagrasses Aquatic Preserve and any aquatic resources of state or Federal importance in the region? How will discharges of high temperature water impact the Big Bend Seagrasses Aquatic Preserve? (**0015-119** [Murphy, Joe])

Comment: The locations of the proposed Levy 1 and 2 nuclear power plants would be in the area of the single most important recharge zone for southern Levy County and thus for the Waccasassa Bay, the Big Bend sea grass beds, the Withlacoochee River and its watershed, the Goethe state forest, the Gulf Hammock wildlife management area, the Rainbow Springs watershed area, the aquiculture area and of utmost importance the area would be for that it provides fresh drinking water to the inhabitants of most of the southern part of Levy County, part of Marion County, and the northern part of Citrus County. (**0015-26** [Casey, Emily])

Comment: I am requesting that the EIS examine and clearly explain to the residents of Levy and Citrus counties and the surrounding region, the difference between the conditions now and the conditions if the new nuclear units reach full operation as proposed. I am interested in the conditions specifically due to the two new reactors and associated operations, without regard for the decommissioning of the coal fired unit at Crystal River. Please express the detailed quantitation and any assumptions made for the calculations of [t]hermal discharges, zone of influence clearly displayed on a map image, and limits which will be applied to the facility. (**0030-2** [Roff, Rhonda])

Comment: I am requesting that the EIS examine and clearly explain to the residents of Levy and Citrus counties and the surrounding region, the difference between the conditions now and the conditions if the new nuclear units reach full operation as proposed. I am interested in the conditions specifically due to the two new reactors and associated operations, without regard for the decommissioning of the coal fired unit at Crystal River. Please express the detailed quantitation and any assumptions made for the calculation of [z]one of influence of surface water withdrawal, incorporating the Florida Department of Environmental Protection's Phase II Florida Aquifer Vulnerability Assessment for Levy and Citrus counties. (**0030-4** [Roff, Rhonda])

Comment: There are many reasons why building new nuclear plants at the Levy site is a terrible idea. One of the big reasons is the impact this would have on water in Florida. Development and population growth in Florida have made water a very big issue here, and it's vital for us to protect the ever-dwindling sources of fresh water we still have. Two new nuclear plants on this site that has never had any power plant, let alone nuclear plants that will use massive amounts of water, is a very bad idea indeed. The water in this area is connected to a large freshwater resource for Florida, and the plant construction alone would damage these resources. (**0032-2** [Wilansky, Laura Sue])

Response: *Chapter 2 of the EIS will describe the current hydrological condition at the proposed site. Chapters 4 and 5 of the EIS will describe the methods and results of the evaluation of impacts on water resources from the construction and operation of the proposed action. Included will be consideration of impacts on fresh waterbodies, groundwater, and the Gulf of Mexico. The NRC staff's review will be performed over a range of climate conditions including drought. The staff will consider the opportunity to mitigate possible impacts by considering alternative plant cooling systems. The NRC staff will address cumulative surface*

water and groundwater impacts in Chapter 7 of the EIS. The release of radionuclides to the environment resulting from normal operations, along with associated impacts, will be described in Chapter 5 of the EIS. The NRC staff's Safety Evaluation Report will address the consequences of an accidental release of radionuclides. Because the State of Florida is the primary regulatory authority over water use and water quality, the staff will work closely with state agencies. Representatives of several state agencies attended the site audit and discussed their specific concerns with the staff. Because construction and operation of the proposed action also have an impact on water quality and aquatic ecology, the staff will closely coordinate these reviews.

Comment: I would just like to propose be considered for the Environmental Impact Statement ... that there be a robust stormwater system, stormwater management system; that it be a closed system, meaning that any rainfall that falls on the site doesn't run off on the surface but is dealt with with DRA's and with bio-remediation and other methods. (**0014-116** [Marraffino, Paul])

Comment: Specifically a "closed" robust stormwater system for the property should be designed to keep all rainwater on site for the highest level of remediation defined by the water district. No stormwater, including a 100-year storm event, should leave the site without treatment or remediation. (**0014-182** [Marraffino, Paul])

Response: *The construction and operation of a nuclear plant involves management of stormwater on the site. The staff assessment of stormwater management plans prepared by the applicant will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.*

Comment: They [Progress Energy] are also going to use the Barge Canal as their intake water. Again, it is an aspect that is there; why not make use of it. And they are also going to use the Barge Canal as the, not the conduit, but the pathway to get to the discharge points which are existing discharge points on the existing power plant. (**0014-41** [Frink, Ken])

Comment: Well, they are going to pull water from the Barge Canal several miles from the Gulf. There are dilution channels that branch off and possibly could bring salt water into public water supply and many private wells. The Barge Canal is presently not as salty as the Gulf because they send water over the Inglis main dam to try and lower the amount of salt. (**0015-91** [Berger, Betty])

Comment: They plan to draw water from the Gulf up the Barge Canal beginning their piping about 7 miles inland. The Barge Canal has periodic flushes of fresh water to keep it diluted so as not to put salt water into the Floridan aquifer, where the entire area draws their drinking water. This plan actually pulls the Gulf water inland as completely salty and not diluted. If they draw from the Gulf they MUST start their enclosed piping at the Gulf and NOT inland. (**0020-2** [Berger, Sarah])

Response: *Chapter 5 of the EIS will describe the methods and results of the evaluation of water quality impacts from the operation of the proposed plant. Included will be consideration of impacts on the Cross Florida Barge Canal and on groundwater along the canal and in the vicinity of the Levy site. Because the State of Florida is the primary regulatory authority over water quality, NRC staff will work closely with state agencies. Additionally, Chapter 9 of the EIS will evaluate alternative cooling systems.*

Comment: In addition to the assessment of chemical loadings, I am requesting an analysis of the impact of the predicted rising sea temperatures on the effectiveness of the cooling system. (**0030-8** [Roff, Rhonda])

Response: *As part of the NRC's environmental review, the staff will independently assess the impact of operation of the plant cooling system including consideration of current and future conditions resulting from climate variability and climate change. The staff's assessment of the impacts will be presented in Chapter 5 of the EIS.*

D.8 Comments Concerning Hydrology – Groundwater

Comment: There's quite a few items that we, as a community, need to be aware of. We are situated on a hydraulic part of the sand hill. Everyone has heard of the karst and how fragile it is. We are at a downhill position from I believe it is north of Levy. (**0014-165** [Waldron, Theresa])

Comment: My first concern is concerning the siting of the facility which is proposed in Levy County. The proposal is to put it on top of the highest level of ground water pressure for miles around, which means that everything that gets generated there is going to go out into the river systems which are fed with fresh water from that very location. (**0014-53** [Hopkins, Norman])

Comment: The environmental review that we are here for today is extremely important to me because I'm a farmer. I have a farm and I'm familiar with aquifers and how they work, and the water flow, and I can even hear it in places on my property. And once you poison those aquifers we're all done and Florida is going to lose its glitter. And the aquifers run all the way across the state and a lot of people draw water from them. (**0014-92** [Roberts, Preston])

Comment: My first concern is regarding the siting of the proposed plant. From a potentiometric map, of which this is a copy, the site appears to be at the highest potentiometric level for miles around. Such that ground water flows out to such environmentally sensitive features as the Rainbow, Withlacoochee, Crystal River/Kings Bay and Wekiva River systems and state parks. That locality is considered to be the source of fresh water to the Crystal River system, and is due to be verified next year. (**0015-105** [Hopkins, Norman])

Comment: It is a very karst area and that means that the thin limestone covering of the Floridian aquifer has lots of holes in it, and there is also sinkholes, in fact, in that surrounding

area. And this is Exhibit 2. The red shows all the sinkhole areas or at least within 787 feet of a sinkhole area. And this is right in here. And water can flow and will flow in many different directions. It just depends on the amount of water in the system at any given time. (**0015-28** [Casey, Emily])

Comment: I am requesting that the EIS examine and clearly explain to the residents of Levy and Citrus counties and the surrounding region, the difference between the conditions now and the conditions if the new nuclear units reach full operation as proposed. I am interested in the conditions specifically due to the two new reactors and associated operations, without regard for the decommissioning of the coal fired unit at Crystal River. Please express the detailed quantitation and any assumptions made for the calculations for [a]mount of Discharge to Groundwater itemized by chemical species, limits which will be applied, and zone of influence. (**0030-3** [Roff, Rhonda])

Comment: The further risk of permanent groundwater contamination posed by operating nuclear plants here is very high. We have seen this kind of contamination again and again around other nuclear plants all over the country, including right here at Turkey Point in Florida. It is simply not worth the risk to our irreplaceable Florida water resources! (**0032-3** [Wilansky, Laura Sue])

Comment: Please assess the sacrifice zone that NRC will be creating by this license action. ...for instance - licensee contaminates ground water - since NRC has not been able to prevent this at dozens of currently licensed sites, it should be assumed to have a reasonable likelihood of happening at Levy. (**0038-10** [Olson, Mary])

Comment: Since the site is on top of karsts - spring recharge areas - the sacrifice must assess the loss of this natural water resource regardless of any spill, contamination or accident - simply by construction. (**0038-13** [Olson, Mary])

Response: *The EIS will evaluate the impact of the proposed plants on groundwater quality and availability. A description of the current groundwater resources will be provided in Chapter 2 of the EIS. The impact of construction at the Levy site will be addressed in Chapter 4 of the EIS. The impact of operating the proposed plants at the Levy site will be addressed in Chapter 5 of the EIS, including the impacts to the environment resulting from the release of radionuclides during normal operations. The NRC staff will evaluate the consequences of an accidental release of radionuclides in its Safety Evaluation Report, and releases from postulated accidents, such as design-basis accidents, will be evaluated in the EIS.*

Comment: I don't think the public understands. It doesn't matter the money, the house, the jewels you own, when we run out of water we are out of life. And there is no guarantee that the millions of gallons of water that these new plants are planning to use are not going to be

affecting the down flow of the aquifer. And everyone that is on the down flow, which would be everyone practically, our wells could be contaminated. (**0014-167** [Waldron, Theresa])

Comment: In addition to the assessment of chemical loadings, I am requesting an analysis of the competing demand for groundwater under the worst-case scenario buildout analysis for the year 2060 as produced by 1000 Friends of Florida. (**0030-9** [Roff, Rhonda])

Response: *The NRC staff will describe and evaluate the impacts of any use of groundwater on local groundwater users during construction and operation of the proposed plants in Chapters 4 and 5 of the EIS. The NRC staff will review the consequences of an accidental release of radionuclides in the staff's Safety Evaluation Report, and releases from postulated accidents, such as design-basis accidents, will be evaluated in the EIS.*

Comment: I am concerned about our groundwater. We have a unique system with the Florida aquifer and it is our drinking water. That is a great concern to me. (**0014-156** [Tyler, Janice])

Comment: [T]his central part of Florida only receives the water that we receive from rain. We don't get it from any other location. We don't get it from snow fall, or another river, or anything else. Central Florida is totally dependent for drinking water from rain which goes through our wetlands that are being destroyed every day. They are being purified and filtered to go into our private aquifer. This aquifer only feeds Central Florida. North Florida has its own aquifer. (**0014-166** [Waldron, Theresa])

Comment: We don't know when that water is going to get the salt intrusion from the Gulf. There is -- I want that in writing, too -- a guarantee that you're not going to be destroying our wells. Because I live in the country I don't have city water. I have the best water I have ever had in my life. I have a private well on the Florida aquifer. (**0014-168** [Waldron, Theresa])

Comment: And if you are going to build the plants, are you also going to voluntarily build us a de-sal plant? Just go ahead and do it for community service and guarantee there is water because in ten years I don't think there will be. (**0014-172** [Waldron, Theresa])

Comment: The only way our environment is ever going to be able to recover from the water deficit is to allow the earth's ecological banking system to work. Where can this banking system be found and what types of resources are needed to make this accounting system functional? The recharge areas which allow water from rainfall to percolate into the Floridian aquifer quickly and the wetlands, which hold, or in parentheses I have (save) water after the rainfall event, must be protected now. (**0015-25** [Casey, Emily])

Comment: This small red zone right down in here, the southern part of Levy County, is a part of the Floridian aquifer's vulnerability assessment map. It shows an area where the groundwater's quality and quantity are extremely vulnerable. (**0015-27** [Casey, Emily])

Comment: From Cedar Key through an area north of Bronson and over to Daytona Beach it is now known that the aquifer only receives water from rainfall. The monitoring well set up north of this area, north of the proposed area, by the USGS shows that the system is at a critical stage for water quantity a lot of the year. The less rainfall the less water that goes into the system. The less water in the system, along with the extremely high increases in consumption, can and will be catastrophic to this area. We tend to think of countries that have lots of oil under their feet as being rich. We should understand that an area with fresh, clean water has a treasure under their feet and it must not be wasted any more. (**0015-30** [Casey, Emily])

Comment: It has been estimated that to provide water needs for all uses through the year 2030, the world would need to invest at least $1 trillion a year on technologies towards that end. By not placing more demands on our fragile Floridian aquifer but to restore habitat and allow nature to work as it was intended to do it provides a cost-free system to obtain the most precious commodity that we all need, clean and fresh water. (**0015-33** [Casey, Emily])

Comment: Their [Progress Energy's] draw of fresh water from the Floridan aquifer is unaccounted for presently, but it could be astronomical. Across Highway #19 from them is the Tarmac King Road proposed mine, drawing 22 million gals of water/day from the Floridan to wash their lime rock. There are 194 private shallow wells in the area, plus four public water supplies and more wells. The Southwest Florida Water Management District has put out printed material stating that this area of the Floridan aquifer is fed only by rainfall due to the high ridges surrounding it. AND IT'S NOT RAINING! Water is more important to people than lime rock and certainly more than nuclear plants, which are not environmentally friendly. (**0020-3** [Berger, Sarah])

Comment: These plants would consume our personal drinking water at an unsustainable rate. (**0029-9** [Cox, Lesley])

Comment: I am requesting that the <u>EIS examine and clearly explain to the residents of Levy and Citrus counties and the surrounding region, the difference between the conditions now and the conditions if the new nuclear units reach full operation as proposed</u>. I am interested in the conditions specifically due to the two new reactors and associated operations, without regard for the decommissioning of the coal fired unit at Crystal River. Please express the detailed quantitation and any assumptions made for the calculation of [z]one of influence of groundwater withdrawl, incorporating the Florida Department of Environmental Protection's Phase II Florida Aquifer Vulnerability Assessment for Levy and Citrus counties. (**0030-5** [Roff, Rhonda])

Comment: There is a shortage of water. Across the highway from Progress Energy is plans for Tarmac Mine pumping 22 billion gallons of water a day to wash their lime rock. For 100 years this area of the Floridian aquifer is fed only by rainfall and it is not raining. According to SWFWMD they have applied to SWFWMD -- this is Tarmac -- they have applied to SWFWMD that they are only using 500,000 gallons. SWFWMD is just counting what they are

consuming. They are not counting what they are pumping out, making it turbid, pumping it back in the aquifer. Not pristine water that they pumped out. ...Anyway, it will be turbid, conceal the crevices of the karst limestone. We won't have what they took out. Blasting is with ammonium nitrate and oil. Nitrate is infiltrating the area's springs already. Do they need more? (**0015-93** [Berger, Betty])

Response: *The NRC staff will describe and evaluate the impacts of any use of groundwater on local groundwater users during construction and operation of the proposed plants in Chapters 4 and 5 of the EIS. Changes in the availability of the water resource by competing demands and long-term variability will be addressed in Chapter 7 of the EIS, cumulative impacts on water use and quality.*

D.9 Comments Concerning Ecology – Terrestrial

Comment: Surrounding the vulnerable recharge area -- since I equate it to economics I call that the area where money can be spent quickly -- it is the most important asset Florida has, the wetlands. And that's the savings account. (**0015-29** [Casey, Emily])

Response: *The impacts on wetlands and groundwater recharge resulting from construction and operation of proposed LNP Units 1 and 2 will be discussed in Chapters 4 and 5 of the EIS. The discussion will include an analysis of the possible effects of groundwater changes on wetlands in the region.*

Comment: What are the potential impacts of habitat loss and disruption, heavy industrial activity on this site, and related projects in the greater region resulting from the proposed Progress Energy Nuclear Power Plant to year round and migratory bird species (neotropical migrants and songbirds, swallowtail kites, etc.) who currently use the greater Nature Coast and Levy County region (the term Nature Coast henceforth shall be used in this document to refer to the coastal and inland ecosystems that stretch from just north of Tampa Bay to the Wakulla County region)? Please conduct a detailed study and full analysis of all State and Federally listed and protected species, both year round and migratory species. (**0015-113** [Murphy, Joe])

Response: *The impacts on resident and migratory birds, including but not limited to Federally and State-listed species, resulting from construction and operation of the proposed LNP will be discussed in Chapters 4 and 5 of the EIS. Cumulative impacts on birds will be addressed in Chapter 7 of the EIS.*

Comment: In terms of regional listed species (State and Federal) and their habitats and wildlife corridors we request that the Nuclear Regulatory Commission request a full site review and regional review and consultation with the U.S. Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FFWCC). We also request that the Nuclear Regulatory Commission fully and independently review past relevant biological and

species site/regional data from the Florida Natural Areas Inventory (FNAI), any current or past wildlife surveys conducted by FFWCC for the region, any current or past documents or species surveys conducted by the property's previous owners. Lastly it is imperative the publicly funded site/regional surveys be conducted with State or Federal biologists as part of the environmental review. (**0015-122** [Murphy, Joe])

Response: *In order to determine Federally and State-listed species to be evaluated in the EIS, the NRC has started informal consultation with the US Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), and the Florida Fish and Wildlife Conservation Commission (FFWCC). These agencies provided NRC with information on listed species that they believe should be addressed in the EIS. All relevant studies and species surveys for Federally and State-listed species from the project vicinity will be reviewed and incorporated into Chapter 2 of the EIS. The results of the NRC's assessment will be reported in a Biological Assessment that will be forwarded to the appropriate services. Additionally, the NRC staff will describe impacts to protected species in Chapters 4 and 5 of the EIS. The NRC will consult with the FWS and the NMFS regarding potential impacts identified in the biological assessment.*

Comment: I'm here to speak just for myself and my wife, Sandra, and narrow it to the Lake Rousseau and your neighbor to the new proposed site for the nuclear power plant. When the dam was put on Lake Rousseau in 1906, it raised the water level and created a lot of islands, marshes and other things that are a wonderful breeding site for many birds in the community. Thousands and thousands of breeding pairs are located there. The Office of Greenways and Trails has been a good steward of this property along with other state agencies. And the question is now that we have a major development being proposed could this large site have an impact on this location. And we, of course, want to minimize that impact because we like birds there. My wife and I do, at least. (**0014-115** [Marraffino, Paul])

Comment: For over a hundred years Lake Rousseau with its vast area of marshes, islands and hummocks, has provided breeding opportunities for a wide variety of birds. With the current stewardship of the Office of Greenways and Trails and other state agencies, nesting populations have grown and flourished. Many of the breeding populations are listed species that require special attention for protection from the environmental impact of large-scale development. The Levy County Nuclear Power Plant that is under development is near Lake Rousseau and, without measured discipline, could have a negative impact on the water quality and breeding potential of this extraordinary area. (**0014-179** [Marraffino, Paul])

Response: *Impacts on water levels and water quality in Lake Rousseau resulting from construction and operation of the proposed LNP, including any associated impact on breeding bird populations and their habitats, will be addressed in Chapters 4, 5, and 7 of the EIS.*

Comment: [O]n the outside border of their property are you all going to require a fence to border their property all the way around to cut off the movement of the wild game to the State Forest and surrounding people. (**0014-35** [Smith, Robert])

Response: *Discussion of impacts on wildlife, including wild game, resulting from any proposed fencing around the LNP site will be discussed in Chapters 4 and 5 of the EIS.*

D.10 Comments Concerning Ecology – Aquatic

Comment: Discharges of hot water will harm Gulf estuarine ecosystems and fisheries. (**0006-7** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: The water discharged from the nuclear plant would be hotter than what is withdrawn. Temperature changes negatively affect the fish, plant, and animal life that depend on healthy water systems. (**0008-10** [Musser, Marcie])

Comment: We have done enough damage to our environment and the animals. The hotter water released by this plant would increase not lessen our disastrous impact there. (**0009-3** [Davis, Suellyn])

Comment: My concern in this regard is the impact upon the marine food web nurtured in our offshore sea grass meadows, and the impact upon dependent professional and recreational fisheries. Power plants are notoriously damaging to sea grasses when venting to such waters. (**0015-109** [Hopkins, Norman])

Comment: Discharges of hot water will harm Gulf estuarine ecosystems and fisheries. (**0029-10** [Cox, Lesley])

Response: *The NRC staff will assess impacts on aquatic biota and ecosystems in the Gulf of Mexico from thermal discharges from proposed LNP Units 1 and 2 in Chapter 5 of the EIS.*

Comment: The water intake system will likely increase salinity in the upper reaches of the Cross Florida Barge Canal, as well as threaten fish and fish larvae, among other aquatic organisms. (**0008-11** [Musser, Marcie])

Response: *The NRC staff will assess impacts on aquatic biota in the Cross Florida Barge Canal from water intake operations for proposed LNP Units 1 and 2 in Chapter 5 of the EIS.*

Comment: My second concern is with regard to the cooling waters of the plant. Huge quantities of water are going to be cycled from the Cross Florida Barge Canal and put back to the -- into the Gulf. My concern in this regard is the possible impact upon the marine food web which is nurtured in our offshore sea grass meadows, and the impact upon the dependent

professional and recreational fisheries. Power plants are notoriously damaging to sea grasses when venting to such waters. (**0014-55** [Hopkins, Norman])

Comment: What are the impacts to State and Federally listed marine species, game fish, and commercial fisheries that depend on healthy and functional coastal estuaries and seagrass beds in this region? Specifically please review and provide analysis of the potential negative impacts to scallops, mullet, sea trout, redfish, oysters, clams, jacks, grouper, sheepshead, shrimp, blue crab, manatee, sea turtles, sturgeon and other important estuary oriented species in the region. (**0015-116** [Murphy, Joe])

Response: *The NRC staff will assess the effects of the withdrawal and discharge of cooling water for the proposed nuclear power plants on aquatic biota, including protected species and species that are recreationally, commercially, or otherwise important, inhabiting the Cross Florida Barge Canal and the Gulf of Mexico in Chapter 5 of the EIS.*

D.11 Comments Concerning Socioeconomics

Comment: This project is essential for the economy and prosperity of citizens of the State of Florida. (**0005-5** [Haghighat, Alireza])

Comment: Finally, the Levy Nuclear plant will be a major source of economic income for both the civil government and the citizens of Levy county through taxes and excellent employment opportunities. (**0011-8** [Tulenko, James])

Comment: I have conversed with many, many people in our county about the proposed power plant. Everyone I have spoken to, without exception, is in favor of the plant. We absolutely want the jobs and the tax base it will bring to our area. (**0013-3** [Bullock, Wade])

Comment: Levy County is excited about these opportunities for our kids. I am interested in the -- mostly interested in our human environment because that's what I deal with all the time in our schools. (**0014-1** [Edison, Jeff])

Comment: As an economic development organization, we feel this would be the most significant infrastructure investment in decades. It is no secret that our region and our state is growing and making sure that it is smart growth is a pivotal step. (**0014-102** [Mucci, Matt])

Comment: The plan for two new reactors would mean a significant amount of jobs which would head our economy back in the right direction. (**0014-104** [Mucci, Matt])

Comment: But there are other benefits of a nuclear power plant to our local economy. It supports high paying jobs directly at the plant. The Levy plant will provide thousands of construction jobs and many permanent jobs to the region. Furthermore it is estimated that for

every job created at a nuclear plant, three more are created in the surrounding community. Three more. Those are Levy jobs. Those are not exportable. They will not go overseas. Better schools, roads, and other civic improvements are also products of nuclear energy and nuclear energy will save Floridians $1 billion a year once up and running. (**0014-112** [Walther, Robert])

Comment: [T]he economic benefits for Levy County will provide a great tax base, job growth, local services, and there are many other benefits that Levy County will also experience. Quite frankly we will have about 800 jobs at our two combined units which will generate about 1,000 to 2,000 indirect jobs as well as 3,000 jobs during construction. (**0014-13** [Barnwell, Martha])

Comment: I believe the economic impact to the area is very important. (**0014-139** [Cheek, Ken])

Comment: But the investment in the plant is only part of our investment. The other part is in our community because we strive to be an excellent neighbor in Levy County, and we strive to continue the strong partnership that we have. (**0014-14** [Barnwell, Martha])

Comment: I think that in summation that the things that they are going to bring to you is greater employment to Levy County, but we hope that all the employees live in Citrus County. ...[I]t will enhance the quality of life for both counties. (**0014-145** [Marmish, John])

Comment: [W]hat is going to happen for property devaluation when you run your transmission lines through people's, near people's homes because of health purposes? Is there any monetary compensation? (**0014-160** [Tyler, Janice])

Comment: [T]here are estuaries that will be destroyed in the bend area of Florida once you open that up to sprawl. (**0014-169** [Waldron, Theresa])

Comment: Bringing construction and everything to Levy County, bringing money, jobs. After the construction is done, how many local people will you be employing with a high school diploma and maybe a year of technical school? Will that be adequate for any of your jobs or will you be bringing in highly-trained college educated people from other plants in other areas? Our area does not have a lot four, six, eight year diplomas hanging around for you to just suck up and employ. So that, I believe, is a fallacy. (**0014-171** [Waldron, Theresa])

Comment: The building of these reactors will be an integral part of strengthening and growing our region's economy. It is my belief that the economic impact will be positive; providing thousands of well-paying jobs, many of which can be filled by current and future students. (**0014-176** [Vianello, Mark])

Comment: [T]he Levy Nuclear Plant will be a major source of economic income for both the civil government and the citizens of Levy County through taxes and excellent employment opportunities. (**0014-25** [Tulenko, James])

Comment: I'm the Executive Director for the Economic Development Council for Citrus County. And obviously, we don't want the plant to go to Levy; we want it to go to Citrus County. (**0014-26** [Welker, Randy])

Comment: [Progress Energy employees] are our Little League coaches, they are our school advisory council members, and we greatly look forward to working with Progress Energy in the opportunities that we have in the field of nuclear and technical education. (**0014-3** [Edison, Jeff])

Comment: I'm concerned about our economy. Our economy is in need of this type of use that is economical and beneficial to our community as well as the United States. From what I understand, this power plant currently that we live in this area with and who has been a very good citizen for our community, is the third largest producer of power in the country. (**0014-30** [Welker, Randy])

Comment: [W]hat kind of information do you all have on the devaluing of the adjoining properties to a nuclear power plant. (**0014-36** [Smith, Robert])

Comment: I would like to touch on three aspects of what we see good things about this project. First and foremost is the positive impact we see in the community. You know, I moved here back in the mid-seventies and we've been visiting Citrus County since the early seventies. And I've watched how all five of those plants, particularly the nuclear power plant up there, has transformed this community. Citrus County has always been a retirement, a slow-moving community with a severe lack of meaningful jobs. It's mostly been support jobs. And this one particular project is going to bring, just during the construction of it, I'm hearing over 3,000 skilled laborers, plus all the ancillary, you people that are going to be supporting those people. And then also they have like over 800 full-time jobs that support these plants on a fulltime basis for probably the next eighty or a hundred years. And this doesn't even account for the ripple effect, the secondary jobs needed to support those folks. (**0014-37** [Frink, Ken])

Comment: But this plant offers a lot of economic and job opportunities for the kids and the families of Levy County, both directly working here at the facilities here now and in the future, and the spin- off businesses that are going to result from the nuclear power plants. (**0014-4** [Edison, Jeff])

Comment: As proven in the past with Crystal River 3, it [the Levy plant] will ultimately be embraced by the community and have a lasting positive impact on both the environment and our local economy. (**0014-44** [Frink, Ken])

Comment: [E]conomic development is about creating sustainable wealth and improving quality of life in our communities. This is done by increasing prosperity, creating high quality jobs, creating new personal income, advancing private enterprise, productive use of local businesses and resources, and broadening the tax base. We believe -- myself, along with the Council believes that this project is going to create an opportunity for that to take place in this entire county. (**0014-61** [Douglas, Amanda])

Comment: [A] couple thousand jobs that have been described as being generated by the construction and operation of this plant, both direct and indirect, will be far and away eclipsed by the numbers of quality jobs for the kinds of people, the people with the skill sets that would accommodate these jobs, that are missing in action today with declining construction in a declining economy. (**0014-64** [Russell, John])

Comment: As we work to diversify the state's economy and create jobs, which is our mission, we have strategically focused our business retention and recruitment efforts on industries that offer great high growth potential and pay higher than average state wages. Clean energy is one of the sectors that we focus on. (**0014-80** [Latimer, Al])

Comment: As Enterprise Florida works to attract new businesses to the state and helps existing businesses to expand, we recognize the many benefits of nuclear power companies. It is generally accepted that businesses function best in an environment where things are predictable and certain. Nuclear generated power can provide low stable cost electricity which helps businesses avoid uncertainty. (**0014-82** [Latimer, Al])

Comment: The jobs that will be generated by the construction of this nuclear plant will be high wage jobs. Those jobs will help raise the state average wage and improve the quality of life for not only this community but for the entire state. (**0014-84** [Latimer, Al])

Comment: I would also like to say that I think it will be important for the economic development. What's being proposed here in Levy County will be a tremendous benefit to our students, to students in North Central Florida and to adults in North Central Florida as well. I think they are a tremendous positive economic impact. (**0014-88** [Vianello, Mark])

Comment: The economic benefits of this plant are terrific. The large local investment will allow the county and residents to make investments through increased tax base, new jobs, enhanced local services and a variety of other benefits that local businesses will receive through our plant that we anticipate building here. Levy County can expect to see about 800 permanent jobs with the two units. In addition to that, 1,000 to 2,000 ancillary jobs will be created and we anticipate during construction 3,000 jobs will be needed, or 3,000 people will be needed on site at its peak for construction. But our investment doesn't just stop with the plant. Our investment, as you have heard already, also involves the community and being a good partner and a good steward. We strive to be a good steward and a good neighbor in the communities we serve. (**0015-18** [Barnwell, Martha])

Comment: But there are other benefits of nuclear energy to the local economy. It supports high paying jobs directly at the plant. In fact, the Levy plant will provide thousands of construction jobs and many permanent jobs to the region. Furthermore it is estimated that for every permanent job that is created at the plant, three more jobs will be created in the surrounding community. That's three more Levy jobs. They can't be exported. Better schools, roads, and other civic improvements are also products of nuclear energy and nuclear energy will save Floridians $1 billion a year once up and running. $1 billion a year once up and running. (**0015-49** [Walther, Robert])

Comment: Homestead Florida also happens to be, according to U.S. News and World Report, the fastest growing city in the United States of America with 50,000 residents or less. That's indicative, at least to me and to that community that having Turkey Point in that area has not been a detriment to population growth. It certainly hasn't been a detriment to the economy. Despite the housing slowdown, it is still very populated. We have restaurants going up everywhere. There is a Chili's that was just built down the street from my home. And nuclear power has not been a detriment. (**0015-52** [Hernandez, Michael])

Comment: This is an expensive and dangerous proposition. Scientists in their studies can be biased towards whoever is funding them. If they dangle jobs in front of you, what kind of jobs? What is your health worth to you to look the other way? (**0015-63** [Sullivan, Jennifer])

Comment: Local spending on plant construction and power generation operations are considered to be new economic activities that represent additional final demand, and thus will generate secondary or spin-off effects for the local and state economies. (**0015-66** [Hodges, Alan])

Comment: For example, purchases of concrete for construction, which they use a lot of in a nuclear plant, gives rise to new demand for aggregate materials which, in turn, stimulates purchases of inputs from mining operations. Another type of spinoff effect is the personal consumption expenditures made by industry employees for food, clothing, housing, transportation and so forth and are model accounts for the different spending patterns that occur by households of different income levels. (**0015-67** [Hodges, Alan])

Comment: Typically, the total impacts of a new development project on a regional economy may be one and-a-half to two-and-a-half times the value of the original spending. Somebody else mentioned three times. That would be a bit unusual. But it all depends on what the structure of your local area is on how these spinoff effects play out. (**0015-68** [Hodges, Alan])

Comment: At this point it has not yet been determined how much of that investment will occur in the local area or what this will contribute toward the assessed value of property in Levy County. Estimating construction expenditures in this case is made difficult because of the

rapidly changing prices for commodities, and also the fact that there have not been any new nuclear plants built in the U.S. in over thirty years. (**0015-70** [Hodges, Alan])

Comment: Based on data currently available, there would be about 2,900 workers on site at the peak of construction, including Progress Energy personnel and contract employees. And based on staffing patterns for other similar large projects, we can estimate that about sixty percent of those contract employees would reside in the local area. (**0015-71** [Hodges, Alan])

Comment: Once in operation, the plant is expected to have 800 to 900 permanent employees, all of whom would presumably reside in the local area and therefore would be spending their income locally. These are, of course, it's been mentioned, very well-paying jobs. Roughly half of those positions are expected to receive annual salaries in excess of $70,000 and an overall average of about $65,000, which is more than double the current average annual earnings in this three-county area of about $31,000. (**0015-72** [Hodges, Alan])

Comment: I am also the President-Elect of the Citrus County Chamber of Commerce, 1200 members. And we are so excited about what this will boost the economy, jobs, schools, education, and the opportunity for our educated people to stay here in this area and have a good job. (**0015-86** [Hollins, Dixie])

Comment: We believe that the development of the nuclear power project in Levy County will bring jobs and economic benefit, not just to Levy County, but also the surrounding communities. We welcome Progress Energy's initiative in bringing a balanced approach to the future energy demands of Florida in our region. (**0015-9** [Pernu, Dorothy])

Comment: Property owners will lose part of the investment they have made in their homes as property values drop and homes become more difficult to sell. (**0040-6** [Medlin, Ted])

Response: *These comments generally refer to potential positive or negative socioeconomic impacts. Socioeconomic impacts of construction and operation will be addressed in Chapters 4 and 5 of the EIS.*

Comment: Our nation is in a recession and the prediction is that it will be a deep and long one. Floridians need ways to reduce their electric bills through energy efficiency and conservation and cannot afford the rate increases that will occur if Progress builds a risky new nuclear plant. (**0008-8** [Musser, Marcie])

Comment: I am a retired senior citizen living on a fixed income. And after what the Energy Commission did and the income today, I can't afford groceries. And it is getting bad and it is getting worse. I've been a professional all my life but at my age nobody wants to hire me. (**0014-46** [Foreman, Patricia])

Comment: There was an article published in the Chronicle on October the 27th by Chris Van Ormer, a wonderful article. Charges Jolt Customers. The utility has virtually no risk if the plant does not come to fruition. It does not have to return our moneys that they want to start collecting in January. To me that is very, very unfair. (**0014-48** [Foreman, Patricia])

Comment: I am not afraid of a nuclear plant but since no one can tell me where the electrical is going from Crystal River, I have, on the QT -- question: I'm told it goes to Chicago and the big cities. Now, if that's true, or maybe if it isn't true, wherever it goes on the grid, charge them. Let them pay for another nuclear plant because I'm tired of it. Everybody is coming along and raiding my kitchen cabinets. It's like I went before the Board for the water, so they've raised it $10. And then they send me a letter telling me the water is poisoned and it has been for a year. So I take it to my doctor and I say, Hey, what am I supposed to do?" He says, Honey, I don't know. I don't know how it will affect you because it will affect everybody different." (**0014-49** [Foreman, Patricia])

Comment: First of all ... the levy of the charges on the customers to help pay for the facility. What, in effect, they are being asked to do is to contribute to the capital base of Progress Energy for nothing. And two letters have already been written to the Governor concerning this. But essentially there is one easy answer. And that is that Mr. Lyash, or Lash, or, I'm sorry, I don't know how to pronounce his name, should do one thing. And that is not to make the levy. That is the simplest way of eliminating it. I've had suggestions that we get together and put together a class action suit and get a petition and so on and so forth, but really that is going to take an enormous amount of time and expense. But the simple way is not to charge the levy. (**0014-52** [Hopkins, Norman])

Comment: [T]he basic issue is it's as if the future will stand still over the interval from breaking ground to putting this plant on line and, indeed, charging present customers for the privilege of doing so. This is not right. (**0014-63** [Russell, John])

Comment: The hole gets deeper and here what do we have? The article in the paper here, Costly Fuel, Bigger Buildings. I'm going to the Commission meetings in Hillsborough and Pinellas County, the School Board meetings, and I'm reminding all the senior citizens: You're paying and there's going to be a big jump in the utility bills. You are paying for these power plants and you are doing it for the investors. And a lot of the senior citizens, they're not going to see a lot of that electricity. They will be dead and buried. This is a crime. (**0015-42** [Klutho, Mark])

Comment: But although it is more expensive to move this energy so far and it is more wasteful to move it, the customer is going to pay for that anyway. (**0015-55** [Sullivan, Jennifer])

Comment: If the Levy County nuclear reactor is private enterprise, why is Progress Energy passing on the cost of the planned nuclear reactor to its customers in the way of a rate hike in their power bills? Why, if the customers are paying for this enterprise, do they not own it? Is

Progress Energy prepared to pay millions of dollars to repair a nuclear plant should it fail after a hurricane, or would the cost of that repair also be passed on to the Progress Energy consumers and customers? (**0015-77** [Stewart, Anita])

Comment: In this time of the super big bailouts, citizens are becoming very weary of footing the bills for the major corporation and their own government. And we can make a perfect example of what happened after Hurricane Andrew when Florida Power and Light's Turkey Point Nuclear Plant, who failed during the storm, one smoke stack was imploded not shortly after the storm itself, and the company paid out $90 million to make the repairs to get the plant back on line. Many people don't know that happened but my source was an article by Tom Dubuque out of the Miami Herald. And my research is still ongoing regarding who actually paid the $90 million. (**0015-78** [Sullivan, Jennifer])

Comment: I would like to voice my strong opposition to Progress Energy's increase to cover, in advance, the cost of new nuclear power plants. I do not feel it is just for them to charge their existing customers in advance for new equipment. In the past bond issues have been used to fund this type of project and I believe it should continue that way. (**0018-1** [Garvin, Bill])

Comment: What is VERY important and seems to be legal is the addition of 25% surcharge on all electric bills beginning in January and extending into infinity. There are presently people without heat in this area, as they had to choose between that and buying food. Their children are barefoot and jobs are gone. The number will be increased unless the Dept. of Energy does something to block this surcharge imposed years before nuclear plant building is completed. (**0020-4** [Berger, Sarah])

Comment: Senior Citizens cannot afford this increase per month on electric bills. Plus, we will not be given the nuclear energy (electric) in our homes. (**0036-2** [Foreman, Patricia])

Comment: [I]t will not be tolerated by the citizens of Florida to be taxed to pay billions for nuclear power plants or charged as customers for something that a private company would never find profitable without public money. (**0039-8** [Arnason, Deb])

Response: *The NRC regulates the nuclear industry to protect public health and safety within existing policy. Issues related to the rate adjustments are outside of the NRC's mission and authority and will not be addressed in the EIS. This authority and responsibility is most often the role of state regulatory authorities such as public service commissions. However, the socioeconomic impacts of construction and operation will be addressed in Chapters 4 and 5 of the EIS.*

Comment: [T]his project up in Citrus and Levy Counties, is what it is going do is it going to make use of the defunct Cross Florida Barge Canal. That's a project, in my opinion, they stopped back in the seventies, probably never should have been built, but here is an organization that is going

to come in and make lemonade out of lemons. This project, what it is going to do is it is going to utilize the transportation aspects of the Cross Florida Barge Canal to bring in their heavy equipment and what not. And I don't know if you could find that somewhere else, but it is going to take down, or take away the wear and tear on the local transportation. (**0014-40** [Frink, Ken])

Comment: In reference to Progress Energy Florida, Inc's LWA and COL to build Units 1 and 2 of its LNP site, the following are considerations that must be addressed: Whereas the Town of Inglis, FL lies less than five miles directly south of the proposed site, and whereas the Town of Inglis is populated by approximately 1,700 residents, and whereas the Inglis Police Department's budget is less than $400,000/yr with slightly less than 24/7 coverage, and whereas the Inglis Fire and Rescue Dept is solely staffed by volunteers with old equipment, and whereas the demands on these two departments of the Town of Inglis will be dramatically overburdened if such a permit is granted. (**0021-1** [Michaels, Edward])

Comment: Currently, less than 28% of the households in the Town of Inglis pay ad valorum taxes. We are a very poor town, with extremely high unemployment, and a high percentage of retirees. The burden of a sudden influx of workers and ancillary businesses to the area will overstress the aforementioned departments to a point of breaking. We simply will not be able to protect and serve our current residents, nor the influx of people that these plants will bring to our town, at the level of service that our residents have come to expect. The Town of Inglis is currently a one stop-light town. Our way of life will dramatically change, and we should not be expected to pay for the myriad changes that one company will immediately and forever bring to us for their benefit. Our town is not even a part of their customer base. (**0021-3** [Michaels, Edward])

Comment: The only possible scenario that would provide us with the capabilities to protect and serve our residents at the current level, once this sudden change befalls us, would be if PEF supplies us with a substantial amount of cash, before construction commences, to supplement our departments, and further, a yearly enforceable commitment to maintain the levels needed, once they have been achieved. (**0021-4** [Michaels, Edward])

Comment: Furthermore, our road and maintenance departments will also be stressed beyond their current capacity. It is imperative that these issues be resolved before PEF can be given a permit. (**0021-5** [Michaels, Edward])

Comment: Having trains cross Highway 41 may block emergency vehicles from homes and medical facilities, making it less safe for all residents in Dunnellon, Rainbow Springs and all adjoining areas. (**0040-2** [Medlin, Ted])

Comment: The already-heavy traffic on Highway 41 will become worse with a second Dunnellon railroad crossing and the resulting train delays. (**0040-3** [Medlin, Ted])

Response: *Socioeconomic impacts such as impacts on transportation and local infrastructure associated with the construction and operation of proposed LNP Units 1 and 2 will be addressed in Chapters 4 and 5 of the EIS.*

Comment: Please analyze the negative impacts this project could have on the clam industry and attempts to develop an expanded local, sustainable aquaculture industry in the Nature Coast. (**0015-117** [Murphy, Joe])

Comment: What are the negative economic impacts to the region, the Nature Coast, and the Gulf Coast of Florida that will result from coastal ecosystems harmed by polluted runoff (high high temperature) and reduced freshwater flow/higher salinity to the coast? What will the economic and social impacts be to the recreational and commercial fishing industry along the Gulf Coast of Florida due to reduced function in coastal estuaries? Please consider these questions in the context of the economic impacts coastal related activities in Florida (see 2006 FFWCC estimates below):

- Saltwater Fishing - $6.0 billion, 59,000 jobs
- Freshwater Fishing - $2.2 billion, 19,000 jobs
- Total Fishing - $8.1 billion, number one in the nation
- Commercial Fishing - $576 million, 9,000 jobs
- Boating Industry - $18.4 billion, 220,000 jobs (**0015-120** [Murphy, Joe])

Comment: What will the negative economic impacts to Levy County, Citrus County, and the Nature Coast be from reduced ecotourism, reduced local fishing activity, and loss of seasonal visitors who engage in wildlife viewing and outdoor recreational activities? These questions directly relate to the growing ecotourism and wildlife viewing industry in Florida, and along the Nature Coast. In a recently released report the FFWCC reported that: In 2006, 3.3 million Floridians viewed wildlife at or near their homes, and 1.6 million Floridians and tourists traveled around Florida for the sole purpose of wildlife viewing. These viewers generated more than $3 billion in total economic impact throughout Florida. Retail sales account for approximately $1.8 billion of this total. While other areas of the economy may be experiencing a downswing the FWC's report finds retail sales for wildlife-viewing activities have almost doubled from $1.575 billion in 2001. Overall, 4.2 million people participated in some form of wildlife viewing in Florida in 2006. (**0015-121** [Murphy, Joe])

Response: *The NRC staff will consider the potential effect of construction and operation of proposed LNP Units 1 and 2 on local fishing, wildlife viewing and outdoor recreational activities, as well as potential socioeconomic impacts of changes in the volume of these industries. These topics will be addressed in Chapters 4 and 5 of the EIS.*

D.12 Comments Concerning Historic and Cultural Resources

Comment: We [the Miccosukee Tribe] have no direct knowledge of any cultural resources located in the area of the two new proposed nuclear power units. However, we recommend that a Phase I Cultural Resources Survey be conducted of the area to ascertain if there are any cultural resources which may be impacted by this project. (**0037-1** [Terry, Steve])

Response: *Evaluation of historical, archaeological, and other cultural resources is part of the NRC staff's assessment. The results of the Phase I Cultural Resources Surveys for the project site will be summarized in Chapter 2 of the EIS. Impacts and mitigation measures on historic and cultural resources will be addressed in Chapters 4 and 5 of the EIS.*

D.13 Comments Concerning Health – Nonradiological

Comment: I would just like to propose be considered for the Environmental Impact Statement ... that there be minimum use of pesticides and herbicides on the site and that within 150 feet of any water source, such as a stream, lake, or large ponds, that there be a pesticide and herbicide free zone within 150 feet of that area. (**0014-117** [Marraffino, Paul])

Comment: I would just like to propose be considered for the Environmental Impact Statement ... to control hazardous materials in a very robust way, including diesel fuel and other petroleum products that are on the site. (**0014-118** [Marraffino, Paul])

Comment: In addition the use of pesticides and herbicides should be minimized to the lowest level practical. There should be a pesticide and herbicide free zone within 150 feet of any lake, river, stream or pond. Finally control of hazardous material including diesel fuel should used and stored in a manor the prevents them from entering the groundwater system. (**0014-183** [Marraffino, Paul])

Response: *Protection of human and ecological health will be assured by compliance with all applicable State and Federal regulations governing the use of pesticides and herbicides and with the storage and control of diesel fuel and other hazardous materials. Issues associated with herbicide and pesticide use and diesel fuel and hazardous materials storage during the construction and operations phases will be addressed in Chapters 4 and 5 of the EIS, respectively.*

Comment: You can listen online to the archives of today's Democracy Now. This show presented today shows studies of the poisons that workers, civilians and soldiers were exposed to, supposedly regulated, and the repercussions are these. One example was the Vietnam Agent Orange. And then there is what is known as the Kuwait Cough from the Gulf War II, or Gulf War I, rather. And now there is a chromium poison by KBR, Kellogg, Brown and Root.

They used to be an affiliate of Halliburton. Anyway, that's in the Gulf War, too. But these things have been happening. (**0015-64** [Sullivan, Jennifer])

Response: *Workers at the site will be protected by compliance with all applicable Federal and State occupational and safety standards related to exposures to toxic substances. Occupational safety and health issues arising in the construction phase will be addressed in Chapter 4, and issues arising during the operations phase will be addressed in Chapter 5 of the EIS.*

Comment: Some Woodlands property owners will have trains operating along the edges of their yards, in close proximity to their homes, and would threaten their tranquility. (**0040-5** [Medlin, Ted])

Response: *Progress Energy filed a Notice of Amendment on November 26, 2008, to the State of Florida Site Certification Application (SCA), to amend the SCA to withdraw all of those sections of the SCA which addresses the proposed 13-mile corridor in Levy and Marion Counties, Florida. Additionally, the Progress Energy response to information need CR-5, by letter dated January 16, 2009 to NRC, states that the rail line has been removed from the plan.*

D.14 Comments Concerning Health – Radiological

Comment: I would just be interested as a matter of point that somebody give some data from this conference on what the radiation testing is around the current nuke plant here in Crystal River. Do some drilling and take some bore samples out of the wells around here and let's just see how they have changed since they've been there for thirty years. I will guarantee you that there is going to be some things here that you are probably not going to want to divulge. (**0014-93** [Roberts, Preston])

Response: *This comment relates to the Radiological Environmental Monitoring Program (REMP) and the airborne and liquid radioactive effluents from the existing Crystal River Energy Complex and proposed LNP. Chapter 2 of the EIS will discuss the radiological environment around the LNP, Chapter 5 will address the release of effluents during operation and the impacts from these releases, and Chapter 7 will address cumulative impacts, including those from the existing Crystal River Energy Complex.*

Comment: There should be test wells around the site. There should be an early development that be measured at a base level and then on a regular basis measure a large selection of items that would be of concern for health reasons and so on. (**0014-119** [Marraffino, Paul])

Response: *This comment relates to the Radiological Environmental Monitoring Program (REMP) and the airborne and liquid radioactive effluents from proposed LNP Units 1 and 2.*

Chapter 2 of the EIS will discuss the radiological environment around LNP and Chapter 5 will address the monitoring of effluent releases during operation and the impacts from these releases.

Comment: With the existing Progress Energy Nuclear Power Plant in Crystal River and at other locations, health physics is a paramount consideration for system management. At the new Levy County plant, monitoring and protection of ground water should be performed at the same level of discipline as the radioactive element in the core facility. This should be required for the potable water requirements of the populace of surrounding communities. Added to the human requirement is the need to protect the water quality and natural habitat of Lake Rousseau. (**0014-181** [Marraffino, Paul])

Response: *Chapter 2 of the EIS will discuss the radiological environment and monitoring conducted around the Levy Nuclear Plant. Chapter 5 of the EIS will address the release of effluents during operation, the impacts from these releases, and radiological monitoring during operations.*

Comment: The Bureau of Radiation Control is responsible for performing a radiological environmental monitoring program around all the nuclear plants in the state of Florida. (**0015-4** [Williamson, John])

Response: *This comment addresses activities conducted by the Florida State Department of Health, Bureau of Radiation Control. Radiological monitoring for proposed LNP Units 1 and 2 will be addressed in Chapter 5 of the EIS.*

Comment: We've been monitoring Crystal River since, I believe, 1969, approximately seven years before they ever first started the plant up. If anyone is interested in getting reports of this environmental monitoring, I encourage you to talk to me after the meeting. I can provide you a business card. You can contact me and I would be happy to provide any of the reports that you like. (**0015-5** [Williamson, John])

Response: *This comment is related to the environmental monitoring program for the nuclear plant at the Crystal River Energy Complex and is not directly related to this environmental review. Radiological monitoring for proposed LNP Units 1 and 2 will be addressed in Chapter 5 of the EIS.*

Comment: I would just like to quote, first of all, from some Progress Energy document: Tritium, which is a hydrogen radioactive isotope, is a byproduct of generating electricity at nuclear power plants. All nuclear power plants release tritium into both the water and air. The U.S. Environmental Protection Agency regulates the acceptable level of tritium concentrations in ground water and drinking water, no matter where it comes from." Now, it is quite clear from the

documentation that tritium will not go in through, into a human's body from outside it normally. But if it is ingested in any way, that's a different question. But also I'm not sure -- and, in fact, I don't know, whether the EPA regulations safeguard microorganisms on which the ecology depends. Now, don't get me wrong. Tritium is the stuff which enables our waters to be seen in the dark. But don't get me wrong. I'm not suggesting that the algae, the fish, the other organisms are going to glow in the dark and that will reduce the need for more generating capacity. I'm not saying that. But also I'm not saying that the algae, the plankton, or the fish will either glow, nor will they grow arms and legs, but they could die, they could get bigger and they could poison whatever eats them. (**0014-54** [Hopkins, Norman])

Comment: In Progress Energy's own words: "'Tritium *(a hydrogen radioactive isotope)* is a byproduct of generating electricity at nuclear power plants. All nuclear plants release tritium into both the water and air. The U.S. Environmental Protection Agency (EPA) regulates the acceptable level of tritium concentrations in ground water and drinking water". To site that plant precisely where the potentiometric groundwater level is highest for miles around does not seem sensible to me. Tritium, with a half life of more than 12 years, cannot be contained. While emissions are unlikely to be externally harmful to humans, if ingested or otherwise absorbed internally tritium is an issue. (**0015-106** [Hopkins, Norman])

Response: *These comments concern emissions of tritium and health effects that may result from such emissions. Emission estimates will be based on the revision of the AP-1000 Design Control Document referenced in the COL application; these emission estimates are anticipated to be conservative (that is, to overestimate emissions). The NRC staff will evaluate human health and environmental impacts of the emissions in the EIS, and the results of this analysis will be presented in Chapter 5.*

Comment: Evidence exists that there is NO such thing as a safe dose of radiation, from release in the predictable periodic accidents or from the continual low grade emissions of radiation from existing and nuclear future plants. Any radiation released is more than a zero impact. (**0006-5** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard]) (**0029-7** [Cox, Lesley])

Comment: In addition to the comparison of wastes and emissions people living on the Nature Coast of Florida deserve to know in specific terms (measurable units) the amount of radioactivity that will be released from the site as:

- radioactive air emissions - including routine and batch releases
  - including both projections of total source term and also concentration
- other pollutants with or without radioactive mixing
- releases of liquid radioactive wastes - and other chemicals released together or separately, with total amounts and projected concentration

- release of heat to both air and water - and amount of water that will leave the site as vapor (**0038-20** [Olson, Mary])

Comment: Assuming that Part 20 is being fully implemented and enforced - and no, I am not attacking the rule - though we would like to - and assuming ALARA is being added on top, why have two studies in the last couple of years found a direct (statistically significant) correlation between distance of residence from a nuclear power plant and incidence of leukemia? Please include and account for these studies in your finding of impact. (**0038-23** [Olson, Mary])

Response: *These comments relate to radiation doses from release of radioactive material from the proposed LNP Units 1 and 2. The impacts on human health from radiological emissions will be addressed in Chapter 5 of the EIS.*

Comment: Furthermore, I do not know whether the EPA levels protects micro-organisms on which the health of existing ecologic systems depend, and upon which the economic health of local communities exist. (**0015-107** [Hopkins, Norman])

Response: *This comment relates to radiation doses from release of radioactive material from the Levy Nuclear Plant. The impacts to biota other than humans from radiological emissions will be presented in Chapter 5 of the EIS.*

Comment: I am requesting that the EIS examine and clearly explain to the residents of Levy and Citrus counties and the surrounding region, the difference between the conditions now and the conditions if the new nuclear units reach full operation as proposed. I am interested in the conditions specifically due to the two new reactors and associated operations, without regard for the decommissioning of the coal fired unit at Crystal River. Please express the detailed quantitation and any assumptions made for the calculations.

- Airborne radionuclides and other pollutants by chemical species and concentration
- Waterborne radionuclides and other pollutants by chemical species and concentration
- Pollutant levels in soil and graphic depiction of zones of influence.
- Pollutant uptake by vegetation and graphic depiction of zones of influence. (**0030-1** [Roff, Rhonda])

Response: *Radiological impacts from normal operation of proposed LNP Units 1 and 2 will be discussed in Chapter 5 of the EIS, and cumulative impacts will be discussed in Chapter 7 of the EIS.*

Comment: I am requesting that the EIS examine and clearly explain to the residents of Levy and Citrus counties and the surrounding region, the difference between the conditions now and the conditions if the new nuclear units reach full operation as proposed. I am interested in the

conditions specifically due to the two new reactors and associated operations, without regard for the decommissioning of the coal fired unit at Crystal River. Please express the detailed quantitation and any assumptions made for the calculation of:

- The increased potential for uptake of Strontium 90 in humans.
- Any potential changes in mammalian milk quality, including dairy cattle and humans.
- Projected increased cancer risk, including but not limited to childhood leukemia as depicted in the epidemiological study recently published by Joseph Mangano and attached hereto. (**0030-6** [Roff, Rhonda])

Response: *Chapter 2 of the EIS will discuss the radiological environment around proposed LNP Units 1 and 2 and Chapter 5 of the EIS will address the release of effluents during operation and the impacts from these releases.*

Comment: And another thing I would like to know is does this United States, what you said, Nuclear Regular Atomic Commission, require specific environmental standards and which have to be complied with? (**0014-128** [Cannon, Renate])

Response: *The NRC, pursuant to the Atomic Energy Act, has established the nuclear power plant regulatory program for radiation protection of individuals and the public. The primary radiological standards are contained in 10 CFR Part 20, 40 CFR Part 190, and 10 CFR Part 50, Appendix I.*

D.15 Comments Concerning Accidents

Comment: A 1982 Congressional report estimated that if a meltdown occurred at just one of Progress Energy's reactors at their nearby Crystal River nuclear plant, it could cause 900 peak early fatalities, 3800 peak early injuries, 2800 peak cancer deaths, and over $53 billion in property damage. The operation of more reactors in this area will only worsen these terrible impacts and put more people's lives and health at risk. (**0008-12** [Musser, Marcie])

Comment: If there is an accident or meltdown the # of fatalities and injuries are absolutely inacceptable for those who live in this state. (**0009-4** [Davis, Suellyn])

Comment: Don't forget, in a facility that stores an average quantity of spent fuel, around 450 metric tons, a meltdown would kill 25,000 people over a distance of 500 miles if evacuation were perfect. (**0019-8** [Heywood, Harriet])

Comment: Accidents happen. It is technically impossible to build a facility that is 100% secure. (**0029-3** [Cox, Lesley])

Comment: Another very important point is the fact that nuclear plants themselves cannot be made 100% safe. Whether through equipment malfunction, operator error, or terrorist attack, nuclear plants pose an unacceptable risk, not just to those of us living in Florida, but to all life on earth. One little incident could literally mean the actual end of all life on earth! If you don't think it can happen, think about that little O ring on the Challenger. We humans are not infallible, and neither is anything we produce. This means that nuclear plants cannot, simply cannot be guaranteed to be safe. And when it comes to accidents or attacks involving nuclear materials, anything less than 100% safety is just not good enough. (**0032-12** [Wilansky, Laura Sue])

Comment: Please assess the sacrifice zone that NRC will be creating by this license action. ...in the event of some type of local accident, fourth would be disclosure of estimates, as were made in the CRAC II report - of a fuel pool accident and a reactor accident. In this day and age, it should also include projections of impact were BOTH containments were to be lost. (**0038-12** [Olson, Mary])

Response: *In Chapter 5 of the EIS, the NRC staff will address risks associated with both design basis and postulated severe accidents. The staff will also address the cumulative risks from operation of the proposed new reactor. Design basis accidents will be evaluated by comparison with regulatory criteria, and the probability-weighted consequences of severe accidents will be compared with risks to which individuals and populations are generally exposed.*

D.16 Comments Concerning the Uranium Fuel Cycle

Comment: High-level radioactive waste created (used nuclear fuel) has no place to be stored or disposed, nor is it likely that a "solution" will be found in our lifetimes. Building a nuclear plant in Levy County will unfairly burden future generations with a legacy of radioactive waste. (**0008-5** [Musser, Marcie])

Comment: The proposed location in Levy County is currently a "green field" site; it is clean and free of contamination or industrial facilities. The long-lived, highly radioactive nuclear waste that will be produced by the proposed new reactors will remain onsite for generations, indefinitely threatening the health of nearby communities and the environment. (**0008-14** [Musser, Marcie])

Comment: Please assess the sacrifice zone that NRC will be creating by this license action. ...the burial of wastes on the site and need for long-term license or institutional controls. (**0038-11** [Olson, Mary])

Comment: Nonetheless, the fact that the Levy County site is the only true "green field" application brings this matter into ever clearer focus. Therefore we offer here a series of issues that we believe MUST be considered in the FEDERAL environmental evaluation of this federal action - to license a site that has never previously been licensed for a new nuclear-waste-

generating and radionuclide-leaking site. This proposed sacrifice (and approval of an activity that will likely garner direct public subsidy) must be weighed against current reevaluation of the Waste Confidence Decision by the Commission - to affirm dry cask storage as THE source of federal confidence in continuing to produce high-level radioactive waste in the form of irradiated nuclear fuel. (**0038-3** [Olson, Mary])

Comment: If nuclear power generation is so clean, why do we need to build storage facilities like Yucca Mountain? (**0043-2** [Eppes, Thomas])

Response: *The safety and environmental effects of long-term storage of spent fuel onsite have been evaluated by the NRC and, as set forth in the Waste Confidence Rule at 10 CFR 51.23, the NRC generically determined that "if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations." The impact of the uranium fuel cycle, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS.*

Comment: [W]hat about the disposal of massive amounts of nuclear waste. According to the NY Times (11.29.08), we can't properly handle the amount of waste flowing into the Chesapeake Bay from a chicken farm with 150,000 chickens in Maryland. So who believes we can adequately and safely deal with the piles of nuclear waste which will accrue from permitting these plants? (**0006-9** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: Yucca Mountain was supposed to take nuclear waste twenty-seven years ago. (**0014-125** [Cannon, Renate])

Comment: Yucca Mountain never occurred. (**0014-162** [Waldron, Theresa])

Comment: This nation does not need and cannot afford to continue stockpiling nuclear waste. I think that is the biggest environmental issue of this hearing. Nuclear waste remains deadly for longer than any society has ever existed. What makes us think that we're going to be around to take care of it. (**0014-71** [Eppes, Thomas])

Comment: Until the problem of waste storage is successfully resolved -- and by successful I mean, politically, economically, scientifically, and safely -- no new nuclear power plant should be permitted by the NRC. (**0014-72** [Eppes, Thomas])

Comment: [W]e [the Socialist Party] stand against the expansion of this type of power in the country because [of] the inability of the country to dispose of waste products. (**0015-102** [Moore, Brian])

Comment: I have here this article about the EPA ruling that says the waste must now be sequestered for a million years. Tell me who and how you are going to get a million year guarantee. And also it was just recently in the news that Yucca Mountain, which, by the way, is not going to be able to accept the waste, can't hold everything that the power plants now have ready to go, much less what any new power plant might make. Talk about a safety issue, an environmental issue. (**0015-37** [Klutho, Mark])

Comment: First, do no harm. We already have nuclear waste with a half life of thousands of years that will already fill the Yucca Mountain area. As the gentleman said, let's not make more. (**0015-61** [Sullivan, Jennifer])

Comment: The safety concerns are enormous. Currently, most nuclear power plants are reaching the ends of their lives, and will have to be decommissioned and there is still no plan to safely compensate for the nuclear waste which is stored onsite at every one of these accidents waiting to happen. These spent fuel rods will be hot for 10,000 years. (**0019-5** [Heywood, Harriet])

Comment: President-elect Obama has expressed reservations about whether our country's massive new investments in renewable energy should include nuclear power until issues of ... disposal of waste have been resolved. (**0028-3** [Horgan, Wendy])

Comment: We still do not have a solution for radioactive waste. (**0029-2** [Cox, Lesley])

Comment: Nuclear power is not sustainable when you have to secure the waste for 100,000 years. (**0029-4** [Cox, Lesley])

Comment: There is also no place for nuclear waste storage in Florida. Due to our delicate and fragile eco-system, our Floridan Aquifer which underlies our entire state and parts of four others, and the way everything in our Florida environment is interconnected, there is just no site here stable or isolated enough for any kind of nuclear waste storage - low-level or high-level. Levy County is certainly not a good place to turn into a nuclear waste dump, and as I understand it, Progress Energy has no other place to store waste from these plants. ...And we still have no permanent long-term solution for what to do with high-level nuclear waste, which remains radioactive for thousands upon thousands of years - so why create more of it?! (**0032-6** [Wilansky, Laura Sue])

Comment: [Uranium] is mined, radioactive, has hazardous waste that remains for thousands of years. (**0039-4** [Arnason, Deb])

Response: *The safety and environmental effects of long-term storage of spent fuel onsite have been evaluated by the NRC and, as set forth in the Waste Confidence Rule at 10 CFR 51.23, the NRC generically determined that "if necessary, spent fuel generated in any reactor can be*

stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations. Further, the Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century and sufficient repository capacity will be available within 30 years beyond the licensed life for operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in any such reactor and generated up to that time." The impact of the uranium fuel cycle, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS.

Comment: Nuclear power is NOT a solution to climate change. When the entire fuel chain is examined, including the initial construction and production processes, nuclear power (sold superficially as carbon neutral) becomes a big carbon producer. (**0006-3** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: I think several hundred million dollars is a joke when we talk about the total cost over time of storing those materials. We today have no effective, you know, plan, reliable means of dealing with even the small amounts of waste that the professor had discussed. They may be small but they are potent. And I encourage people to look at a movie called Kilowatt Ours, Kilowatt O-U-R-S. It specifically delineates where we are at with regard to, you know, even the mining of uranium, which is a declining resource in exactly the same way as oil. (**0014-67** [Russell, John])

Comment: Nuclear is not a carbon-neutral enterprise. Those who say it is are not taking into account the mining, extraction, purifying, storing, transportation and all other aspects of providing the fuel for nuclear power plants. (**0026-7** [Towles Ezell, Joy])

Comment: Nuclear energy is neither carbon-free nor emission-free throughout its entire life cycle, which includes a variety of wastes produced by mining uranium and making nuclear fuel, in addition to the aforementioned unsolved problem with spent fuel and other nuclear waste. (**0032-8** [Wilansky, Laura Sue])

Comment: Nonetheless, the fact that the Levy County site is the only true "green field" application brings this matter into ever clearer focus. Therefore we offer here a series of issues that we believe MUST be considered in the FEDERAL environmental evaluation of this federal action – to license a site that has never previously been licensed for a new nuclear-waste-generating and radionuclide-leaking site. This proposed sacrifice (and approval of an activity that will likely garner direct public subsidy) must be weighed against:

- Current - and possible future lack - of any facility licensed under 10CFR61 for the permanent disposal of so-called low-level waste. If NRC is planning to license the

expanded production of this waste production of this waste for which there is no permanent disposition that is currently licensed - what will the impacts (procreative, health, safety, environment, socio-economic, economic, legal, security) be on Levy County if a so-called "temporary plan" becomes a defacto permanent "solution"?

- The environmental impact statement must include the environmental impact of any possible "short-term" plan that Progress (or NRC) plan to employ to deal with the operational waste that would be generated at this site. These "short-term" options may include:
  - on-site storage - de facto permanent would mean that the waste never actually leaves the site, so the County is effectively becoming both a "low-level" and a "high-level" dump site. Please apply the above climate informed projections to a the so-called "low-level" waste as well.
  - shipping to a radioactive waste processor for decontamination and release - please include a complete assessment in the environmental impact statement of the impacts of Levy-generated waste on the public, workers (including transport), processor community, and eventual "end-users" of any materials released for re-use or recycle, or impact of disposal in municipal land-fills
  - shipping to a processor/waste broker for storage - please analyze all impacts to the public workers (including transport), host community and the potential of this plan reverting to on-site storage since it is likely that such storage would be time-limited
  - incineration - same as above
- combinations of all of these in a "shell game" that still does not resolve the fundamental problem of making this waste with no where for it to end up. (**0038-5** [Olson, Mary])

Response: *The NRC staff will evaluate impacts from the life-cycle of fuel production, construction, operation, and decommissioning of the plant. The results of this analysis will be presented in Chapters 4, 5, and 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, Table of Uranium Fuel Cycle Environmental Data. In accordance with the guidance in 10 CFR 51.51, the staff will rely on Table S-3 as the basis for evaluating the environmental impacts (including fossil emissions) of uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low-level wastes and high-level wastes related to uranium fuel cycle activities.*

Comment: I would like to know why we cannot recycle the waste and re-use it like it is done in France, if I am not mistaken. (**0014-130** [Cannon, Renate])

Response: *Federal policy no longer prohibits reprocessing. The Energy Policy Act of 2005, P.L. 109-58, Section 953, directed the U.S. Department of Energy (DOE) to conduct an advanced fuel recycling technology research and development program to evaluate*

proliferation-resistant fuel recycling and transmutation technologies that minimize environmental or public health and safety impacts. Additional research and development is needed before commercial reprocessing and recycling of spent fuel produced under the U.S. commercial nuclear power program occurs. Reprocessing as part of the fuel cycle and waste management will be discussed in Chapter 6 of the EIS.

Comment: This proposed sacrifice (and approval of an activity that will likely garner pulic subsidy) must be weighed against an examination of the supply of uranium that is cost-effective and energy balance-effective to use for fuel. A disclosure of assumptions made in licensing 2 new reactors that would operate 40 - 60 years while other nations are also expanding their nuclear generating capacity and the impact on both cost to operate and reliability of this form of power generation. (**0038-9** [Olson, Mary])

Response: *The irretrievable and irreversible commitment of resources, such as uranium, will be addressed in the context of the resources availability in Chapter 10 of the EIS.*

D.17 Comments Concerning Transportation

Comment: [T]ransportation of radioactive waste through our state to other sites poses additional environmental dangers. (**0032-7** [Wilansky, Laura Sue])

Comment: In spite of assurances from Progress Energy, residents are concerned about the possible future transportation of hazardous materials and nuclear waste through their neighborhoods. This danger would obviously pose significant pollution and health hazards. (**0040-7** [Medlin, Ted])

Response: *A detailed analysis of the impacts of transporting fuel and waste by truck to and from the proposed LNP site will be conducted and included in Chapter 6 of the EIS.*

D.18 Comments Concerning Decommissioning

Comment: But what are we going to do with those plants? That's why I asked that question before. We have plants that are old right now that need to be decommissioned. (**0014-66** [Russell, John])

Comment: This [nuclear] waste includes the plants themselves, which operate for a few decades, and then take, at a minimum, hundreds of years to be decommissioned. (**0032-9** [Wilansky, Laura Sue])

Response: *10 CFR Section 50.75 requires the applicant to provide reasonable assurance that funding will be available for decommissioning activities at the time they are needed. The environmental impact from decommissioning a permanently shutdown commercial nuclear*

power reactor will be discussed in Chapter 6 of the EIS. In addition, the staff may consider information from Supplement 1 to NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, which was published in 2002, when analyzing the expected impacts from decommissioning.

D.19 Comments Concerning Site Redress

Comment: The EIS should provide information on what actions will be taken by PEF, if, in fact; the LWA work is accomplished, but all environmental clearances and permits are not obtained or if PEF decides not to continue with the project. How will the site be restored? What types of mitigation measures, if any, will be needed for affected wetlands? The EIS should fully document all actions to be taken by PEF if an LWA is granted, the work accomplished, and the project does not go forward. (0044-4 [Mueller, Heinz J])

Response: *By letter dated May 1, 2009, Progress Energy provided notification to NRC to withdraw their request for an LWA*.

D.20 Comments Concerning Cumulative Impacts

Comment: There appears to be no recognition of cumulative impacts resulting in the discharge of three nuclear power plants in a single location, a discharge flowing into a very shallow coastal estuary region and rich marine resource. It is both a marine nursery and habitat for at least one listed species. I find no reference to, or evaluation of salinity increases and associated impacts resulting from the LNP Blowdown contribution to the CREC discharge flow and think this is pertinent to the CZMA. (**0014-185** [Hilliard, Dan])

Comment: I'm going to be Progress Energy's closest neighbor. I live 7,000 feet or less from where their nuclear reactor is going to be. And I have three questions I've been trying to get answered and I think I got some answers but not all. One of them is, I want to know how many people live within 7,000 feet or less of adjoining properties to two nuclear reactors in the state of Florida, and I want to know if there has been any health studies done on them people within thirty years. (**0014-34** [Smith, Robert])

Comment: Is there another location in the United States or the world where two nuclear power plants will be located within eight statute miles of each other? If so, I would like to know it because with all the research I've done -- and a lot of people will tell you I'm a heck of a researcher -- it doesn't exist. Just one. Could you please tell us, the folks located between the two projected closest locations in the world, why they are so needed so proximate to that which already exists with the grid for distribution that already exists? (**0015-98** [Peters, Michael])

Comment: The proposed site plan is too close to the current Florida Power & Light nuclear plant exposing the people and environment in the entire area to too much of a potential for disaster to occur. Having nuclear power plants within close proximity to each other invites those who wish to do harm to our country to act upon those deadly desires. The proposed site is also next to a state forest - a place that the people of the state of Florida wish to preserve. (**0026-5** [Towles Ezell, Joy])

Comment: Progress Energy operates a nuclear power plant in Citrus County, Florida, where I live and its proposal to locate another nuclear power facility nearby unreasonably exposes the residents of Levy and Citrus County to the increased risks that are well understood to be associated with nuclear power plants. (**0028-2** [Horgan, Wendy])

Response: *The comments address the proximity of proposed LNP Units 1 and 2 to the existing Crystal River Unit 3. The cumulative impacts associated with the construction and operation of the proposed nuclear power facility will be evaluated and the results of this analysis will be presented in Chapter 7 of the EIS.*

Comment: Under the National Environmental Policy Act (NEPA), we are compelled to point out that building a new nuclear power reactor at all, anywhere is a “major federal action” not in and of itself, but also because it has now been almost 34 years since a new nuclear power reactor was ordered that actually went on-line. As such, the 15 some combined operating licensing actions now pending before the NRC constitute together this major federal action. Since NRC is implementing NEPA at each site, there is an overall effect of truncation since the decision to license a nuclear power reactor at all is not being considered. (**0038-2** [Olson, Mary])

Response: *The spatial and temporal effects identified for the proposed action will be reasonably bounded to the appropriate geographical area in Chapter 7 of the EIS.*

Comment: The largest single issue facing our world today is CLIMATE CHANGE. Any decisions we make from now on MUST contain an analysis of that project’s impact on climate change. It is a matter of life. The whole world should have a say as to whether or not these proposed power plants are permitted. Think Alaskan villages toppling into the sea, Bangladeshi coastal-dwellers, the low lying portions of our own fair state of Florida, and the melting permafrost that is releasing methane at unprecedented rates. Increased carbon emissions mean accelerated climate change. (**0006-2** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: Maybe we could use the wetlands and the trees. They are part of a carbon sequestration banking system. I just think it is an idea since we’re talking about all different ways to help our environment and the air and global climate change. (**0015-32** [Casey, Emily])

Comment: It is not acceptable to state that the climate crisis is speculative, nor is it acceptable to contemplate granting a federal license that will result in billions of dollars of taxpayer and electric-power consumer money being spent on something that is not going to address that crisis - but the public funding is being justified under such a banner. This is either delusion or fraud. (**0038-21** [Olson, Mary])

Response: *The airborne emissions from proposed nuclear plants, although normally sufficiently small as to not degrade air quality or be important in climate change, will be considered in the evaluation of potential impacts. The impacts on air quality resulting from construction and operation of proposed LNP Units 1 and 2 will be discussed in Chapters 4 and 5 of the EIS. The impacts of nuclear power generation on climate change will be addressed in Chapter 7 of the EIS.*

Comment: [Progressive Energy] [has] made no decisions about the four coal units that we have operating in Crystal River. Clearly we have decisions that we will be making in the long term but it is quite a few years off before we will have all of the decisions finalized. (**0015-10** [Barnwell, Martha])

Comment: What are the cumulative environmental impacts of this project for the greater Nature Coast region given current and other proposed projects in the region (Tarmac Mine, Cemex Mine, proposed residential developments in Levy County, Gulf Hammock mines currently in operation)? Please fully explore the full cumulative regional impacts from this project and other projects in the region and their connections and relationships in terms of regional water supply, health and structure of the aquifer, regional water quality, health of wetlands systems, habitat, and coastal ecosystems and estuaries, etc. (**0015-114** [Murphy, Joe])

Response: *The cumulative impacts associated with the construction and operation of the proposed nuclear power facility will be evaluated and the results of this analysis will be presented in Chapter 7 of the EIS.*

D.21 Comments Concerning the Need for Power

Comment: We have followed with great interest the steady progression of PEF in pursuit of their proposed electrical generating facility, which when completed will:

- Provide electricity to meet the demands of continued growth in the region, for customers of Progress Energy and other utilities.
- Ensure more flexibility and a backup system for providing critical energy to the area.
- Maintain a robust system for supplying and delivering electricity to ensure the continued economic prosperity of the region. (**0010-2** [Johannesen, Francine])

Comment: We concur with the PEF philosophy that - electricity is far too important to risk service interruptions or problems with power quality due to inadequate equipment. We applaud Progress Energy for its continued efforts to work cooperatively with regulators, community leaders, and other stakeholders in Florida to ensure the company makes the best long-term decisions to meet Florida's future energy needs. (**0010-3** [Johannesen, Francine])

Comment: Life would be nice without the threats associated with nuclear power. However, no one I know wants to give up electricity and what it brings to our lives; therefore, power plants are a necessary evil. With that in mind, I believe, and most people agree, rural areas are the best place for power plants. (**0013-1** [Bullock, Wade])

Comment: Along with the proper transit solutions, energy production/consumption is a critical component and decisions need to be made now so that the state is not faced with an energy shortage. (**0014-103** [Mucci, Matt])

Comment: The U.S. Department of Energy estimates that our electricity demand will increase twenty-five percent by the year 2030. Roughly that means, for every four Americans you can add one more flipping the switch, adjusting the thermostat or opening the refrigerator. As technology advances and our population increases, so too will our need for energy grow. In Florida alone demand is increasing faster than the state's population. Is it any wonder? It used to be the only thing you would carry on your person that ran on electricity was your watch, just a small battery. But today we have cell phones, laptops, Blackberries, iPods, and in the not too distant future we may have cars that are running on electricity that you have to plug into the wall every single night. In fact, it is somewhat ironic that today on Capitol Hill, Congress is talking about to get bailed out the car manufacturers are going to have to make electric vehicles. So how will we handle the enormous increases in electricity that we will need? (**0014-108** [Walther, Robert])

Comment: The Levy County project clearly is intended to address the documented needs for additional electrical service that is going to be required within the State of Florida. (**0014-131** [Maidhof, Gary])

Comment: Despite the current economic downturn that we are seeing not only in this state but across the United States, Florida is, indeed, the fourth largest state in the United States. And we are ranked third nationally in per capita energy consumption. Over the last three decades homes in the state have grown by an average of over fifty percent and usage is up in those homes by over thirty percent. And, quite frankly, over the next decade we anticipate that usage will increase by over twenty-five percent. (**0014-6** [Barnwell, Martha])

Comment: Even with our significant commitment to alternatives, renewables, and to energy efficiency, we will need additional generation to meet the growth of our state. (**0014-8** [Barnwell, Martha])

Comment: The need for electricity within this region, both now and in the future, is clearly documented. (**0015-1** [Maidhof, Gary])

Comment: [L]et me just begin with by saying that despite the fact that this area of the state of Florida, as well as across the United States, that we are seeing an economic downturn, energy usage and growth in the State of Florida has been strong for a number of years. Florida is the fourth largest state and ranks third in the usage per capita of energy consumption. In addition, over the last three decades our home sizes have grown by over fifty percent and our usage has grown by over thirty percent. In the next decade, we project that we will have a twenty-five percent growth in usage here with our customers in the state of Florida. (**0015-11** [Barnwell, Martha])

Comment: At Progress we recognize that there is no one solution to the energy needs that we have here in the state. It must be a balanced solution. And that solution includes energy efficiency, investments in alternatives and renewables, as well as the building of state of the art plants, including state of the art nuclear plants. (**0015-12** [Barnwell, Martha])

Comment: The U.S. Department of Energy predicts that by the year 2030 our demand for electricity will have gone up by twenty-five percent. Roughly that means for every four people in the United States add another who is flipping a switch, opening the refrigerator, or adjusting the thermostat. As technology advances and our population increases, so too does our demand for electricity. In Florida alone demand is increasing faster than the state's population. But is it any real wonder? It used to be the only thing you used to carry on your person that used electricity was a watch than ran off a small battery. But now laptops, iPods, Blackberries, cell phones, and pretty soon we may have cars that are plugging into the outlets. I mentioned earlier that today we had a hearing on the Hill with the automakers. And our congressmen and women suggested that electric hybrid plug-ins have to be part of the solution, have to be part of the future. So how are we handling the enormous increases in electricity that we will need? Conservation and more efficient electrical appliances will help. (**0015-46** [Walther, Robert])

Comment: Our region is one of the fastest growing in Florida. Progress Energy is mindful of that fact and how best to serve Florida's future energy demand. The Levy County project will do just that. (**0015-8** [Pernu, Dorothy])

Comment: Our future energy needs are paramount. (**0035-5** [Craig, Avis])

Response: *The comments support or conclude that more baseload power resources are needed. The NRC staff will evaluate the need for power in Chapter 8 of the EIS.*

Comment: I would like to see Progress Energy present some true alternatives. I mean, a lot of their models are based on Florida just growing, growing, growing. We all know it's not happening right now. Things have slowed down and there is no guarantee that things are going

to start taking off and growing in the future again like they used to be. Past performance is no guarantee of future performance. You know, our country is changing. It is time to downsize. If they need power let's build small efficient plants where the power is needed. (**0014-154** [Jones, Art])

Comment: I guess what I really want to say is I have an answer for us dummies. We need to form a coalition, hire an advocate attorney, and nip this thing in the bud from the Governor all the way down. Now, you say: Well, that probably wouldn't work. Well, it did because I donated my $10 in Palm Beach County. We took Florida Power and Light to court and we won. And I got $13.75 back and I got $10 a month lower in the bill. So it is possible. I've written this in the newspapers, both St. Pete Times and the Chronicle. I would be very happy to form this and spend my time. It will take donations. Now, I only gave $10, but my God, you've got to figure that was 1950. So I don't know what it would take. But I think it is the idea, a way for us seniors to fight this. Not so much the plant. You can build a dozen plants but don't ship my energy up north. (**0014-50** [Foreman, Patricia])

Comment: The new plant that could be built in Levy will be able to power 1.4 million homes. The reality is we will need to require more from all of these sources and all others in the years ahead. If the housing crisis in Florida has shown us anything, it is that sound economic policy must recognize the virtue of diversity. So too must a wise energy plan. And in that diverse plan nuclear energy is a critical component. (**0015-48** [Walther, Robert])

Comment: This society has convinced itself that electric power is vital to our survival. NRC in implementing NEPA must remember and evaluate resources based on the truth - living human beings need in this order: air, water, food and then a whole bunch of things - somewhere down that list is electric power. (**0038-15** [Olson, Mary])

Response: *The NRC staff will evaluate the need for power in Chapter 8 of the EIS*.

D.22 Comments Concerning Alternatives – Energy

Comment: We should be putting our emphasis on conservation and efficiency instead of simply generating more power. (**0006-11** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: Not only will its construction and use be detrimental in many ways, most significantly, its high dollar cost will directly squander the resources essential for America to implement meaningful climate mitigation through development of alternative/sustainable energies. Florida already has FREE energy coming to us every day, from the sun. We should be pouring our resources into developing solar energy state wide. (**0006-4** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: This 17 million dollars could be better spent on renewable, clean, safe energy technologies - we do not want any further investment in coal or nuclear! (**0007-2** [Whiteley, Naomi])

Comment: [W]e must produce electricity needed in Florida through less risky energy supplies such as energy efficiency, solar, wind, water and biopower. (**0008-13** [Musser, Marcie])

Comment: Floridians need and want affordable, clean and safe energy choices such as energy efficiency, wind, water, solar, and biopower. (**0008-2** [Musser, Marcie])

Comment: Were the "Sunshine State" to put 1/4 th that amount into solar we could avoid all the drawbacks of nuclear power. (**0008-4** [Musser, Marcie])

Comment: It would make much more common sense, be more affordable, present less hazard to us and the environment or animals if we developed renewable energy. (**0009-5** [Davis, Suellyn])

Comment: We have taken an interest in alternative energy approaches and it is a priority of our local legislative state delegation. (**0014-105** [Mucci, Matt])

Comment: The Clean and Safe Energy Coalition supports conservation. Let me be clear. We support conservation. Energy conservation and efficient electrical appliances will help and a deeper commitment to renewable sources like wind, solar and geothermal is needed. Again, let me be clear. We support these alternative forms of energy. (**0014-109** [Walther, Robert])

Comment: Wind and solar are also a part of the diverse mix. I want to make that very clear and continue to stress we may be a coalition that does advocate the expansion of nuclear power, but we also support a diverse portfolio. (**0014-135** [Hernandez, Michael])

Comment: And it is an enormous amount of money which is being taken out of financing other forms of alternative energy which are competitive and cleaner. Now those competitive systems could be brought on stream well in advance of the time taken for the Levy plants to be completed and brought on stream. (**0014-57** [Hopkins, Norman])

Comment: Progress Energy has right of way of hundreds of miles of land under existing transmission lines. It uses solar energy in five Sun Smart schools in Florida. It exercises hydrogen fuel economies in Florida. I'm sorry, initiatives in Florida. And its facility in Citrus County has cheap railcar access. One ought to exploit these assets as an alternative to putting something which is essentially a tumor on our society and on our land, possibly by siting solar installations on their own rights of way, which they already have, capturing the electricity generated, back-feeding it to the plant site to supply the national grid, converting excess loads generated into hydrogen fuel to service cars and transportation as a future resource. A

balanced complementary generating policy is needed. If this were founded in Citrus County, creating jobs of the type just described for handling all of that solar energy collection, and increasing the County purse because that would not suffer, then go, make progress. (**0014-59** [Hopkins, Norman])

Comment: [W]e can look at vortex-induced vibration for aquatic clean energy, which is a hybrid which works. You know, these are proven technologies. It is wave energy on steroids. Of course, on the campaign trail one of the state senators that I was on the dais with, he had no clue what wave energy was. This is a problem that I spoke about that involves the political industrial hand-in-glove relationship that is in return for those lobbyists' contributions of $2300 we have people that go along and get along. There is great ownership in denying us progress in the future. (**0014-68** [Russell, John])

Comment: This [no new nuclear plant should be permitted by the NRC until the problem of waste storage is successfully resolved] is especially true in Florida which has enormous yet largely untapped sources of safe, clean, renewable energy. The technology to convert that energy into electricity can be installed by the power companies for about half the cost of building a nuclear plant and will create far more permanent jobs to help our economy. (**0014-73** [Eppes, Thomas])

Comment: Please do not permit our utilities to divert tens of billions of dollars, of our dollars, into Twentieth Century nuclear technology when Twenty-First Century solar technology is so much safer, cleaner and cheaper. Companies like Southern California Edison, Sun Edison, Solyndra, and VRB Power are showing everyone how to do it. The NRC can help by not permitting Progress Energy Florida to build a nuclear plant in Levy County. Some things last forever like nuclear waste and solar cells. Which would you rather have in your environment? (**0014-75** [Eppes, Thomas])

Comment: France was mentioned. France has gone big on nuclear. It is an entirely different nuclear process than what Progress Energy is talking about doing here and what we do in the United States. Germany has not been mentioned. Germany is doing a huge amount of solar energy. Which business model do we want to follow? Progress Energy talks about a balanced solution which I support. I think we need to have a balanced solution of alternative energy and energy efficiency in addition to state of the art power plants. (**0014-76** [Eppes, Thomas])

Comment: But where is the balance when Progress Energy is going to limit renewable energy sources to just three percent of the fuel mix with or without this nuclear plant. Where is the balance when Progress Energy has an energy efficiency program that based on current expenditures over the next eight years will amount to less than ten percent of their investment in this nuclear power plant. (**0014-77** [Eppes, Thomas])

Comment: This power plant will cost $7.7 million per megawatt. Southern California Edison is installing solar panels on leased commercial rooftops in high growth areas for $3.5 million dollars per megawatt. Less than half the cost. (**0014-78** [Eppes, Thomas])

Comment: A recent study by Navigant Consulting for the Florida Public Service Commission showed that Florida's solar potential is 175.8 kilowatt hours which amounts to 71.7 percent of all the electricity produced in Florida in 2007. That simply confirms the study done by the American Council for an Energy Efficient Economy last year which showed that solar and other renewables could replace 26 percent of conventionally generated electricity in Florida by the year 2023. California is going to have 20 percent of their electricity generated by renewables by 2010. Certainly we can do just as good a job. (**0014-79** [Eppes, Thomas])

Comment: We can reduce our energy -- now, I'm familiar with this because when we lived in Europe in the eighties they were building buildings over there that had solar energy built into them when they were brand new. The Greeks. We lived in Greece and they had on the tops of roofs, every new house being built had pipes running up to the roof for heating hot water. We haven't done anything like that in this country. We don't have any solar panels here to speak of except in California, which is the leader, the big leader, and God bless them. (**0014-94** [Roberts, Preston])

Comment: We can reduce our energy requirements by, I calculate, a minimum of twenty percent when we build a new home. And the way of doing it is through the design of the house, the positioning of the house for the sun. They do that in many places out west. They design a house so that they either get rid of the sun or attract the sun. Insulation, and there are all kinds of insulation programs available today, different kinds of insulation. Triple glazed glass in your windows. Tremendous heat gain can be stopped by having triple glazed glass or you can keep your cool in or your heat in, whichever you're trying to do. Improved heat pump systems. (**0014-95** [Roberts, Preston])

Comment: [P]utting solar panels on the roofs and having the Federal government, as well as the State, start giving incentive to contractors to put these units in and let us sell the energy back to Progress. Let us make lots of electricity in our homes, which we can do. We can use -- we have batteries there. We pull that energy in, we use it in our homes. We will use what we need to use when we want it, want to do that, and the balance, let's sell it back. Boulder, Colorado has gone all electric now with panels in their homes. This is true. This was out about two weeks ago. And they are conserving energy and they are very interested in solar. And all the homes now have these units in there that control the house electric flow at the prime and peak times. And that's not something new; that's been readily available. But Boulder is on top. And they are going after it and doing it, and God bless them. (**0014-96** [Roberts, Preston])

Comment: I understand this Progress Energy plant is going to service thirty-five counties. That's what was told to me today, thirty-five counties. I wonder if we held a vote, a vote in those

thirty-five counties, explained the alternate possibility besides a nuke plant, two nuke plants, three nuke plants, maybe solar panels. Solar farms they call them. They call them solar farms. Putting those solar farms in place. (**0014-97** [Roberts, Preston])

Comment: My fourth concern questions the relevancy of the project at this time. Efficiency first. The project diverts money, attention and effort from such a campaign that could reduce energy consumption in this country by one fifth. (**0015-111** [Hopkins, Norman])

Comment: Our last electric bill, $36.47. Now, you want to talk about the environment? That's because of the solar on the roof for our hot water. I haven't even done the retrofit on the house yet. It will be even less when that's completed and the house will also be able to stand up to a hurricane five. (**0015-44** [Klutho, Mark])

Comment: Where are the options of conservation? You want to hear that. They don't make money off of that. Where are the solar representatives? Not invited, not funded, not considered as an option. Where are the wood power reps? Same thing. Solar is being used worldwide despite the oil, coal, gas and nuclear industry's suppression of it. It is used in the Northwest United States and in Scandinavia. There are huge solar fields that are being built in the western part of this nation. And if you think we don't have wind here in Florida, they say we don't, then these people need to get out in the Gulf of Mexico once in a while. We've got wind. (**0015-58** [Sullivan, Jennifer])

Comment: Progress Energy could do the right thing and take the billions of dollars that are allocated for the planning and implementation of this plant and work on creating truly sustainable energy plans for our state using solar, wind and other natural alternatives. By doing this we would be creating just as many jobs, sustaining our environment, protecting our employment, and leaving green solutions for those who come after us, such as our children. (**0015-79** [Stewart, Anita])

Comment: By the time the Levy County plant comes on line some of its technology will already be outdated. Everybody is talking about change this year. It has become a real key word. Do we want nebulous change or something really life changing. This is something that we all need to think about and this gives us many opportunities. Alternative energy sources could be our real change. (**0015-80** [Stewart, Anita])

Comment: Possibly there is no real need for the nuclear but there is a need for more wind and water. (**0015-94** [Berger, Betty])

Comment: We are at the edge of a new beginning in terms of energy and the environment. New technology is beckoning at our door and we must open that door to the future. Thousands of new jobs, trades and learning opportunities are enveloped in the new solar, wind, thermal and tide energies. We as a world leader must say 'NO' to the old ways of polluting our own world.

Just like our bodies, we only get one. Though it is too late for us as a nation to take the lead in this environmental transition, we join the advanced nations on the correct path. (**0016-2** [Waldron, Theresa])

Comment: The environmental negatives of such a project are obvious, and I don't need to elaborate extensively on them. The science does not support nuclear power as a viable alternative to greenhouse gases. Nuclear power distracts us from the real viable alternative fuels that don't pollute and add to the greenhouse effect. Solar, wind, geothermal and other clean fuel technologies are the only answer to our energy future. (**0019-10** [Heywood, Harriet])

Comment: Progress Energy had made little effort in developing our region's energy conservation and energy alternatives. We live in a state where solar energy is about to take hold. Progress and Levy County are in a position to set the trend for the future through the promotion of conservation and solar and wind energy. (**0023-1** [Highsprings, Jojo])

Comment: [T]he loss of this expanded level of state grid capacity would be catastrophic to the state power supply needs, since the utilities in Florida have not brought forward other renewable energy supplies such as solar and solar photovoltaic, river current electricity, tidal energy, ocean current, nor wind where possible. (**0026-2** [Towles Ezell, Joy])

Comment: The NRC should work its way out of existence by concentrating on closing down nuclear power plants and moving into a new, sustainable, safe, renewable power future for the United States. (**0026-8** [Towles Ezell, Joy])

Comment: This is not the time to push ahead with a nuclear power plant that is not supported by the general public and does not advance our country's interests in developing renewable energy sources that are safe for people and the environment. (**0028-5** [Horgan, Wendy])

Comment: Uranium is a scarce resource. The sun, wind, conservation, and energy efficiency are not. (**0029-5** [Cox, Lesley])

Comment: Not only will its construction and use be detrimental in many ways, most significantly, its high dollar cost will directly squander the resources essential for America to implement meaningful climate mitigation through development of alternative/sustainable energies. Florida already has FREE energy coming to us every day, from the sun. We should be pouring our resources into developing solar energy state wide. (**0029-6** [Cox, Lesley])

Comment: Lastly, and most importantly, I would like to see an assessment of the <u>long-term opportunity cost</u> of constructing, maintaining and employing this type of electricity generation as opposed to meeting the projected demand through conservation, efficiency and renewable energy generation. Give the limited financial resource projection and current Florida regulation,

we are not confident that conservation, efficiency and renewables will be fundable once the nuclear capacity is funded. (**0030-10** [Roff, Rhonda])

Comment: And building new nuclear plants will directly interfere with the development of better, safer technologies by diverting much-needed resources from their development. There is enormous potential in many already existing sustainable technologies, as well as new ones currently in development. If these promising technologies had a fraction of the resources that have been poured into the giant sinkhole that is the nuclear industry, we would not even be having this discussion. It would be crystal clear to everyone, as it is to me, that there are better, safer energy options, and that there is no need for new nuclear plants in Florida or anywhere else. If we are to save our environment and our planet, now is the time to invest everything we can into truly safe, sustainable technologies. But the huge financial investment required by new nuclear plant construction will mean that the full development of new renewable, sustainable energy technologies could be set back by years, at the time when we need these new technologies the most. Florida in particular has abundant solar energy that is not being used. And through improved energy conservation alone, we could reduce our power consumption in Florida enormously. These are just a few of the many safer and more cost-effective ways to address our Florida energy needs, rather than building new nuclear plants. (**0032-10** [Wilansky, Laura Sue])

Comment: What about turbines & sun uses for electric in our communities? (**0036-3** [Foreman, Patricia])

Comment: Address the climate crisis head-on: compare nuclear energy (including fuel production and waste management) to other forms of electric power generation - besides coal which IS the problem - for contribution to reducing greenhouse gas emissions. Please also include systemic programs that produce “nega-watts” - also called energy efficiency - but in this case NOT the action of individual consumers, but actual institutional programs whether by utility corporations or independent administrators. (**0038-18** [Olson, Mary])

Comment: Given the striking fact that there has not been a new reactor license that was not subsequently canceled in more than 30 years, under NEPA there should be a specific comparison to other alternatives that includes a comparison of the wastes, emissions and routine releases from various forms of energy. Please include carbon footprint in this analysis - and include the mining and production of the fuel and the handling of the wastes in that analysis. We all know that coal has very bad emissions and wastes as well, however it is time that NRC includes a fair and balanced assessment of nuclear compared to the fastest growing electric power generating capacity on the planet: wind. Concentrating solar is growing as well - and while new forms of hydro are still under development, some of these could be included as well. While you are at it, please include the so-called “Gen IV” reactors since they are being invoked by the industry as THE REASON to build the current sorry generation 2 (it is a stretch to call these same-old, same-old PWRs and BWRs Gen 3). We need some good data

disclosure on the wastes of Gen II, Gen III and Gen IV - it would a service for NRC to give us these comparisons. (**0038-6** [Olson, Mary])

Comment: My husband and I, 400 signatures I have collected from family and friends, say no coal, no nukes, go solar first. (**0039-2** [Arnason, Deb])

Comment: [Nuclear energy] accident potential far beyond that of solar, wind, wave, geothermal. (**0039-7** [Arnason, Deb])

Comment: Power companies should be public utilities. We need honest plans like www.ieer.org, Carbon-Free and Nuclear-Free, A Roadmap for US Energy Policy and Google Energy's plan to power the US 2500x over using solar, wind and geothermal. This is being done. Only the political and corporate determination to make a killing instead of a living off of the citizens of Florida and the US and the planet keep us from truly clean, renewable energy. (**0039-9** [Arnason, Deb])

Comment: Please heed the warnings from mere citizens such as myself for me and my young family members. Find the alternatives that promote health and well being. (**0042-2** [Malwitz-Jipson, Merrillee])

Comment: Please clarify whether the EIS process will incorporate a review of reasonable alternative energy sources. To inform the reviewer, applicant's design alternative evaluations can be incorporated by reference. (**0044-2** [Mueller, Heinz J])

Response: *Decisions regarding which generation sources and alternatives to deploy are made by the applicant and regulatory bodies such as State energy planning agencies. The alternatives must be technically viable, feasible, and competitive. Alternative actions such as the no-action alternative (energy efficiency and demand-side management), new generation alternatives, purchased electrical power, alternative technologies (including renewable energy sources such as wind and solar), and the combination of alternatives will be considered in Chapter 9 of the EIS.*

Comment: The territory of the State of Florida is quite unique, being a peninsula, with limited energy resources, limited borders with other states, and therefore limited space for installation of power lines. All this indicate that the State should invest on internal generation of power/electricity. Different sources specially Nuclear Power and Solar Energy should be expanded because both do not have greenhouse gas emissions. (**0005-2** [Haghighat, Alireza])

Comment: It [nuclear power] also provides long-term cost stability as it is the lowest production cost of any major source of electricity, including natural gas and coal. And as we invest in more carbon-free nuclear, we decrease our reliance on fossil fuels and we help to stabilize rates and reduce fuel volatility that we've been experiencing over the past several months. (**0014-10** [Barnwell, Martha])

Comment: The greater conservation and renewable energy don't provide the base load power, the power that gets you to and from work, that gets the economy moving all twenty-four hours of the day. Consider that today all renewal sources produce two percent of our electricity while nuclear power accounts for twenty percent or one out of every five homes and businesses in the United States. (**0014-110** [Walther, Robert])

Comment: With regard to the waste question, the fissioning of a uranium atom releases 200 million electron volts. The burning of one coal atom releases four electron volts. In other words, on an atom-for-atom basis, nuclear creates 50 million times less waste. (**0014-20** [Tulenko, James])

Comment: [T]he true honest concern is yes, I do have a large carbon footprint; yes, I would like to see alternatives to the fuel that we are currently using because it is not in our best interest. (**0014-29** [Welker, Randy])

Comment: [I]n my opinion, fossil fuels need to become a dinosaur and a way of the past. And fossil fuels, obviously there is no doubt that they harm the environment and there is lasting impacts that we would like to see go away. (**0014-38** [Frink, Ken])

Comment: As an aside, a remark has been made about the cost, the comparative cost of electricity. Now, according to Amory B. Lovins, J. Rom (phonetic), Lester Brown who are widely accepted in this field, the cost of the energy in terms of cents per kilowatt hour from the nuclear plants will be at least twice the cost of the same from wind or solar. (**0014-58** [Hopkins, Norman])

Comment: At Progress Energy we have a responsibility to serve the electrical needs of our customers but we also recognize that there is no one single solution to meeting the energy needs of our customers. Our solution is a three-fold solution, a balanced solution. It is a combination of energy efficiency, alternatives and renewables, as well as investing in state of the art plants. (**0014-7** [Barnwell, Martha])

Comment: Even with a significant commitment to energy efficiency and renewables, we will not be able to meet the needs without cost-effective environmentally responsible ways to serve Florida's needs through nuclear. Nuclear also provides long term cost stability and it is the lowest production cost of any source of electricity, including coal and natural gas. (**0015-13** [Barnwell, Martha])

Comment: As we invest in carbon-free nuclear, we decrease our reliance on fossil fuels, and we stabilize our rates and reduce the fuel volatility that we have seen over the past several months. (**0015-14** [Barnwell, Martha])

Comment: A deeper commitment to renewable sources such as wind, solar and geothermal is needed. Let me be clear. We support them. But greater conservation and renewable energy

don't provide the base-load power, the round-the-clock power that we need to run our country. We need to be able to turn the switch on any time of day. Consider today that all renewal sources produce two percent of our electricity while nuclear power accounts for twenty percent. That's one out of every five homes or businesses in the United States. (**0015-47** [Walther, Robert])

Comment: Energy Yield - or Energy Balance/Thermal Pollution - please start including in your side-by-sides of the different alternatives an honest disclosure of energy in vs energy out...include the mining and production of the fuel and handling of the wastes. It is high time that the younger generation get to SEE that 2/3 of the radioactive waste generated in this process did NOT make electric power. The latent heat issue needs full disclosure in the context of efficiency of power production. It is not appropriate to assert that wind and solar are intermittent forms of power and operate at a lower capacity without in the same comparison pointing out that power production that depends on steam wastes 2/3 of the fuel by releasing the latent heat of phase transition as thermal pollution, not power. (**0038-7** [Olson, Mary])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates the nuclear industry to protect public health and safety within existing policy. The discussion of alternative energy sources in Chapter 9 of the EIS will describe potential impacts from alternative energy sources, including fossil and renewable energy sources such as wind and solar, in comparison with the proposed action.*

D.23 Comments Concerning Alternatives – Sites

Comment: [W]e have chosen Levy County as our preferred site. It provides a sufficient supply of cooling water which is one of the major requirements and important factors in the sustainability of any plant site. Our preferred site was chosen because it has ample water to meet the needs without adversely affecting other water usage and requirements in the area. Cooling water for the plant will be supplied through an intake from the Gulf of Mexico. This site also works well because it can connect easily to our transmission grid with our transmission plans that we have associated with the plant, allowing the energy generated here to serve in our thirty-five counties. (**0014-12** [Barnwell, Martha])

Comment: I think that the location of this plant is a bad location. I've listened to what people have said here, and particularly Mr. Norm Hopkins. And this is somebody who has really done his homework. It is somebody that is not on anybody's payroll. It is somebody who is doing his homework because they care about Crystal River and all the people that live here. (**0014-147** [Jones, Art])

Comment: [L]et's build it where the need is for the power so you don't, you know, have these transmission lines going 180 miles to bring power over the villages. If the villages are growing, and the villages need power, and these nuclear plants are so safe, well then build it over near

the villages. This just looks like a really bad location for the plant. It looks like a bad environmental disaster waiting to happen. (**0014-152** [Jones, Art])

Comment: So, you know, I just want to say I think we should keep it simple. I know the NRC has got tons, and tons, and tons of paperwork to go over and, you know, I hope you really look and listen clearly to people like Mr. Hopkins who has done their homework and that will take the burden off you. Here is someone that did the homework and it is just not a good location for these plants. (**0014-155** [Jones, Art])

Comment: And this is a lovely area, pristine area, and I think that's one of the reasons we've been targeted to put three together in here. And I would like to know where the energy is going aside from locally. (**0014-158** [Tyler, Janice])

Comment: Placing the proposed plants in this area would contribute to the degradation of the ecological banking system which has worked fine for us in the past and will work better in the future if we can restore or at least maintain a lot of what we already have and not lose any more. (**0015-31** [Casey, Emily])

Comment: [T]hey [Progress Energy] are putting this plant so far away from the population that it supposed to be serving. The more populous areas would be a lot more costly to cover should there be a disaster. (**0015-54** [Albert, Pamela])

Comment: [T]here are 4100 acres in Crystal River where there happens to be two coal-fired plants and a nuclear power plant. Well, there are over 3,000 acres there unused. There is an existing distribution network for the power that could be made with the new dual nuclear power plants located where one already is and two back-up coal-fired plants already are. (**0015-96** [Peters, Michael])

Comment: Progress Energy has proposed one of the worst siting situations in history. (**0026-3** [Towles Ezell, Joy])

Comment: The NRC issued a public notice for the 12/4/2008 meeting that stated that it intended to gather the information necessary to prepare the EIS as part of the review of the LWA and COL application for the LNP site. The public notice stated that the EIS would include alternatives to the proposed action (issuance of the LWA and COL), such as no action, reasonable alternative energy sources, and alternate sites. But at the public scoping meeting, NRC Environmental Project Manager Douglas Bruner stated that the EIS would be developed for only one specific site, the 3105 acre site near Inglis, FL specified in the Levy Nuclear Plant Units 1 and 2 COL Application's Environmental Report. Mr. Bruner indicated that no alternative sites are to be assessed. Also, it was stated that the NRC would only consider the one specific design submitted by PEF. Please clarify whether the EIS process will incorporate a review of

reasonable alternate sites. To inform the reviewer, applicant's site alternative evaluations can be incorporated by reference. (**0044-1** [Mueller, Heinz J])

Response: *The NRC will address alternatives to the proposed action in Chapter 9 of the EIS such as "no action, reasonable alternative energy sources, and alternate sites" to a level necessary to meet the requirements of NEPA. Additionally, the EIS will provide the information necessary for the U.S. Army Corps of Engineers to address the Least Environmentally Damaging Practicable Alternative (LEDPA) in their Record of Decision required under Section 404(b)(1) of the Clean Water Act.*

D.24 Comments Concerning Benefit-Cost Balance

Comment: I am greatly angered by the audacity of the NRC for allowing the investors to build a double reactor in Levy County. Aside from the nonsensical, and I might add astronomical, cost for such a HUGE time-consuming dinosaur, the environmental and safety concerns are staggering. (**0019-1** [Heywood, Harriet])

Comment: [I]t is clear to me that building new nuclear plants at the proposed Levy County site would be extremely dangerous and very costly in a variety of ways. (**0032-1** [Wilansky, Laura Sue])

Response: *These comments express opposition to the applicant's COL application. The NRC will carefully review the application against its regulations that are intended to protect public health and safety and the environment. An evaluation of the benefit-cost balance of constructing proposed LNP Units 1 and 2 will be discussed in Chapter 10 of the EIS.*

Comment: The insolence of the nuclear industry's request for REDUCED safeguards at the same time they ask for massive Federal funding should be a first signal that something is terribly out of whack. We now have a more refined sense of what an ANNUAL request for $25 billion or MORE actually represents in terms of the public's ability to pay. (**0006-8** [Dickinson, Josh] [Dickinson, Sally] [Malwitz-Jipson, Merrillee] [Wapner, Howard])

Comment: My third concern is the cost of the project and the unrewarded charges to consumers for capital expense of Progress Energy incurred. (Both costs and time to build are guesses at this stage. Even Progress Energy literature is vague on this in a range of $2.5 billion to $17 billion). The project costs are hard to comprehend. Looked at another way, the latter equals about three times the value of gold reserves held by the International Monetary fund (IMF), or 5% of IMF total reserves. That is a huge sum to apply to a single venture, taking money away from competitive power generation alternatives, which would be expected to mature years before the Levy County system is completed. (**0015-110** [Hopkins, Norman])

Response: *The NRC does not have authority under the law to ensure that the proposed plant is the least costly alternative to provide energy services under any particular set of assumptions concerning future circumstances. This authority and responsibility is most often the role of State regulatory authorities such as public service commissions, or in the case of merchant plants, the competitive marketplace. The EIS will consider the potential for alternative non-nuclear technologies to provide the electricity that could be generated by the proposed plant and their environmental impacts. The potential effect of a particular nuclear power investment on the future development and implementation of alternative technologies is speculative and beyond the scope of the EIS.*

Comment: Progress Energy's proposal to build the Levy County nuclear plant provides a recent example of the high cost of nuclear energy and the difficulty in providing accurate cost estimates. The cost of two Westinghouse AP1000 reactors has nearly tripled since initial estimates, to more than $17 billion. (**0008-3** [Musser, Marcie])

Comment: [W]hen are we going to get a lottle sense and quit spending so much money??? Of there is an affordable way and one that eventually we MAY recoup the expenses then common sense says that going the more affordable way would make financial sense. (**0009-2** [Davis, Suellyn])

Comment: A major advantage of a nuclear power plant is that once built, electricity costs will remain relatively stable for the next 60 to 80 years, because the major costs are the capital cost of building the plant. Once built, the fuel costs are a minor part of the total cost, unlike natural gas. (**0011-6** [Tulenko, James])

Comment: If our plans continue to move forward and are approved by our State and Federal regulators, the two new advanced technology reactors could begin operating in 2016 and 2017 respectively. And once those plants begin operating we will save our customers over $1 billion annually in fuel costs. (**0014-11** [Barnwell, Martha])

Comment: Because of the time and expense required to build nuclear facilities we've got to take the long-term view now, and that is why we are all here today. If plans continue to move forward and we receive state and Federal regulatory approval, the two new advanced technology reactors could begin operating in 2016 and 2017, respectively. Once the plants begin, we anticipate that we will save our customers over $1 billion annually in fuel costs. (**0015-15** [Barnwell, Martha])

Comment: According to figures provided by Progress Energy, total investment in the two new nuclear units and associated infrastructure will be on the order of $17 billion. This is certainly a large investment by any standard, and particularly in a relatively rural area such as this. Perhaps the largest single investment ever made in Levy County. (**0015-69** [Hodges, Alan])

Comment: I ask you to include the true costs of nuclear plants throughout their entire life cycle in your environmental calculations, including among other factors: the guaranteed damage to Florida's environment; the very real potential for enormous risks to health and life; the diversion of resources from the desperately- needed development of truly safe and sustainable energy technologies; the cost of hundreds of years of plant decommissioning; and the cost of nuclear waste storage for thousands of years to come. (**0032-13** [Wilansky, Laura Sue])

Response: *The disclosure of the costs of the proposed action will rely on the best available estimate of financial costs with uncertainties noted. Associated costs that cannot be reliably quantified also will be discussed. The EIS will discuss the estimated overall internal and external benefits, costs, and associated environmental impacts of the proposed project.*

Comment: My third concern is the cost of the project, and also the fact that we are being asked to contribute to the capital base as has already been discussed. It is difficult to comprehend $17 billion, but it's three times the gold reserves of the International Monetary Fund. It is also five percent of the total reserves of the International Monetary Fund. (**0014-56** [Hopkins, Norman])

Comment: Let's look at a cost comparison. Let's do a vote. Let's have a mandate that we take those thirty-five counties and get people to say yes or no. Then there is no question on whether or not it is going to happen. If they say yes, they've got the go-ahead. If they say no, we want more environmental information, and we want to see the dollars and cents figures. (**0014-98** [Roberts, Preston])

Comment: Another issue is that it's apparently $10 billion to erect a power plant of this nature and the economy cannot bear this burden, especially in light of what is happening today. (**0015-104** [Moore, Brian])

Comment: Another problem is that Wall Street does not like the nuclear industry because of the huge risk factors involved. Many folks remember huge cost overruns, ignored safety inspections, and deep pocket corruption. (**0019-3** [Heywood, Harriet])

Response: *While these comments are related to benefit-cost balance, they do not provide specific information related to the environmental effects of the proposed action and will not be evaluated in the EIS.*

Comment: Please take action to stop Progress Energy from making the citizens pay for the construction costs of the planned nuclear power plant. The Progress Energy shareholders, not the public, should bear the cost of building new plants. For the next 8 years Progress Energy plans to charge the average customer each and every month to pay for this plant. That will total of thousands of dollars for each and every one of us. We, the citizens, should not pay thousands of dollars to enrich the Progress Energy Corporation. (**0017-1** [Miller, Joan] [Miller, Ron])

Comment: In a time when money is so tight, and clean, and relatively cheap energy sources are begging to be developed, why is the NRC so hot to allow the nuclear industry to push such a risky a venture on us? Who will be paying for this project? Public subsidies (us) rate increases (us). (**0019-4** [Heywood, Harriet])

Comment: I do not believe it should be the responsibility of present Progress Energy Customers to pay for two buildings in Levy County for Nuclear Power. If the CEOs, Governor, Legislature and Energy Commission want these two plants let them pay for them. (**0036-1** [Foreman, Patricia])

Response: *The NRC regulates the nuclear industry to protect public health and safety within existing policy. Issues relate to sale adjustments are outside of the NRC's mission and authority and will not be addressed in the EIS. This authority and responsibility is most often the role of state regulatory authorities such as public service commissions.*

Comment: If nuclear power generation is so safe, why do we still need the Price-Anderson Act? (**0043-1** [Eppes, Thomas])

Comment: If nuclear power generation is so cost-effective, why does it continue to require billions of taxpayer dollars in Federal subsidies? (**0043-3** [Eppes, Thomas])

Comment: What is the dollar value (per megawatt of capacity) of all Federal subsidies to the nuclear power industry, including Price-Anderson and the projected costs of securely storing deadly waste for the requisite thousands of years? (**0043-4** [Eppes, Thomas])

Comment: I suggest that future NRC public meetings specifically address these [Federal subsidies and long term waste storage costs] questions. If you have the answers to any of these questions, please send them to me. Thank you for your public service. (**0043-5** [Eppes, Thomas])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates the nuclear industry to protect public health and safety within existing policy. Thus, matters related to the Price-Anderson Act of 1957 are outside the scope of this review and will not be included in the EIS. However, the EIS will include an evaluation of potential health impacts of operating a nuclear plant on the LNP site in Chapter 5. In addition, the safety assessment for the proposed licensing action was provided as part of the application. The NRC is in the process of developing a Safety Evaluation Report that analyzes all aspects of construction and operational safety. The NRC will only issue a license if it can conclude that there is reasonable assurance that: (1) the activities authorized by the license can be conducted without endangering public health and safety, and (2) such activities will be conducted in compliance with the rules and regulations of the NRC. Issues related to the evaluation of the benefit-cost balance for proposed LNP Units 1 and 2 will be addressed in Chapter 10 of the EIS.*

Comment: If nuclear energy was truly cost-effective and truly a profitable business, the companies trying to build new nuclear plants would not have to keep coming back to Congress for loan guarantees, liability insurance and tax breaks. The fact that this industry cannot obtain operating insurance by any means other than Congressional action is extremely telling! Nuclear plants are uninsurable!!!! Does that sound like an environmentally safe, economically sound business to you?! It surely doesn't to me! And haven't we had enough Congressional bailouts of failing private industries? The investments we have already made in the nuclear industry over many past decades have not paid off for the American people, and no further such investments should be made, based on their extensive existing track record. (**0032-11** [Wilansky, Laura Sue])

Comment: The people who decided to promote new reactor licenses (Dick Cheney, George Bush for two) liked to claim that nuclear energy will solve the climate crisis" - is this true? Is it the most cost effective way? This is particularly important, since NRC's licensing decision would trigger the use of massive public subsidy in the form of tax dollars and also public loan guarantees. It is NRC's fiduciary responsibility to address the climate issue head-on and disclose real facts about the comparative value of the public's investment in fighting this imminent threat. (**0038-19** [Olson, Mary])

Response: *The NRC is not involved in establishing energy policy. Rather, it regulates the nuclear industry to protect the public health and safety within existing policy. Issues related to the subsidization of nuclear power are outside of the NRC's mission and authority and are not addressed in the EIS. These comments will not be considered further in the EIS.*

Appendix E

Draft Environmental Impact Statement Comments and Responses

Appendix E

Draft Environmental Impact Statement Comments and Responses

As part of the U.S. Nuclear Regulatory Commission (NRC) review of the Levy Nuclear Plant (LNP) application for combined construction permits and operating licenses (COLs) for proposed Units 1 and 2 at the LNP site located in southern Levy County, Florida, the NRC and the U.S. Army Corps of Engineers (USACE) (together referred to as the "review team") solicited comments from the public on the draft environmental impact statement (EIS). The draft EIS was issued in August 2010. A 75-day comment period began on August 13, 2010, when the U.S. Environmental Protection Agency (EPA) issued a *Federal Register* Notice of Availability (75 FR 49539) of the draft EIS to allow members of the public to comment on the results of the environmental review.

As part of the process to solicit public comments on the draft EIS, the review team

- placed a copy of the draft EIS at the Citrus County Coastal Region Library in Crystal River, Florida, the Dunnellon Branch Library in Dunnellon, Florida, the AF Knotts Public Library in Yankeetown, Florida, and the Bronson Public Library in Bronson, Florida;
- made the draft EIS available in the NRC's Public Document Room in Rockville, Maryland, (ML1021400231 and ML103140235);
- placed a copy of the draft EIS on the NRC website at www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1941/;
- provided a copy of the draft EIS to any member of the public who requested one;
- sent copies of the draft EIS to certain Federal, State, Tribal, and local agencies;
- published a notice of availability of the draft EIS in the *Federal Register* on August 13, 2010 (75 FR 49539);
- filed the draft EIS with the U.S. Environmental Protection Agency; and
- held two public meetings on Thursday, September 23, 2010 in Crystal River, Florida.

Approximately 125 people attended the public meetings and numerous participants provided oral comments. A certified court reporter recorded these oral comments and prepared written transcripts of the meeting. The transcripts of the public meetings were published on October 7, 2010, as part of the public meeting summary (Agencywide Documents Access and

Management System [ADAMS] Accession Numbers ML102800375 and ML102800378). In addition to the comments received at the public meeting, the NRC received letters and e-mail messages with comments.

The comment letters, e-mail messages, and transcripts of the public meeting are available in ADAMS. ADAMS is accessible at http://www.nrc.gov/reading-rm.html. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC's Public Document Room reference staff at 1-800-397-4209 or 301-415-4737. The ADAMS accession numbers for the letters, e-mail messages, and transcripts are provided in Table E-1.

E.1 Disposition of Comments

Each set of comments from a given commenter was given a unique correspondence identifier, allowing each set of comments from a commenter to be traced back to the transcript, letter, or e-mail in which the comments were submitted.

After the comment period concluded, the review team considered and dispositioned all comments received. To identify each individual comment, the team reviewed the transcript of the public meeting and each letter and e-mail received related to the draft EIS. As part of the review, the review team identified statements that it believed were related to the proposed action and recorded the statements as comments. Each comment was assigned to a specific subject area, and similar comments were grouped together. Finally, responses were prepared for each comment or group of comments.

Some comments addressed topics and issues that are not part of the environmental review for this proposed action. These comments included questions about NRC's safety review, general statements of support or opposition to nuclear power, and comments on the NRC regulatory process in general. These comments are included, but detailed responses to such comments are not provided because they addressed issues that do not directly relate to the environmental effects of this proposed action and are, thus, outside the scope of the National Environmental Policy Act (NEPA of 1969, as amended) review of this proposed action. Many comments, however, specifically addressed the scope of the environmental review, analyses, and issues contained in the draft EIS.

Table E-1 provides a list of commenters identified by name, affiliation (if given), comment number, and the source of the comment.

Table E-1. Individuals Providing Comments During the Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspond -ence ID
Avery-Smith, Ellen		Meeting Transcript (ML102800378)	0002-7
Avery-Smith, Ellen	Rogers Towers	Letter (ML102810521)	0023
Bacchus, Sydney		Email (ML103050032)	0011
Bacchus, Sydney	Nuclear Information and Resource Service	Letter (ML103340094)	0020
Bacchus, Sydney	Nuclear Information and Resource Service	Letter (ML103200014)	0030
Baxter, Farouk		Letter (ML102350160)	0022
Berger, Betty		Meeting Transcript (ML102800375)	0001-5
Berger, Betty		Email (ML102730873)	0041
Cannon, Renate		Meeting Transcript (ML102800375)	0001-6
Casey, Emily	Environmental Alliance of North Florida	Meeting Transcript (ML102800378)	0002-11
Casey, Emily	Environmental Alliance of North Florida	FAX (ML103160268)	0029
Casey, Emily	Environmental Alliance of North Florida	Email (ML102810519)	0045
Cino, Cynthia		Email (ML102730857)	0036
Crabtree, Roy	National Marine Fisheries Service (NMFS)	Email (ML103370190)	0021
Croom, Miles	National Oceanic and Atmospheric Administration (NOAA)	Email (ML103050542) Email (ML103080057)	0014
Diamond, Darryl		Meeting Transcript (ML102800375)	0001-3
Elnitsky, John	Progress Energy - New Generation Projects and Programs	Meeting Transcript (ML102800375)	0001-4
Elnitsky, John	Progress Energy - New Generation Projects and Programs	Meeting Transcript (ML102800378)	0002-1
Fetrow, Robert		Meeting Transcript (ML102800375)	0001-12
Fetrow, Robert		Letter (ML103000302)	0026
Fetrow, Robert	Gator Engineering Services, Inc.	Letter (ML103050294)	0028

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspond -ence ID
Foley, Beth		Meeting Transcript (ML102800378)	0002-2
Foley, Beth		Email (ML102730866)	0039
Foley, Beth		Letter (ML102810525)	0043
Foreman, Patricia Parker		Email (ML103270091)	0018
Fritz, Carol Fritz, Charles		Email (ML102530389)	0034
Garvin, Bill		Meeting Transcript (ML102800375)	0001-13
Golden, James	South Florida Water Management District	Letter (ML102871136)	0024
Hilliard, Dan	Withlacoochee Area Residents, Inc (WAR)	Meeting Transcript (ML102800375)	0001-10
Hilliard, Dan		Email (ML102730863)	0037
Hilliard, Dan	Withlacoochee Area Residents, Inc (WAR)	Letter (ML102810030)	0042
Hilliard, Dan	Withlacoochee Area Residents, Inc (WAR)	Letter (ML102810494)	0044
Hogue, Gregory	United States Department of the Interior	Email (ML102990091)	0007
Hollins, Dixie	Hollinswood Ranch	Meeting Transcript (ML102800375)	0001-1
Hopkins, David		Letter (ML102860837)	0046
Hopkins, Norman	Amy H. Remley Foundation	Meeting Transcript (ML102800375)	0001-9
Hopkins, Norman	Amy H. Remley Foundation	Meeting Transcript (ML102800378)	0002-12
Hopkins, Norman	Amy H. Remley Foundation	Email (ML102780054)	0004
Hopkins, Norman	Amy H. Remley Foundation	Email (ML102930176)	0005
Hopkins, Norman	Amy H. Remley Foundation	Email (ML102980407)	0006
Hopkins, Norman	Amy H. Remley Foundation	Email (ML103000429)	0013
Hopkins, Norman	Amy H. Remley Foundation	Letter (ML103080876), Letter (ML103200270)	0015
Hopkins, Norman	Amy H. Remley Foundation	Email (ML103160552)	0016
Hopkins, Norman	Amy H. Remley Foundation	Email (ML102730865)	0038
Hopkins, Norman	Amy H. Remley Foundation	Letter (ML102860837)	0046
Houston, Andy	City of Crystal River	Meeting Transcript (ML102800375)	0001-2

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspond -ence ID
Hubbard, Michael		Email (ML102990101)	0008
Hopkins, Norman	Amy H. Remley Foundation	Email (ML102990103)	0009
Jones, Art		Meeting Transcript (ML102800378)	0002-5
Kammerer, Laura	Florida Department of State, Division of Historical Resources	Letter (ML103270399)	0019
Kitchen, Robert	Progress Energy	Letter (ML102990184), Letter (ML103010056)	0010
Klutho, Mark		Meeting Transcript (ML102800378)	0002-4
Lester, Cecilia		Email (ML102730855)	0035
Lott, Phyllis		Meeting Transcript (ML102800378)	0002-3
Minno, Maria		Meeting Transcript (ML102800375)	0001-11
Mueller, Heinz J	EPA	Email (ML102990187), Email (ML103080058)	0003
Olson, Mary	Southeast Office of Nuclear Information and Resource Service	Meeting Transcript (ML102800378)	0002-8
Overa, Beverly		Email (ML103000428)	0012
Pantaleo, Greg		Meeting Transcript (ML102800375)	0001-8
Poole, Mary Ann	Florida Fish and Wildlife Conservation Commission (FWC)	Letter (ML102730869, ML102780380, ML102730869)	0040
Price, Sally		Meeting Transcript (ML102800375)	0001-14
Ritter, Monte	Southwest Florida Water Management District (SWFWMD)	Email (ML103200108)	0017
Seiling, Barbara		Meeting Transcript (ML102800378)	0002-9
Seymour, Mike		Meeting Transcript (ML102800378)	0002-10
Smith, Charles	Robinson Estates	Meeting Transcript (ML102800378)	0002-6
Smith, Charles		Letter (ML102560367)	0023
Smith, Charles		Letter (ML103000303)	0027
Smith, Robert		Meeting Transcript (ML102800375)	0001-7

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspond -ence ID
Steele, Willard	Seminole Tribe of Florida	Email (ML102500172)	0032
Stroh, Scott	Florida Division of Historical Resources, State Historic Preservation Officer (SHPO)	Letter (ML102740568)	0025
Thuemler, Ronald		Email (ML102310258)	0031
York, Elliot	Seminole Tribe of Florida	Email (ML102500172)	0032
York, Elliot	Seminole Tribe of Florida	Email (ML102500173)	0033

Table E-2. Comment Categories in Order of Presentation

Section	Comment Category	Page
E.1.1	Comments Concerning Process - COL	E-14
E.1.2	Comments Concerning Process - NEPA	E-19
E.1.3	Comments Concerning Site Layout and Design	E-20
E.1.4	Comments Concerning Land Use - Site and Vicinity	E-22
E.1.5	Comments Concerning Land Use - Transmission Lines	E-24
E.1.6	Comments Concerning Hydrology - Surface Water	E-26
E.1.7	Comments Concerning Hydrology - Groundwater	E-43
E.1.8	Comments Concerning Ecology - Terrestrial	E-78
E.1.9	Comments Concerning Ecology - Aquatic	E-114
E.1.10	Comments Concerning Socioeconomics	E-125
E.1.11	Comments Concerning Historic and Cultural Resources	E-131
E.1.12	Comments Concerning Geology	E-136
E.1.13	Comments Concerning Meteorology and Air Quality	E-136
E.1.14	Comments Concerning Health - Nonradiological	E-141
E.1.15	Comments Concerning Health - Radiological	E-142
E.1.16	Comments Concerning Nonradiological Waste	E-154
E.1.17	Comments Concerning Accidents	E-154
E.1.18	Comments Concerning the Uranium Fuel Cycle	E-154
E.1.19	Comments Concerning Transportation	E-161
E.1.20	Comments Concerning Cumulative Impacts	E-164
E.1.21	Comments Concerning the Need for Power	E-169
E.1.22	Comments Concerning Alternatives - Energy	E-171
E.1.23	Comments Concerning Alternatives - System Design	E-186
E.1.24	Comments Concerning Alternatives - Sites	E-188
E.1.25	Comments Concerning Benefit-Cost Balance	E-195
E.1.26	General Comments in Support of the Licensing Action	E-199

Table E-2. (contd)

Section	Comment Category	Page
E.1.27	General Comments in Support of the Licensing Process	E-200
E.1.28	General Comments in Support of Nuclear Power	E-200
E.1.29	General Comments in Support of the Applicant	E-202
E.1.30	General Comments in Opposition to the Licensing Action	E-204
E.1.31	General Comments in Opposition to Nuclear Power	E-206
E.1.32	Comments Concerning Issues Outside Scope - Emergency Preparedness	E-207
E.1.33	Comments Concerning Issues Outside Scope - Miscellaneous	E-208
E.1.34	Comments Concerning Issues Outside Scope - NRC and USACE Oversight	E-210
E.1.35	Comments Concerning Issues Outside Scope - Safety	E-211
E.1.36	Comments Concerning Issues Outside Scope - Security and Terrorism	E-213
E.1.37	General Editorial Comments	E-214

Table E-3. Individuals Providing Comments During the Comment Period by Category

Comment Category	Commenter (Comment ID)
Accidents-Severe	• Hopkins, Norman (0001-9-3)
Alternatives-Energy	• Bacchus, Sydney (0011-3) (0011-9) (0011-10) (0020-49) (0020-51) (0030-3-11) • Elnitsky, John (0001-4-6) (0002-1-6) • Foreman, Patricia Parker (0018-2) • Hopkins, Norman (0005-4) (0005-5) (0005-17) (0005-18) (0005-19) (0005-29) (0006-9) (0015-4) (0015-5) (0038-1) • Hubbard, Michael (0008-43) (0008-44) (0008-45) (0008-46) (0008-47) (0008-48) (0008-49) (0008-50) (0008-51) (0008-52) (0008-54) (0009-1) (0009-3) (0009-9) • Klutho, Mark (0002-4-2) • Lester, Cecilia (0035-2) • Price, Sally (0001-14-8) • Seiling, Barbara (0002-9-6) • Smith, Charles (0027-7) • Thuemler, Ronald (0031-6)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
Alternatives-Sites	• Berger, Betty (0001-5-4) (0041-1) (0041-5) (0041-6) • Foley, Beth (0039-1) • Golden, James (0024-1) (0024-2) (0024-3) (0024-4) (0024-5) (0024-6) (0024-8) • Hilliard, Dan (0042-25) • Hopkins, Norman (0005-16) • Hubbard, Michael (0008-55) (0008-68) (0009-2) • Jones, Art (0002-5-1) (0002-5-7) • Mueller, Heinz J (0003-22) (0003-24) • Price, Sally (0001-14-2) • Seiling, Barbara (0002-9-1) • Seymour, Mike (0002-10-6) • Smith, Robert (0001-7-11) (0001-7-13)
Alternatives-System Design	• Fetrow, Robert (0028-1) (0028-2) (0028-3) (0028-4) (0028-6) (0028-7) (0028-8) • Hilliard, Dan (0042-24) • Mueller, Heinz J (0003-10)
Benefit-Cost Balance	• Bacchus, Sydney (0011-14) (0011-16) (0011-17) • Berger, Betty (0001-5-8) • Hopkins, Norman (0002-12-2) (0005-6) (0005-7) (0006-5) (0006-8) (0013-1) (0015-2) (0015-3) • Hubbard, Michael (0008-56) (0008-62) (0009-5) (0009-6) (0009-7) • Klutho, Mark (0002-4-1) (0002-4-4) • Thuemler, Ronald (0031-3)
Cumulative Impacts	• Bacchus, Sydney (0020-7) (0020-8) (0020-9) (0020-10) (0020-52) (0030-1-5) (0030-1-14) (0030-1-15) (0030-3-12) (0030-3-17) • Hubbard, Michael (0008-23) (0008-25) (0008-63)
Ecology-Aquatic	• Bacchus, Sydney (0020-46) (0020-47) (0020-48) (0020-54) (0030-2-1) (0030-2-3) (0030-3-9) (0030-3-10) (0030-3-14) • Berger, Betty (0001-5-11) • Croom, Miles (0014-2) • Fetrow, Robert (0028-5) • Hilliard, Dan (0037-2) (0042-5) (0042-14) • Hopkins, Norman (0005-12) (0005-27) • Hubbard, Michael (0008-27) • Kitchen, Robert (0010-1-13) (0010-1-15) (0010-1-16) (0010-1-17) (0010-1-18) (0010-1-19) (0010-1-20) (0010-2-1) (0010-2-2) (0010-4-5) (0010-4-6) (0010-4-8) (0010-4-10) (0010-4-11) (0010-4-12) • Minno, Maria (0001-11-7) • Mueller, Heinz J (0003-5) • Poole, Mary Ann (0040-1) (0040-4) (0040-5) (0040-6) (0040-8) (0040-9)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
Ecology-Terrestrial	• Avery-Smith, Ellen (0002-7-1) (0002-7-2) (0002-7-3) (0002-7-4) (0002-7-5) (0002-7-6) (0002-7-12) (0023-1) (0023-2) (0023-4) (0023-5) (0023-6) (0023-7) (0023-9) (0023-16) • Bacchus, Sydney (0011-5) (0011-7) (0011-8) (0011-11) (0011-18) (0011-19) (0020-21) (0020-35) (0020-36) (0020-39) (0020-44) (0020-45) (0030-1-17) (0030-2-5) (0030-2-7) (0030-2-8) (0030-2-9) (0030-2-13) (0030-2-14) (0030-2-15) (0030-2-19) (0030-2-20) (0030-3-1) (0030-3-2) (0030-3-3) (0030-3-6) (0030-3-8) (0030-3-15) (0030-3-18) • Casey, Emily (0002-11-1) (0045-1) (0045-2) • Foley, Beth (0002-2-2) (0002-2-3) • Hogue, Gregory (0007-2) • Hubbard, Michael (0008-2) (0008-3) (0008-4) (0008-5) (0008-6) (0008-11) (0008-12) (0008-15) (0008-22) (0008-24) (0008-58) • Jones, Art (0002-5-3) • Kitchen, Robert (0010-1-9) (0010-2-10) (0010-2-14) (0010-3-2) (0010-3-3) (0010-3-4) (0010-3-6) (0010-4-2) (0010-4-13) • Minno, Maria (0001-11-6) • Mueller, Heinz J (0003-1) (0003-4) (0003-9) (0003-11) (0003-12) (0003-13) (0003-14) (0003-15) (0003-16) (0003-25) • Seiling, Barbara (0002-9-3) (0002-9-4) (0002-9-5) • Seymour, Mike (0002-10-3) (0002-10-4) (0002-10-5) • Smith, Charles (0002-6-5) (0023-1) (0023-2) (0023-4) (0023-5) (0023-6) (0023-7) (0023-9) (0023-16) • Smith, Robert (0001-7-6) (0001-7-7) • Thuemler, Ronald (0031-5)
Editorial Comments	• Kitchen, Robert (0010-1-6) (0010-1-7) (0010-1-8) (0010-1-10) (0010-1-11) (0010-1-12) (0010-1-14) (0010-2-3) (0010-2-4) (0010-2-7) (0010-2-9) (0010-3-1) (0010-3-5) (0010-3-7) (0010-3-10) (0010-4-3) (0010-4-4) (0010-4-7) (0010-4-9) • Mueller, Heinz J (0003-7)
Geology	• Bacchus, Sydney (0030-1-2) • Price, Sally (0001-14-7) • Smith, Charles (0027-6)
Health-Nonradiological	• Berger, Betty (0001-5-6) • Kitchen, Robert (0010-2-5) (0010-3-11)
Health-Radiological	• Hopkins, Norman (0001-9-1) (0001-9-2) (0001-9-4) (0001-9-5) (0001-9-6) (0002-12-6) (0004-1) (0005-3) (0005-11) (0005-14) (0005-20) (0005-21) (0005-22) (0005-23) (0005-24) (0006-3) (0015-6) (0015-7) • Hubbard, Michael (0008-8) (0008-9) (0008-35) (0008-36) (0008-37) (0008-38) (0008-39) (0008-59) (0008-67) (0009-13) (0009-14) • Kitchen, Robert (0010-3-12) • Minno, Maria (0001-11-2) (0001-11-4)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
	• Olson, Mary (0002-8-8) • Smith, Charles (0027-1) (0027-2) (0027-3) (0027-5) • Smith, Robert (0001-7-1) (0001-7-17)
Historic and Cultural Resources	• Bacchus, Sydney (0011-6) (0020-13) (0020-14) (0020-15) (0020-16) (0020-17) • Kammerer, Laura (0019-1) • Kitchen, Robert (0010-2-15) (0010-3-8) • Steele, Willard (0032-1) (0032-2) (0032-3) • Stroh, Scott (0025-1) • York, Elliot (0032-1) (0032-2) (0032-3) (0033-1)
Hydrology-Groundwater	• Avery-Smith, Ellen (0002-7-7) (0023-3) (0023-13) • Bacchus, Sydney (0020-18) (0020-19) (0020-22) (0020-23) (0020-24) (0020-25) (0020-26) (0020-27) (0020-30) (0020-32) (0020-34) (0020-37) (0020-38) (0020-41) (0020-43) (0030-1-1) (0030-1-3) (0030-1-6) (0030-1-7) (0030-1-8) (0030-1-9) (0030-1-10) (0030-1-11) (0030-1-12) (0030-1-13) (0030-1-16) (0030-1-20) (0030-2-4) (0030-2-6) (0030-2-21) (0030-2-22) (0030-3-19) • Berger, Betty (0001-5-1) (0001-5-9) (0001-5-13) • Cannon, Renate (0001-6-3) • Casey, Emily (0002-11-2) (0002-11-3) (0002-11-4) (0002-11-5) (0029-2) (0029-3) (0045-3) (0045-4) (0045-5) • Foley, Beth (0002-2-1) (0043-1) (0043-2) • Golden, James (0024-7) • Hilliard, Dan (0042-9) (0042-11) (0042-16) (0042-20) (0042-23) (0044-5) • Hopkins, Norman (0001-9-7) (0002-12-3) (0002-12-4) (0005-10) (0005-26) (0005-28) • Houston, Andy (0001-2-3) • Hubbard, Michael (0008-10) (0008-14) (0008-16) (0008-17) (0008-18) (0008-19) (0008-21) (0008-26) (0008-28) (0008-30) (0008-31) (0008-32) (0008-57) (0008-60) (0008-61) (0009-10) (0009-15) • Jones, Art (0002-5-2) (0002-5-4) • Kitchen, Robert (0010-1-4) (0010-1-5) (0010-2-12) (0010-2-13) • Minno, Maria (0001-11-8) • Mueller, Heinz J (0003-18) • Price, Sally (0001-14-5) • Seiling, Barbara (0002-9-7) (0002-9-8) • Smith, Charles (0023-3) (0023-13) (0027-4) • Smith, Robert (0001-7-3)
Hydrology-Surface Water	• Avery-Smith, Ellen (0002-7-13) (0023-14) • Bacchus, Sydney (0011-12) (0011-13) (0020-6) (0020-20) (0020-29) (0020-31) (0020-33) (0020-40) (0020-42) (0020-50) (0030-1-18) (0030-1-19) (0030-2-2) • Casey, Emily (0029-1) • Hilliard, Dan (0001-10-1) (0001-10-2) (0001-10-3) (0001-10-4) (0037-3)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
	(0042-1) (0042-2) (0042-3) (0042-4) (0042-6) (0042-7) (0042-8) (0042-10) (0042-12) (0042-15) (0042-17) (0042-18) (0042-19) (0042-21) (0042-22) (0042-26) (0044-1) (0044-2) (0044-3) (0044-4) (0044-6) (0044-7) • Hopkins, Norman (0002-12-5) (0002-12-7) • Hubbard, Michael (0008-64) • Olson, Mary (0002-8-1) • Poole, Mary Ann (0040-2) (0040-3) (0040-7) • Ritter, Monte (0017-1) (0017-2) (0017-3) • Smith, Charles (0002-6-3) (0023-14)
Land Use-Site and Vicinity	• Avery-Smith, Ellen (0002-7-8) • Berger, Betty (0001-5-2) • Cannon, Renate (0001-6-1) • Kitchen, Robert (0010-1-1) (0010-1-2) • Minno, Maria (0001-11-5) • Seymour, Mike (0002-10-2) • Smith, Charles (0002-6-1) (0002-6-4)
Land Use-Transmission Lines	• Berger, Betty (0001-5-5) • Kitchen, Robert (0010-1-3) (0010-2-11) (0010-2-16) (0010-3-13) (0010-4-1) • Mueller, Heinz J (0003-6) (0003-23)
Meteorology and Air Quality	• Bacchus, Sydney (0030-2-10) (0030-2-11) (0030-2-12) (0030-2-16) (0030-2-17) (0030-2-18) (0030-3-4) (0030-3-5) (0030-3-7) • Foley, Beth (0002-2-4) • Jones, Art (0002-5-5) • Kitchen, Robert (0010-3-9) • Mueller, Heinz J (0003-17) • Smith, Robert (0001-7-4) (0001-7-5)
Need for Power	• Bacchus, Sydney (0011-15) • Cannon, Renate (0001-6-5) • Elnitsky, John (0001-4-5) (0002-1-5) • Hopkins, Norman (0005-2) (0005-8) (0006-6) (0013-2) (0015-1) • Klutho, Mark (0002-4-5) • Thuemler, Ronald (0031-2)
Nonradiological Waste	• Hubbard, Michael (0008-1) • Lott, Phyllis (0002-3-5)
Opposition-Licensing Action	• Bacchus, Sydney (0020-3) (0030-1-4) • Berger, Betty (0041-2) (0041-3) • Foreman, Patricia Parker (0018-1) • Garvin, Bill (0001-13-1) • Hopkins, Norman (0006-4) • Lott, Phyllis (0002-3-4) • Minno, Maria (0001-11-10)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
	• Price, Sally (0001-14-10) • Thuemler, Ronald (0031-1)
Opposition-Nuclear Power	• Hopkins, Norman (0002-12-1) (0005-1) • Lester, Cecilia (0035-1) • Minno, Maria (0001-11-1) (0001-11-11)
Outside Scope-Emergency Preparedness	• Berger, Betty (0001-5-3) • Diamond, Darryl (0001-3-1) • Price, Sally (0001-14-4)
Outside Scope-Miscellaneous	• Bacchus, Sydney (0011-2) (0020-28) • Berger, Betty (0001-5-12) • Cannon, Renate (0001-6-4) • Hilliard, Dan (0037-1) • Hollins, Dixie (0001-12-3) • Hubbard, Michael (0008-29) • Seymour, Mike (0002-10-1) • Smith, Robert (0001-7-16)
Outside Scope-NRC and USACE Oversight	• Klutho, Mark (0002-4-3) • Minno, Maria (0001-11-9) • Seiling, Barbara (0002-9-9)
Outside Scope-Safety	• Baxter, Farouk (0022-1) • Elnitsky, John (0002-1-8) • Jones, Art (0002-5-6) • Mueller, Heinz J (0003-2) (0003-8) • Pantaleo, Greg (0001-8-1) • Price, Sally (0001-14-6) • Smith, Robert (0001-7-14)
Outside Scope-Security and Terrorism	• Avery-Smith, Ellen (0023-10) (0023-12) • Hopkins, Norman (0006-1) (0006-2) • Hubbard, Michael (0009-12) • Price, Sally (0001-14-3) • Smith, Charles (0023-10) (0023-12)
Process-ESP-COL	• Bacchus, Sydney (0011-1) (0011-4) (0020-1) (0020-2) (0020-4) (0020-5) (0030-3-13) • Berger, Betty (0041-4) • Fetrow, Robert (0026-1) • Hilliard, Dan (0001-10-6) • Hollins, Dixie (0001-12-1) • Hopkins, Norman (0005-15) • Hubbard, Michael (0008-7) (0008-13) (0008-20) (0008-65) • Olson, Mary (0002-8-5) • Overa, Beverly (0012-3)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
	• Price, Sally (0001-14-1) (0001-14-9)
Process-NEPA	• Bacchus, Sydney (0020-53) (0030-3-16) • Berger, Betty (0001-5-10)
Site Layout and Design	• Berger, Betty (0001-5-7) • Croom, Miles (0014-1) • Hilliard, Dan (0001-10-5) • Hopkins, Norman (0005-9) (0006-7) (0016-1) • Kitchen, Robert (0010-2-6) (0010-2-8)
Socioeconomics	• Avery-Smith, Ellen (0002-7-11) (0023-8) (0023-11) (0023-15) • Bacchus, Sydney (0020-11) (0020-12) • Diamond, Darryl (0001-3-2) (0001-3-3) • Elnitsky, John (0001-4-3) (0002-1-3) • Fetrow, Robert (0026-2) • Hilliard, Dan (0042-13) • Hollins, Dixie (0001-1-4) (0001-12-2) • Hopkins, Norman (0005-30) • Houston, Andy (0001-2-1) • Lott, Phyllis (0002-3-3) • Olson, Mary (0002-8-6) • Overa, Beverly (0012-1) • Smith, Charles (0002-6-2) (0023-8) (0023-11) (0023-15) • Smith, Robert (0001-7-2) (0001-7-8) (0001-7-10) (0001-7-12) (0001-7-15) • Thuemler, Ronald (0031-4)
Support-Licensing Action	• Cino, Cynthia (0036-2) • Fritz, Carol (0034-1) • Fritz, Charles (0034-1) • Hollins, Dixie (0001-1-3) • Houston, Andy (0001-2-4)
Support-Licensing Process	• Cannon, Renate (0001-6-2)
Support-Nuclear Power	• Cino, Cynthia (0036-1) • Elnitsky, John (0001-4-7) (0002-1-7) • Fritz, Carol (0034-2) (0034-3) • Fritz, Charles (0034-2) (0034-3) • Pantaleo, Greg (0001-8-2) (0001-8-3)
Support-Plant	• Elnitsky, John (0001-4-1) (0001-4-2) (0001-4-4) (0002-1-1) (0002-1-2) (0002-1-4) • Hollins, Dixie (0001-1-1) (0001-1-2) (0001-1-5) • Houston, Andy (0001-2-2) • Overa, Beverly (0012-2) (0012-4)
Transportation	• Avery-Smith, Ellen (0002-7-10)

Table E-3. (contd)

Comment Category	Commenter (Comment ID)
Uranium Fuel Cycle	• Hubbard, Michael (0008-40) (0008-41) (0009-4) • Mueller, Heinz J (0003-20) (0003-21) • Seiling, Barbara (0002-9-2) • Avery-Smith, Ellen (0002-7-9) • Hopkins, Norman (0005-13) (0005-25) • Hubbard, Michael (0008-33) (0008-34) (0008-42) (0008-53) (0008-66) (0009-8) (0009-11) (0009-16) • Lott, Phyllis (0002-3-1) (0002-3-2) • Minno, Maria (0001-11-3) • Mueller, Heinz J (0003-3) (0003-19) • Olson, Mary (0002-8-2) (0002-8-3) (0002-8-4) (0002-8-7) • Smith, Robert (0001-7-9)

E.1.1 Comments Concerning Process – COL

Comment: I'd like to say that the room is not totally packed today because somebody failed to send our Newscaster, the only local free paper that's distributed to 4,000 people locally, a notice of this meeting. I write for it and I just happened to get the notice yesterday in an e-mail. (**0001-14-1** [Price, Sally])

Comment: If the meeting had been advertised in our area, you would have seen a room full of people. (**0001-14-9** [Price, Sally])

Comment: [T]he public review period was grossly inadequate to address the myriad critical deficiencies of the proposed LNP project. (**0020-4** [Bacchus, Sydney])

Response: *It is NRC policy to involve the public in the Commission's decision-making process; therefore, it elects to conduct open public meetings to collect comments on the draft EIS in association with its environmental review process. Notice of the public meetings held in Crystal River, Florida, was provided through regional news releases and local newspaper advertisements, as well as on the NRC website. A minimum of 45 days is required for a draft EIS comment period per NRC regulations. The comment period on the draft EIS was open for 75 days, and during that time the public and other agencies were welcome to submit comments by mail, e-mail, or in person. No changes were made to the EIS as a result of these comments.*

Comment: In short, almost the entire DEIS will need to be re-issued as a Supplemental DEIS as required at 10 CFR 51.72(a) and (c) due to the incomplete plant design and pervasive effects on so many of the impact analyses that should be substantially complete in a DEIS. (**0008-13** [Hubbard, Michael])

Comment: That this "specific evaluation" [impacts of water use at the Tarmac mine on groundwater levels and wetlands] was not performed is further evidence that this DEIS is

substantially incomplete and needs to be re-issued as a Supplemental DEIS in accordance with 10 CFR 51.72(a)(1) and (2). (**0008-20** [Hubbard, Michael])

Comment: On October 26, 2010 I submitted preliminary comments on the proposed Combined Licenses for Levy Nuclear Plant Units 1 and 2 ("LNP" and "project") referenced above and requested a 60-day extension of time pursuant to the ADA [Americans with Disabilities Act] to submit more detailed comments on the proposed project. You granted only a 30-day extension, which was insufficient for me to address the myriad grave inadequacies of the LNP DEIS. The attached supplemental comments represent only a small fraction of the DEIS' failure to comply with the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Clean Water Act (CWA), the Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act") and other federal requirements. Although my comments are not comprehensive, they are sufficient to justify the necessity for a supplemental DEIS. (**0020-1** [Bacchus, Sydney])

Comment: Two circumstances require preparation of a supplemental DEIS. A supplemental DEIS must be prepared if either (1) [t]he agency makes substantial changes in the proposed action that are relevant to environmental concerns, or (2) [t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts (40 C.F.R. § 1502.9(c)(l) & (2)). See Dubois v. U.S. Department of Agriculture, 102 F.3d 1273, 1291-92 (1st Cir. 1996); California v. Block, 690 F.2d 753 (9th Cir. 1982). See also NRDC v. Hughes, 437 F. Supp. 981, 990 (D.D.C. 1977). Clearly both circumstances apply to the LNP DEIS. First, the project as proposed in the DEIS fails to comply with federal requirements referenced above, as described in my preliminary and supplemental comment letters and affidavit dated November 12, 2010, and would require substantial changes in the proposed action that are relevant to environmental concerns. Second, my comment letters and affidavit provide extensive significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts that the DEIS failed to give a hard look at or even consider. (**0020-2** [Bacchus, Sydney])

Response: *The NRC implements Section 102 of NEPA through Title 10 of the Code of Federal Regulations (CFR) Part 51. According to 10 CFR 51.72, a supplement to the draft EIS will be prepared when either (1) there are substantial changes in the proposed action that are relevant to environmental concerns, or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The NRC staff may also prepare a supplement to a draft EIS when, in the staff's opinion, doing so will further the purposes of NEPA. There have been no substantial changes to the proposed action in Progress Energy Florida, Inc.'s (PEF's) COL application (PEF 2009a) that are relevant to environmental concerns and the information in the comment did not provide any significant new information not considered by the review team in the draft EIS, and the NRC staff did not find any new and significant information associated with environmental issues. No changes to the EIS were made as a result of these comments.*

Comment: Several years ago, over at the Armory, there was a meeting concerning the new nuclear power plant they were going to build in Levy County. At that meeting, I asked about a

limited work authorization for this project, so this job --this project could get started and put people to work. In May of 2009, it was decided by the NRC not to issue an LWA until the construction operating permit. At the earliest received final approval, due to several environmental issues. Since the environmental study and review has been completed, but the only formal board approval required, can the LWA be issued soon in order to get - start some work? If approval is granted, it would be Progress Energy's decision at that point to start the project, rather than the federal government. (**0001-12-1** [Hollins, Dixie])

Comment: I urge you to issue an LWA as soon as Progress Energy requires it. (**0012-3** [Overa, Beverly])

Comment: At a public Nuclear Regulator Commission meeting nearly 2 years ago regarding the Levy County Nuclear Power Plant project, I asked a question relative to the timing of issuing a Limit Work Authorization (LWA) by the NRC. By the NRC issuing a LWA means Progress Energy can start limited construction on activities for the nuclear power plants prior to the NRC issuing a Combined Operating License (COL). At that meeting the NRC stated that Progress Energy was working on submitting a request for a LWA at that time. Than on May 1st, 2009, a press release was issued by Progress Energy stating the NRC would not be issuing a LWA but instead would not allow the start of construction until a Combined Operating License was approved. It is this writer's opinion that issuing of a COL will probably not happen until late 2011 or early 2012. Per this press release, this policy change was made due to several environmental issues addressed by citizen's group and the U.S. Corp of Engineers. Since that time, Progress Energy has continually submitted the requested environmental studies requested to help address these issues. Than on August 9th, 2010, the NRC issued a Draft Environmental Impact Statement which concluded that no environmental impacts were found during their review process which would stop them from issuing licenses to Progress Energy in the future for the two planned nuclear reactors in Levy County. Therefore, I am writing this letter to reconsider issuing a Limited Work Authorization as soon as feasibly possible. (**0026-1** [Fetrow, Robert])

Response: *PEF requested a Limited Work Authorization (LWA) to perform certain construction activities in its initial application (COL Application, Revision 0, Part 6 (PEF 2008a)), but the request was withdrawn by letter dated May 1, 2009 (letter from PEF to NRC, ML091250350); therefore, construction activities will not commence before the COLs are issued. No changes were made to the EIS as a result of these comments.*

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] the needs to contain national debt, and take steps to exploit the truly renewable energy resources encouraged by government policies, and creating jobs for local residents in the shorter term, should be considered in public forum. (**0005-15** [Hopkins, Norman])

Response: *The COL review process is being conducted under NRC's environmental protection regulations in 10 CFR Part 51, which includes the format for the public participation process. Issues related to the national debt, such as the subsidization of nuclear power, and hiring*

choices for construction and operations labor force personnel are outside the scope of NRC's regulatory authority. Alternative energy sources were addressed in Section 9.2 of the EIS. No changes to the EIS were made as a result of this comment.

Comment: We believe the Commission has statutory authority and responsibility to review these issues in a more comprehensive manner than has been presented in the draft. The issues at hand have both environmental and economic impact that will prevail over the life of the plant. (**0001-10-6** [Hilliard, Dan])

Comment: INCOMPLETE DEIS -The DEIS for the proposed project provides incomplete and limited information that does not allow submittal of comprehensive comments. (**0011-1** [Bacchus, Sydney])

Comment: Failure to comply with other NEPA and federal requirements - In addition to the DEIS' failure to conduct a comprehensive cumulative impacts assessment, the DEIS fails to comply with a host of other federal requirements. (**0030-3-13** [Bacchus, Sydney])

Response: *The review team conducted its environmental review and prepared this EIS in accordance with the requirements of the National Environmental Policy Act (NEPA), Title 10 of the U.S. Code of Federal Regulations (CFR) Part 52, and 10 CFR Part 51. The review was based on information presented in the COL application Environmental Report (ER) submitted by the applicant and information obtained from independent sources. The review team used the SMALL, MODERATE, and LARGE impact category levels after completing its analyses to communicate the results of its assessment of the environmental impacts of the proposed action and alternatives to the action. The structure for the impact category levels was based on Council on Environmental Quality (CEQ) guidance (40 CFR 1508.27) and on discussions with the CEQ and the U.S. Environmental Protection Agency (EPA) when it was first implemented for licensing actions. Definitions of the three impact category levels are provided in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, and are provided in Section 1.1.1.1 of the EIS. No changes to the EIS were made as a result of these comments.*

Comment: Please note that, even if NRC claims not to have authority over offsite transmission lines and other corridors, this DEIS also represents USACE regulatory requirements that must address minimization of adverse environmental impacts associated with this proposed project. (**0008-7** [Hubbard, Michael])

Comment: MITIGATION -The subject of mitigation cannot be broached when there has been no determination made that all potential impacts have been avoided to the maximum extent practicable. Only at that point are unavoidable impacts then mitigated to the extent appropriate and practicable by requiring steps to minimize impacts, and finally, compensate for aquatic resource values. See the Memorandum of Agreement (MOA) between EPA and Corps dated November 15, 1989. (**0011-4** [Bacchus, Sydney])

Response: *The project, as being evaluated by the USACE, includes the construction of new electrical transmission lines to integrate the proposed plant's electrical output into central Florida's electrical grid. The USACE's final evaluation of the proposed project and final decision*

whether to issue a Department of the Army (DA) permit will be documented in a separate Record of Decision (ROD) by the USACE after issuance of the final EIS. The evaluation and determination documented in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the 404(b)(1) Guidelines of the Clean Water Act (CWA), the USACE's Public Interest Review, other laws and regulatory requirements, and in accordance with the referenced Memorandum of Agreement (MOA) (USACE and EPA 1989) and with 33 CFR 332.1(c). The MOA provides guidance that the determination of compensatory mitigation is the third step in a three-step sequence of actions that must be followed by the USACE in its evaluation process. The three steps in sequence are avoidance, minimization, and compensation. Appropriate and practicable compensatory mitigation required to offset the unavoidable adverse impacts that remain may not substitute for avoiding and minimizing impacts. 33 CFR 332.1(c) reiterates the requirement for this sequenced evaluation when considering compensatory mitigation. No changes were made to the EIS as a result of these comments.

Comment: [T]his is a community that has a right to say whether it is going to be the next so-called low level waste dump for Progress Energy, if it is going to be the next so-called high level waste dump for Progress Energy. Those need to be really considered at the local level. (**0002-8-5** [Olson, Mary])

Response: *The licensing process for COL applications is specified in 10 CFR Part 52. The process includes a detailed review by the NRC of an applicant's COL application to determine the safety and environmental effects of construction and operation of a nuclear power facility. Radiological waste disposition is described in Section 6.1.6. Public involvement and comments are invited and encouraged throughout the environmental review of major Federal actions; the NRC formally solicits both written and oral comments from members of the public at the beginning of the process during environmental scoping for the EIS and when the draft EIS is issued. In preparing the draft EIS, the review team contacted Federal, State, Tribal, regional, and local agencies to solicit comments. A list of the agencies and organizations contacted is provided in Appendix B. No changes were made to the EIS as a result of this comment.*

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... DEIS is Missing Pages. Pages 7-3 and 7-8 of the section regarding cumulative impacts are missing from the NRC website. (**0008-65** [Hubbard, Michael])

Response: *The commenter is correct that pages 7-3 and 7-8 are blank in the pdf file for Volume 1 of the draft EIS on the NRC web site. The complete Volume 1 document was publicly available through ADAMS (ML102140231). In addition, complete versions of the bound DEIS and CDs were also available at the public meeting, information was presented at the public meeting on how information could be requested, and hard copies were mailed to*

those on the mailing list or to those who requested hard copies or CDs. No changes to the EIS were made as a result of this comment.

Comment: Perhaps the plans of PEF if accepted by Levy Authorities would not be in agreement with either State or Federal Laws according to required terms and conditions. (**0041-4** [Berger, Betty])

Response: *Interactions between PEF and State and local agencies are outside the purview of the NRC's environmental review. The NRC regulates the nuclear industry to protect public health and safety and the environment. The licensing process for COL applications is specified in 10 CFR Part 52. The process includes a detailed review by the NRC of an applicant's COL application to determine the safety and environmental effects of construction and operation of a nuclear power facility. The Clean Water Act Section 401 certification is issued by the FDEP as part of Florida's Power Plant Siting Act (PPSA) Certification (29 Fla. Stat. 403) and ensures that the project does not conflict with State water-quality standards. PEF received this certification on September 8, 2009, and a modification to the certification on February 18, 2011 (FDEP 2009, 2011a). Pursuant to its regulatory authority under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act of 1899 over jurisdictional waters of the United States, including wetlands, the USACE can only issue a permit for the least environmentally damaging practicable alternative that meets the project's overall purpose. The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the final EIS. The EIS was updated to include Section 401 certification information.*

Comment: Failure to include essential water-related modeling data files – One of the primary grave deficiencies in the LNP DEIS is the failure to provide public access to the water-related model files. In addition to the failure of the LNP DEIS to include these essential data, both the NRC and Progress Energy Florida, Inc. (PEF) refuse to provide public access to these essential data, as evidenced in the Motion for Order Compelling Discovery of PEF Groundwater Model Digital Files for Proposed LNP dated 9/27/10 (**Bacchus Exhibit A3**). (**0020-5** [Bacchus, Sydney])

Response: *This comment does not suggest any changes to the EIS. No changes were made to the EIS as a result of this comment.*

E.1.2 Comments Concerning Process – NEPA

Comment: Limitations are imposed on NRC's authority under the NEPA Act. And by the Federal Water Pollution Control Act, NRC recognizes that pollutant discharges into receiving waters rests by statute with EPA. (**0001-5-10** [Berger, Betty])

Response: *The NRC implements NEPA according to its regulations in 10 CFR Part 51. The NRC uses these regulations as the basis for preparing EISs or environmental assessments in*

support of NEPA. This comment is general in nature and provides no specific information related to the environmental review. No changes were made to the EIS as a result of this comment.

Comment: Failure to comply with other NEPA and federal requirements - In addition to the DEIS' failure to conduct a comprehensive cumulative impacts assessment, the DEIS fails to comply with a host of other federal requirements. Examples of these deficiencies are provided in my preliminary DEIS comment letter dated 10/26/10 on the proposed LNP and attached hereto as Bacchus Exhibit A1. (**0020-53** [Bacchus, Sydney])

Comment: Mitigation and review process fails to comply with NEPA and other federal requirements - Neither the proposed mitigation plan nor the review process comply with NEPA and other federal requirements. (**0030-3-16** [Bacchus, Sydney])

Response: *The comments relate to the requirements set forth in NEPA for preparing an EIS. Section 102 of NEPA directs that an EIS be prepared for major Federal actions that have the potential to significantly affect the quality of the human environment. NRC has implemented Section 102 of NEPA in 10 CFR Part 51. Furthermore, in 10 CFR 51.20, the Commission has determined that the issuance of a COL under 10 CFR Part 52 is an action that requires an EIS. The NRC has followed these requirements in preparing the EIS for LNP Units 1 and 2. These comments provide no specific information related to the environmental assessment, so no changes were made to the EIS in response to these comments.*

E.1.3 Comments Concerning Site Layout and Design

Comment: We ask if the chosen site location for the CWIS is so necessary that it may usurp rational water management practices. (**0001-10-5** [Hilliard, Dan])

Response: *The NRC does not have the authority or responsibility to regulate or manage water resources. NRC has the responsibility under NEPA to assess the potential impacts of the proposed action. The analysis in the EIS of the impacts of water use for the proposed new units uses information from the authorities that are responsible for managing water resources, including the Southwest Florida Water Management District (SWFWMD). Impacts on water resources are considered in Section 5.2 of the EIS. Cumulative impacts on water resources are discussed in Section 7.2. Alternatives are discussed in Chapter 9. No changes were made to the EIS in response to this comment.*

Comment: The NRC has not approved the Westinghouse AP-1000 containment building. (**0001-5-7** [Berger, Betty])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] the degree of uncertainty regarding the viability of the AP1000 design causing delay and cost increases. (**0005-9** [Hopkins, Norman])

Comment: That the AP1000 units are essentially a Demonstration Project having never been approved, built or operated and having uncertain construction costs. (Westinghouse has said that it will not bid on a new Finnish reactor following the withdrawal of the French AREVA who had had to commit to a cost guarantee.) (**0006-7** [Hopkins, Norman])

Response: *NRC regulations allow an applicant for a COL to reference a design that has been certified. In addition, an applicant for a COL may "....at its own risk, reference in its application a design for which a design certification application has been docketed, but not granted" (see 10 CFR 52.55(c)). The NRC will not issue a COL referencing a standard design until it has been certified through NRC rulemaking. The NRC conducts a concurrent safety review of each COL application along with the environmental review; the results of the NRC's safety review are published in a Safety Evaluation Report. Regarding concerns about the viability of new reactor designs, approval of designs is contingent on the rigorous safety review of the design control document (DCD) and their construction is verified by inspections, tests, analyses, and acceptance criteria (ITAAC) prior to initial testing and operation. No changes were made to the EIS as a result of these comments.*

Comment: Section 3.2.3.2, Page 3-15, Line 16; Line 16 should read "cooling tower basins through two 48-in.-diameter intake pipelines for each nuclear unit (four in total)". The makeup water pipes are planned to be 48-in .-diameter, not 54-in.-diameter.

Section 3.4.2.4, Page 3-29, Line 17: Under the drainage discussion, suggest revising to read as "... drained through groundwater infiltration and small diameter pipes within 5 days." (**0010-2-6** [Kitchen, Robert])

Response: *Sections 3.2.3 and 3.4.2 of the EIS were modified in response to this comment.*

Comment: Section 3.4.4.2, Page 3-36, Table 3-3: Recommend replacing "prior to reuse" with "prior to discharge" in all three rows for "Storm" System.

Section 3.4.4.2, Page 3-36, Line 3: Recommend revising to read as "... would equal approximately 4.9 percent or less of the combined ..." There are different permitted flow rates at CREC between summer and winter. (**0010-2-8** [Kitchen, Robert])

Response: *Section 3.4.4 of the EIS was modified in response to this comment.*

Comment: Finally, it appears the proposed blowdown pipeline corridor would require the filling of approximately 4.5 acres of estuarine emergent wetlands. Based on our review of the proposed corridor, NMFS believes alternate pipeline routes exist between the LNP site and Crystal River Energy Complex facility that would not require the filling of tidal wetlands. (**0014-1** [Croom, Miles])

Comment: Further to our discussion earlier regarding blow-down piping and Page 3-22 - (3.3.1.14), Micky Thomason, of local Greenways and Trails administration, called to say that in his latest conversations with PEF the path of the blow-down piping was to cross CFBC (N-S) immediately to the west of the US 19 Bridge and traverse underground west to turn south to the

CREC - joining the track of transmission lines roughly ten miles distant. You may wish to have 3.3.1.14 clarified. (**0016-1** [Hopkins, Norman])

Response: *Section 4.1.1 of the EIS has been modified to indicate that an alternative proposed blowdown pipeline route that would avoid saltwater wetlands has been proposed by PEF and approved by Florida Department of Environmental Protection (FDEP). Chapters 3 and 4 of the EIS have been revised to reflect the current status of the FDEP decision.*

E.1.4 Comments Concerning Land Use – Site and Vicinity

Comment: It's time to fill in and reclaim the Cross-Florida Barge Canal for the environment. But guess what? We'll be unable to do this with the new nuclear power plant sited on the edge of that Canal. (**0001-11-5** [Minno, Maria])

Response: *The NRC regulates the nuclear industry to protect public health and safety and the environment. Issues related to local politics and zoning are outside of the NRC's purview and are not addressed in the EIS. No changes were made to the EIS in response to this comment.*

Comment: Besides piping salt water up the Barge Canal, PEF plans to barge all of their plant building materials up to the lock site and dredge a staging area for unloading. There's never been a barge that made this trip. A half loaded one named "Aiple" went aground just west -- just east of the 19 Bridge. (**0001-5-2** [Berger, Betty])

Response: *PEF is not planning to pipe water up the barge canal. As described in Chapter 3 of the EIS, cooling water for LNP Units 1 and 2 would be obtained from the cooling-water intake structure to be constructed on the north bank of the canal approximately 0.5 mi west of Inglis Lock. Cooling-water discharges from the plant would be piped from the LNP site to the Crystal River Energy Complex (CREC) site. The barge-unloading facility would also be constructed on the north bank of the canal west of the cooling-water intake facility. PEF has indicated that dredging will not be required for barges to access and transport building materials to the barge unloading facility. Section 4.3.2.1 was modified to include information provided by PEF to NMFS and USACE in response to dredging needs.*

Comment: I have my sincere doubts that Progress Energy Florida is violating the Levy County Comp Plan. I have attended all the meetings when they asked for their rezoning, which was necessary. And I'm sure the company would not have continued its pursuit of the application if the Levy County zoning decision had not been in favor of the proposed project. It would not have been possible. (**0001-6-1** [Cannon, Renate])

Response: *As described in Section 2.2.1 of the EIS, each of the three counties located within the LNP site and vicinity (Levy, Citrus, and Marion Counties) has a comprehensive land-use plan. All three plans include public utilities as potential future land-use options. No changes were made to the EIS as a result of this comment.*

Comment: [I]t was our understanding, based on what Danny was telling us, that their goal was to preserve as much of that land because of the land that they would be impacting. They would be creating an access to wildlife from the Goethe State Forest to the Withlacoochee. Even some of the State plans were to purchase that property to be able to put it back into the public domain, to where they could create benefits for the water sheds of both the Withlacoochee and sorry, I can't pronounce the other water shed that's in that area, the Warkusi (ph) water shed. But anyway, they both joined up in that particular area and if I'm not mistaken, the boundary is almost through that Robinson tract and goes up through the Goethe State Forest. And so, I do know that that was high on the State's list, to try to preserve that particular corridor in that area. And by purchasing that 5,700 acres, they would have been able to maintain that, and they would have been able to spread the impact of what they're doing on their property over a wider piece of property, and it would not have had the same effects as it's going to have now in that particular area. (**0002-10-2** [Seymour, Mike])

Response: *PEF submitted a wetland mitigation plan to the FDEP in April 2010, as described in Section 4.3.1.7 of the EIS. PEF is required by Section 404 of the CWA to avoid or minimize wetland impacts to the extent practicable, and to mitigate for unavoidable impacts by fully offsetting the functional wetland losses predicted to occur because of the LNP project. Table 4-9 in the EIS summarizes the affected watersheds (including the Withlacoochee and Waccasassa Watersheds) and the watersheds served by the specific mitigation components (e.g., Daniels Island Tract, LNP site, Boarshead Ranch). No changes were made to the EIS in response to this comment.*

Comment: With more than two miles of contiguous border with the LNP site on our west and some three and a half miles of contiguous border with the Goethe National Forest to our north, we have definite concerns regarding the proposed plans for this facility, primarily due to the ambiguity of the plant itself and the uncertain effect of the plant upon our property. (**0002-6-1** [Smith, Charles])

Response: *The LNP site layout and plant description are presented in Chapter 3 of the EIS, including all structures, systems, and components with major environmental interfaces. Construction and operational impacts of the plant on the land, water, and ecological resources on the site and in the vicinity are described in Chapters 4 and 5, respectively. No changes were made to the EIS in response to this comment.*

Comment: We currently have a hunting club leasing our property. Our immediate concern is that there will be no adverse restrictions on the use of this property [Robinson property] for this purpose. On a longer term basis, we are seeking assurances that there will be no adverse affect on the property for future residential and commercial development. (**0002-6-4** [Smith, Charles])

Comment: Going to safety concerns. Again, as Mr. Smith said, there is a hunting camp that hunts on the Robinson Estate property. We hope that that will not -- that activity will not be preempted or in any way minimized by the activities, especially the shooting range, on the Progress Energy site that's proposed. (**0002-7-8** [Avery-Smith, Ellen])

Response: *When development occurs on the LNP site, wildlife habitat would be lost and wildlife would be displaced into adjacent habitats as described in Section 4.3.1 of the EIS. During operation of LNP Units 1 and 2, heat dissipation, increased noise and traffic, and nighttime lights could affect wildlife populations in the vicinity of the LNP site as described in Section 5.3.1. Future uses of adjacent residential or commercial properties would not be precluded by the presence of LNP Units 1 and 2. No changes were made to the EIS in response to this comment.*

Comment: Section 2.2.1, Page 2-5, Lines 23-27: Describes the common corridor leaving the site and going all the way to CREC. This is misleading; the common corridor really goes from the site to the CFBC where it diverges into a pipeline corridor going west then south and a transmission line common corridor that goes south to the Citrus Substation. The term common corridor primarily refers to the transmission line corridor and not the pipeline corridor which it sometimes overlaps. (**0010-1-1** [Kitchen, Robert])

Response: *Section 2.2.1 of the EIS was modified to clarify the use of the term "common corridor.*

Comment: Section 2.2.1, Page 2-7, Lines 35-37: The description provided, "Two pipelines for liquefied natural gas in the vicinity are owned and operated by FGT [Florida Gas Transmission Company]. These underground pipelines are located on the north side of US19 alongside the abandoned railroad track." is the beginning of the description provided in the reference (PEF 2009a) and appears to be incomplete in describing the location of these pipelines. The cited reference states the following, "These underground natural gas pipelines are located on the north side of US-19 alongside the abandoned railroad track. The pipelines cross CR-121, turn south, and cross over CR-336. The lines run parallel to power lines that run south with US-19, crossing over US-19 near the intersection of US-19 and CR-40, and continuing towards the LNP site." (**0010-1-2** [Kitchen, Robert])

Response: *Section 2.2.1 of the EIS was modified to provide a more complete description of the liquefied natural gas pipelines in the vicinity of the LNP site.*

E.1.5 Comments Concerning Land Use – Transmission Lines

Comment: Irreversible commitments of resources would be involved if their plan is implemented. Our area of Inglis and Yankeetown could be spared the increased truck traffic and transmission lines now planned. Many homes would be affected, as these lines require much space. They affect people living near them. (**0001-5-5** [Berger, Betty])

Comment: The DEIS states "PEF expects to acquire rights-of-way as necessary to provide a typical width of 220 ft for the proposed 500-kV transmission lines and a typical width of 100 ft for the proposed 230-kV transmission lines." In order to protect high quality wetland systems, EPA recommends that the all rights-of-way be reduced to the minimum dimensions practicable. (**0003-6** [Mueller, Heinz J])

Comment: Section 7.1, Page 7-9, Lines 11-13: Note that "...the review team expects the corridors to have a noticeable impact on the local area". Since most of the lines except for the common route between LNP and Citrus are either adjacent or rebuilding of existing ROW, this impact should be minimal. (**0010-4-1** [Kitchen, Robert])

Response: *The review team has assessed the environmental impacts of the planned installation of the new transmission system and related upgrades on land use and aesthetic resources in Sections 4.1.2, 4.4.1.4, 5.1.2, and 5.4.1.4. In addition, transmission line-related environmental impacts on terrestrial and aquatic resources including wetlands have been addressed in Sections 4.3.1.2, 4.3.2.2, 5.3.1.2, and 5.3.2.2. These impacts are also discussed in terms of cumulative impacts in Chapter 7. The review team concluded that MODERATE impacts on land use and terrestrial resources would result from installing the new and upgraded transmission lines, and that MODERATE impacts on visual aesthetics would result from adding lines and corridors through relatively highly populated areas. The comments do not provide any new information and no changes were made to the EIS as a result of these comments.*

Comment: Section 2.2.2, Page 2-10, Line 11: Page 2-10 of the DEIS, line 11, incorrectly notes that the line from the Brookridge substation to the Brooksville West substation is 500-kV. LNP ER Section 3.7.1.3 Additional Corridors notes: a. "The BBW corridor for one 230-kV transmission line will originate at the Brookridge Substation in Hernando County, and will terminate at the Brooksville West Substation, also located in Hernando County. The BBW corridor is also known as Brookridge." (**0010-1-3** [Kitchen, Robert])

Comment: Section 4.1.2, Page 4-11, Lines 32-33: Statement fails to note that transmission line siting in Florida can be under the Transmission Line Siting Act as well. Recommend that the sentence be revised to read "Transmission-line siting in Florida is regulated under the Transmission Line Siting Act (TLSA) or (as in this case) the Florida Power Plant Siting Act (PPSA) ..." (**0010-2-11** [Kitchen, Robert])

Comment: Section 4.1.2, Page 4-12, Lines 23-30: Notes one of the 500kV lines beyond the first substation. All of the 500kV lines from LNP go to a first substation be it Citrus, CREC or Central Florida South. None go beyond the 1st substation. (**0010-2-16** [Kitchen, Robert])

Comment: Section 5.12, Page 5-123, Table 5-22: This table notes under land use that "No ground disturbing activities are planned to occur during the maintenance of the transmission lines". This isn't totally correct during regular maintenance. During regular maintenance, there is likely no ground disturbing activities but there could be times where new ground rods need to be driven or poles replaced and minor ground disturbing activities could occur during those times. (**0010-3-13** [Kitchen, Robert])

Response: *These comments identify factual errors or provide updated information. The EIS has been updated to incorporate the new or corrected information.*

Comment: The DEIS assumes that 10 acres per mile [T-line corridors] would be impacted by each of the proposed alternatives. The FEIS should provide some supporting scientific data to support this assumption. (**0003-23** [Mueller, Heinz J])

Response: *As discussed in Section 4.1.2 for the LNP site, where transmission-line land-use impacts were analyzed in detail, 1790 ac are expected to be disturbed over 180 mi of corridor, which roughly equates to 10 ac/mi. Because of the absence of data at the reconnaissance level, the review team concluded that this assumption is reasonable to apply at the alternative sites. The applicant is bound by permit conditions resulting from the Florida State Site Certification Application process, which would require it to use existing corridors to the extent practicable. No changes were made to the EIS as a result of this comment.*

E.1.6 Comments Concerning Hydrology – Surface Water

Comment: After review of the draft, we were puzzled to find NRC identifies a geographically narrow scope of impact to surface waters related to intake cooling water and the Cross-Florida Barge Canal. The draft mentions a priority set by the Withlacoochee Basin Board to restore Lake Rousseau and the Lower Withlacoochee River, but apparently does not acknowledge such objectives will necessitate restoring the hydrologic connection between the severed segments of the lower river. Slight [re-]location of the CWIS, as proposed by the applicant, will substantially obstruct such action. (**0001-10-1** [Hilliard, Dan])

Comment: In large part, the present bifurcation of the lower river is the basis of need for restoration priorities set by the Basin Board. It is not clear the Commission understands fresh water supply source locations within the Canal, as we do, or what quantity of supply may be provided by springs within the Canal. We are providing information about substantial spring flows in the Canal that are apparently not addressed by the applicant or draft. (**0001-10-3** [Hilliard, Dan])

Comment: DEIS Section 7.2.1.1 states in part; "In a preliminary study conducted by the Withlacoochee Regional Water Supply Authority in cooperation with the SWFWMD, the agencies concluded that an additional 93 Mgd of surface water supply may potentially be available from the river." (Attachment P-NRWP-SWFWMD) Due to containment structure design for Lake Rousseau, consumptive water use described in the foregoing statement will result in corresponding reduction of flows to the Lower River via the Inglis Bypass Channel and Spillway. (Attachment Q) This volume of flow will result in a 143+CFS reduction in System component flow and in conjunction with the Applicant's consumption of fresh water from the CFBC will result in a loss of fresh water contribution to the estuary ranging from 47.8-60.5% during low flow scenarios in the System. It is not clear the State will be able to certify consistency with the Clean Water Act in this circumstance; therefore it may be required to revert to ground water use which will cause adverse impacts to regional first magnitude springs such as Rainbow Springs and Silver Springs, both of which are powerful economic forces in local economies. (**0042-19** [Hilliard, Dan])

***Response*:** *The review team stated in DEIS Section 7.2.1.1: "In a preliminary study conducted by the Withlacoochee Regional Water Supply Authority in cooperation with the SWFWMD, the agencies concluded that an additional 93 Mgd of surface water supply may potentially be available from the river. Currently, minor withdrawals totaling 0.5 Mgd are permitted from the Withlacochee and the Rainbow rivers (SWFWMD 2010)." The availability of 93 Mgd (144 cfs) does not mean that this water will be removed from the Withlacoochee River system as the commentor suggests. The review team mentioned in the DEIS that the current allocation from this resource is 0.5 Mgd (0.8 cfs). The review team acknowledges that it is possible that the allocation of the available resource could increase from its present-day use in the future. However, the review team is not aware of any plans to use all available surface water from the Withlacoochee River system in the foreseeable future. Therefore, no changes were made to the EIS as a result of this comment.*

Comment: WAR disagrees with that assessment in context of ... ground water impacts within NRC's review jurisdiction. After consideration we find the determination to be based on narrow review of environmental and economic factors and conclude there is reason to consider modification of the Applicant's proposal. The conclusions within the DEIS are generally uniform that impacts from this application will be small in context of ... ground water impacts. WAR disagrees with this assessment for three reasons. 1) The impacts discussed within this submission are not necessary, and 2) they will not be small. 3) Review by the NRC is incomplete thus the conclusions are premature. (**0042-22** [Hilliard, Dan])

Response: *This comment expresses disagreement with groundwater impacts presented in the EIS. This comment does not provide specific information related to the environmental effects of the proposed action, and no changes were made to the EIS as a result of this comment.*

Comment: Section 9.4.2.4 of the DEIS states in part; "The Withlacoochee River is designated as an Outstanding Florida Water and therefore has regulatory protection (Fla. Admin. Code 62302). In addition, the Withlacoochee River Basin Board has made the restoration of Lake Rousseau and the Lower Withlacoochee River a priority in its Fiscal Year 2006 Basin Priorities Statement. Both of these surface waters contribute to a major groundwater recharge area (PEF 2009e)." What is not recognized in conclusions of the DEIS is a significant point. In making restoration of Lake Rousseau and the Lower Withlacoochee River a Priority, the Withlacoochee Basin Board examined several issues that adversely impacted the System. On the point of the Lower River, a primary cause of degradation is reduced system flows caused by construction of the CFBC. Reduced flows have contributed greatly to inshore dislocation of historic isohaline values and the river has lost historic scouring action once caused by higher system flows. Discussion of this and alterations of System water chemistry is discussed in Attachment N-Janicki. (**0042-26** [Hilliard, Dan])

Comment: The essential concern expressed by WAR [Withlacoochee Area Residents, Inc.] is the impacts which will result from authorization of the proposed Circulating Water Intake System (CWIS) site location. There are alternatives that will not result in obstruction of sound resource management policy, System restoration objectives set forth by a State water board and estuarine impacts to Outstanding Florida Waters and State Aquatic Preserves. These

alternatives can provide for maximum beneficial utilization of water resources across the spectrum of users found in the region and need not impinge environmental considerations or operational considerations of the project. (**0042-4** [Hilliard, Dan])

Comment: The Draft mentions a priority set by the Withlacoochee Basin Board to restore Lake Rousseau and the Lower Withlacoochee River, but apparently does not acknowledge such objectives will necessitate restoring the hydrologic connection between the severed segments of the Lower River. Site location of the CWIS as proposed by the Applicant will substantially obstruct such action. (**0044-2** [Hilliard, Dan])

Comment: This is a river system already greatly impacted by construction of the Cross Florida Barge Canal. In large part, the present bifurcation of the Lower River is the basis of need for the restoration priority set by the Basin Board. (**0044-7** [Hilliard, Dan])

Response: *These comments are related to impacts associated with the intake location and water withdrawal for LNP Units 1 and 2. Several possible alternative intake designs and locations are discussed in Section 9.4.2.5 of the EIS. As the commenters allude, the proposed location for the intake would be inconsistent with possible future efforts to reestablish the historical Withlacoochee River channel. Building the intake at a location on the CFBC below the historical channel would eliminate this conflict and allow the possibility for future channel restoration efforts. The review team is not aware that committed funding for this restoration project exists and the review team finds that this project is not reasonably foreseeable. Regardless, the review team did determine that, if such a restoration project were to be funded in the future, the impacts of relocating the intake to below the historical river channel, would be minor.*

The review team considered the impacts from capture of freshwater in the intake to the condenser cooling system, the reduction in groundwater discharge through springs, and the reduction in overland flow due to the LNP stormwater management system on water quality in the estuary and determined that the cumulative impact of these three factors related to building and operating the LNP units would not detectably alter the salinity regime in Crystal and Withlacoochee bays as described in Section 7.2. No change was made to the EIS based in these comments.

Comment: NRC determinations related to surface water impacts focus on Crystal Bay discharge and intake from the CFBC. There is the appearance that NRC has misunderstood system hydrology and dynamics, in and near the CFBC, precipitated in part by the Applicant's COLA. The determination ignores implications of regional impacts to water resources that will be directly and indirectly precipitated by approval of the application without modification or direction to viable and beneficial alternatives. It ignores impacts to habitat known to support multiple Endangered Species Act listed species. (**0042-3** [Hilliard, Dan])

Comment: Issues of surface water impacts due to consumptive use of water by the CWIS are significant, and in several respects are not addressed by the Applicant and NRC via the DEIS. At the first tier of potential impacts there is no discussion in any form within the application or

DEIS related to modification of salinity and SO4 natural background chemistry in the coastal estuaries north of the CFBC. WAR [Withlacoochee Area Residents, Inc] contends that barring such review there is no assurance of consistency with Federal Statute set forth within the National Environmental Policy Act, the Clean Water Act, Endangered Species Act, and Marine Mammal Protection Act. It is not clear the DEIS conclusions are supported by determinations made or pending by the US Army Corps of Engineers (ACoE) and/or other Federal Agencies. In consideration of the absence of ACoE determinations and reference to other Federal Agency determinations it appears the release of the DEIS is premature. (**0042-7** [Hilliard, Dan])

Response: *These comments relate to impacts on the estuary due to water use associated with the operation of LNP Units 1 and 2. The review team recognizes that groundwater and surface water are interdependent resources as are the aquatic and terrestrial resources that rely on these waters. The impacts of groundwater withdrawal on the groundwater system are addressed in Section 5.2 of the EIS; cumulative impacts due to groundwater withdrawal to operate the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.2.1.2. The review team determined the impacts due to groundwater withdrawal would be SMALL. The impacts of surface-water use are addressed in Section 5.2 of the EIS; cumulative impacts due to surface-water use during operation of the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.2.1.1. The review team determined the impacts due to surface-water use would be SMALL. The review team considered alternatives to the cooling water intake system in Section 9.4.2.5.*

Impacts on estuaries due to groundwater withdrawal and the capture of fresh surface water by the intake pumping station are considered in the assessment of ecological impacts presented in Section 5.3 of the EIS; cumulative impacts on aquatic ecological resources due to the operation of the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.3.2. The review team determined that the cumulative impacts on aquatic ecological resources due to the operation of the proposed units and other past, present, and reasonably foreseeable actions would be SMALL to MODERATE. The review team confined its assessment to the CFBC and Crystal Bay because the impacts associated with building and operating the proposed units would not be detectable beyond these two water bodies.

The review team's assessment is consistent with NEPA, the CWA, the Endangered Species Act (ESA), and the Marine Mammal Protection Act. The staff's evaluation related to the ESA is described in Sections 5.3.1 and 5.3.2 of the EIS. Furthermore, the USACE is a cooperating agency in the preparation of this EIS. The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit will be documented in a separate USACE ROD after issuance of the EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements.

No changes were made to the EIS as a result of these comments.

Comment: The NRC developed a Finite Volume Coastal Ocean Model to evaluate the discharge plume effects. A description of the assumptions is contained in Section 5.2.3.1. While the NRC modeling shows minimal impacts, it is our understanding that accurate hydrographic current data that would be used in modeling is not available. Since collection of hydrographic current data is a condition of Florida's certification, we recommend that the final EIS reflect that requirement. (**0040-2** [Poole, Mary Ann]) (**0040-3** [Poole, Mary Ann])

Comment: [FWC recommend that the Final EIS:] acknowledge the collection of hydrographic data to more accurately assess potential impacts from the discharge plume. (**0040-7** [Poole, Mary Ann])

Response: *As discussed in Section 5.2, the review team did an independent confirmatory calculation using a numerical computational fluid dynamics model to estimate the impact of the thermal discharge from the proposed project. The review team subsequently revised the simulations to consider different velocity boundary conditions associated with different seasons. The review team also simulated different discharges associated with the other power plants that are proposed to use the same discharge system as that for the proposed LNP Units 1 and 2. These additional simulations did not alter the impact findings of the review team discussed in the draft EIS. Discussion of these additional simulations has been added to Section 5.2.3 of the EIS.*

Comment: [W]e question whether or not the drainage pattern would be the same. Pre-development runoff should be equal to post-development runoff. (**0002-7-13** [Avery-Smith, Ellen])

Comment: Additional adverse impacts to natural overland flow proposed -The following statement on page 4-20, lines 20-27 of the LP DEIS reveal additional "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal: Hydrologic alterations also will result from grading and building a series of stormwater drainage ditches. These surface modifications will result in changes in the rate and distribution of surface recharge and may affect groundwater levels beneath the LNP site. Stormwater-drainage ditches will direct runoff into three stormwater-retention and infiltration ponds. Any excess [sic] rainfall will be pumped to the cooling-tower blowdown basin and, if necessary, discharged with blowdown .... It is my professional opinion that the construction and operation of those proposed stormwater ponds within the floodplain wetlands would result in irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal, that would exceed "LARGE." (**0020-40** [Bacchus, Sydney])

Comment: "Mitigation" for land-use impacts -The following statement beginning on page 4-10, line 37 of the LP DEIS is evidence that the NRC and Corps not only have failed to analyze the direct, indirect and cumulative impacts of the proposed filling of floodplain wetlands, but would create additional adverse impacts from capturing all of the natural overland flow essential for the surrounding ecosystems (e.g., the flowing water in videos and photographs in Ms. Casey's declaration) in the proposed stormwater ponds: To lessen the land-use impacts, PEF has indicated that it would use mitigation measures during construction and preconstruction activities, such as erosion control access roads, and restricted construction (PEF 2000a).

Stormwater runoff from LNP corridors would be controlled by a stormwater-drainage system. Three stormwater ponds would be designed and constructed to fully contain the runoff from a 25-year, 24-hour rainfall. It is my professional opinion that the proposed filling of floodplain wetlands that would result in "LARGE" adverse impacts could not possibly be minimized or reduced by the proposed "mitigation" referenced above. (**0020-42** [Bacchus, Sydney])

Comment: I am focusing on the damage that would occur to the Waccassa Watershed and thus to the Waccassa Bay which is connected to the Big Bend Seagrass Beds. It is stated that there are not rivers or streams on PE property. However streams do occur very close to the property and on the property during the wet season or significant rainfall events. The stream known as Horse Hole Creek flows from the southeast area close to PE's property to the north-northwest and feeds into Cow Creek and/or Ten Mile (water flows into the creek from most all of the surrounding lands). This provides an important amount of fresh water flowing into the Waccassasa River thus assisting with keeping salt-water intrusion at bay. Clean, fresh water is collected in the shallow (not deep, stormwater retention ponds) [5.2.3.1] wetland areas providing a banking system to both the surface waters and the ground waters. The deep retention ponds, roads and buildings will alter the entire surface water functionality of the area. As stated the water will drain from the stormwater retention ponds in 5 days, The cumulative effect of this rapid drainage on the entire ecosystem has not been addressed. This will also affect the quantity and quality of groundwater. The statement that affects will be SMALL (or MINOR) are not true for this area and the harm caused by placement of the nuclear power plants here cannot be mitigated. It is necessary to understand this is truly a unique area hydro logically and a similar area with data does not exist. (**0029-1** [Casey, Emily])

Comment: Furthermore, there is no scientific basis for assertions that there will be no off-site impacts from stormwater that is captured on the proposed LNP site. "Stormwater" simply is an engineering term for what was "overland flow" or the natural sheetflow of water to surrounding wetland and upland ecosystems and surface waters prior to development of a site. Therefore, the mere fact that the proposed LNP project proposes to capture this natural overland flow and detain it on sight [sic], where pollutants will be added is an admission that off-site impacts will occur. (**0030-1-18** [Bacchus, Sydney])

Response: *Any large facility built on a greenfield or undeveloped site would alter the chemistry, magnitude, location, and timing of runoff within the boundary of the site. As mentioned in Sections 4.2 and 5.2, changes to the site grading and impervious surfaces would alter the runoff within the site. Engineering practices involved in the design and construction of a facility must balance the desire to drain water away from areas of the site that need to remain dry and to simultaneously have a limited impact past the boundary of the site on the patterns and timing of runoff and recharge. PEF will be required by the State of Florida to develop a detailed stormwater management plan for both the construction period and the operating period of the plant. Pursuant to the CWA, the U.S. Environmental Protection Agency is responsible for stormwater regulation. Florida is authorized to implement the National Pollutant Discharge Elimination System (NPDES) Stormwater Program and administer its own stormwater permitting program. Best management practices (BMPs) are well understood and demonstrated. These BMPs include the use of vegetative buffers, infiltration basins, infiltration trenches, bioretention*

filters, retention ponds, and detention ponds: however, even with an optimally designed stormwater management system, some changes to the magnitude, location, and timing of the runoff would occur. The review team identified nothing to suggest that BMPs used in Florida and approved through the NPDES process would be inadequate to minimize offsite impacts. No changes to the EIS were made based on these comments.

Comment: Multi-basin impacts on Rainbow Springs and the Rainbow River - The first figure in that composite exhibit, LNP DEIS Figure 2-7, illustrates the proximity of the Rainbow Springs and River, in the adjacent Withlacoochee drainage basin, to the poteniometric high adjacent to the proposed LNP site. The LNP DEIS failed to take a hard look at the adverse direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on Rainbow Springs and River. In my professional opinion those impacts would exceed "LARGE" and would result in irreversible alterations of the chemical, physical and biological integrity of those national waters. (**0020-29** [Bacchus, Sydney])

Comment: Multi-basin impacts on impaired waters - The Florida Department of Environmental Protection (FDEP) has designated the Withlacoochee and the Waccassassa Rivers as impaired waters (Bacchus Exhibits D1f and D1g, respectively). The LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on the impairment of these waters. For example, how will the extraction and diversion of large volumes of surface and ground waters during construction and operation of the proposed LNP and unidentified mine site affect the chemical, physical and biological integrity of those impaired national waters and the biota that rely on those waters for survival? This grave deficiency is additional evidence that a supplemental DEIS is required to prepare a more realistic model of all water-related impacts as a first step in assessing the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project. (**0020-33** [Bacchus, Sydney])

Response: *As indicated in Section 2.5.2.4, Rainbow Springs is more than 10 mi from the proposed wellfield location. Water discharging from Rainbow Springs creates the Rainbow River, which drains into Lake Rousseau about 6 mi from the location of the proposed wellfield. The Waccassassa River is also more than 10 mi from the proposed wellfield location. Based on the distance from the LNP site to Rainbow Springs, the Rainbow River, and the Waccassassa River; estimates of groundwater recharge; spatial and temporal variability of recharge; and other hydrogeologic parameters, the review team determined that impacts on these water bodies would not be detectable.*

The Withlacoochee River is much closer to the proposed wellfield location. Section 5.2.2.2 describes the anticipated reduction in groundwater discharge to surface water bodies due to operation of the proposed units. Figure 5.5 shows the areal extent of the impact of water withdrawal for operation of the proposed units. Cumulative impacts from water use on surface water, including water use for surface mines, are presented in Section 7.2.1. Cumulative impacts on ecological resources are presented in Section 7.3. The review team determined that the projected groundwater usage associated with normal LNP operation and temporary increases in withdrawal rate associated with maximum daily operation are small relative to the

groundwater resource. Based on its evaluation, the review team determined that the cumulative impacts on surface water including the Withlacoochee River, from building and operating two new nuclear units and other past, present, and reasonably foreseeable future activities would be SMALL. No changes were made to the EIS in response to these comments.

Comment: [T]he LNP DEIS does not appear to include any model results of impacts to groundwater or surfacewater levels of flows – including natural overland flow – that would result from the construction phase of the proposed project. Furthermore, there is no evidence in the LNP DEIS that construction-phase alterations were even analyzed, thus preventing the NRC and the U. S. Amy Corps of Engineers (Corps) from taking a hard look at direct, indirect and cumulative adverse impacts of the construction phase of the proposed project, which would exceed "LARGE". Therefore, **a supplemental DEIS is required to assess the water-related direct, indirect and cumulative adverse impacts of the construction phase of the proposed project** to provide the affected public and other agencies the ability to provide meaningful comments on water-related impacts during the construction phase of the proposed project. (**0020-6** [Bacchus, Sydney])

Response: *This comment relates to how building the proposed units would alter groundwater and surface flows. Alteration of the hydrologic environments caused by building the proposed units is presented in Section 4.2.1 of the EIS. No changes were made to the EIS in response to this comment.*

Comment: I think it's page 15, where the water resources are discussed in the handout. The regulator finds that the impacts would be small. And our contention states that we believe the impacts will be large [water use and water quality]. (**0002-8-1** [Olson, Mary])

Comment: Multi-basin impacts on Outstanding Florida Waters, springs and estuarine ecosystems - Additionally the LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on the Outstanding Florida Waters, springs and estuarine ecosystems shown in PEF LNP Exhibit Griffin-I (Bacchus Exhibit D1c) and in LNP DEIS Figure 2-17 (Bacchus Exhibit D1d). In my professional opinion those impacts would exceed "LARGE" and would result in irreversible alterations of the chemical, physical and biological integrity of those national waters. (**0020-31** [Bacchus, Sydney])

Comment: Additional misconceptions regarding mitigation are illustrated on page 4-10 of the LP DEIS, beginning on line 37, as follows: To lessen the land-use impacts, PEF has indicated that it would use mitigation measures during construction and preconstruction activities, such as erosion control access roads, and restricted construction (PEF 2000a). Stormwater runoff from LNP corridors would be controlled by a stormwater-drainage system. Three stormwater ponds would be designed and constructed to fully contain the runoff from a 25-year, 24-hour rainfall. As described throughout my comments letters and affidavit, the construction activities described in the LNP DEIS exceed "LARGE" and in my opinion would result in irreversible direct, indirect and cumulative impacts far beyond the property boundaries of the proposed LNP site. Furthermore, it is a disturbing misconception that capturing and diverting essential overland flow

could be considered as "mitigation." In my professional opinion, that aspect alone would result in "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nation's waters. (**0020-50** [Bacchus, Sydney])

Comment: WAR disagrees with that assessment in context of surface [water] ... impacts within NRC's review jurisdiction. After consideration we find the determination to be based on narrow review of environmental and economic factors and conclude there is reason to consider modification of the Applicant's proposal. The conclusions within the DEIS are generally uniform that impacts from this application will be small in context of surface ... water impacts. WAR disagrees with this assessment for three reasons. 1) The impacts discussed within this submission are not necessary, and 2) they will not be small. 3) Review by the NRC is incomplete thus the conclusions are premature. (**0042-21** [Hilliard, Dan])

Response: *These comments are not specific and express disagreement with the impact level determined by the review team related to surface waters. The review team provided information to support its determination in the EIS on the cumulative effects of building and operating the proposed new reactors and past, present, and reasonably foreseeable actions, including the mining of fill in Section 7.2.1.1, and carefully reviewed the application against regulations that are intended to protect public health and safety and the environment. The review team discusses stormwater management in Section 3.2.2.1. These comments do not identify specific environmental effects of the proposed action and, therefore, the review team is unable to provide a more detailed response. No changes were made to the EIS as a result of these comments.*

Comment: The discussions in Sections 4.2.1 and 4.3.1.4, regarding floodplains and historic basin storage (HBS), do not appear to be consistent with the criteria contained in the District's Basis of Review. For example, the sentence on Page 4-19, Line 3 should be revised to replace the term "seasonal high water level" or "(SHWL)", with "overflow elevation", to properly differentiate between detention storage and retention storage. (**0017-1** [Ritter, Monte])

Comment: Similarly, beginning with the sentence on Page 4-19, Line 19, floodplain fill and HBS fill should be defined as volumes of fill above and below, respectively, the overflow elevation of natural depressions. (**0017-2** [Ritter, Monte])

Comment: [T]he sentence beginning on Page 4-19, Line 22 appears to incorrectly indicate storage loss in isolated or unconnected floodplain map units will not be considered. Isolated or unconnected floodplain map units are normally closed basins. Closed basins are watersheds in which runoff does not have a surface outfall up to and including the 100-year flood level, and are comprised entirely of retention storage or HBS. Any loss in HBS must be considered and replaced or properly mitigated as retention storage. (**0017-3** [Ritter, Monte])

Response: *These comments ask NRC to use terminology in the EIS that is consistent with terminology used by the SWFWMD. Sections 4.2 and 4.3 of the EIS were modified in response to these comments.*

Comment: [W]e cannot afford to lose the waters of Crystal River Kings Bay, which today contribute something like $20 million a year to the local economy. (**0002-12-5** [Hopkins, Norman])

Comment: [T]hey're [the waters of Crystal River Kings Bay] important to those of us who live and dwell in Crystal River or in Citrus County, and we can't afford to lose that water resource. (**0002-12-7** [Hopkins, Norman])

Response: *The localized drawdown associated with the proposed withdrawal of groundwater at the LNP site would not have a detectable impact on the waters of Crystal River or Kings Bay located some 15 mi south of the site. These comments provide no new information and no changes were made to the EIS in response to these comments.*

Comment: The draft mentions proposed water withdrawal from the Withlacoochee River water shed. It does not examine cumulative impacts, which were results from the applicant's diversion of fresh water resources and the State's obligation to provide water supply to the very development which provides the basis of need for this power plant. Draft Section 5.2 recognizes Florida's Clean Water Act Section 401, certification for this project, yet it is not clear to us this is justified. There is no information submitted by the applicant that addresses diversion of fresh water from coastal estuaries and the attendant modification of inshore water chemistry, which will result. Such impacts will directly increase average salinity in the lower reaches of the Withlacoochee River, Withlacoochee Bay, and by extension, adjacent estuaries and preserves. This is a river system already greatly impacted by construction of the Cross-Florida Barge Canal. (**0001-10-2** [Hilliard, Dan])

Comment: Although the applicant and draft repeatedly represents that the source of cooling water for the plant is the Gulf of Mexico, in our view the majority supply will be fresh water contribution from springs in the Canal and leakage from the Inglis Dam. The question is unresolved at this point or what quantity of fresh water will actually be diverted for cooling water and what impacts, both environmental and economic, will follow. (**0001-10-4** [Hilliard, Dan])

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Water quality impacts due to decreased freshwater input to estuary not assessed at all. (**0008-64** [Hubbard, Michael])

Comment: Furthermore, there is a direct connection, in that water withdrawn from the CFBC and groundwater wells adjacent to the CFBC for the proposed LNP would reduce fresh water that formerly flowed to the Gulf of Mexico and associate estuarine ecosystems. As clearly stated in the DEIS (p. 5-12, Line 3), The CFBC: would start to experience elevated salinity as a result of incoming tidal waters when the combined freshwater discharge from the Inglis Dam and spring inflow is smaller than 1073 cfs, which would occur approximately 89 percent of the time. Thus, the proposed LNP would directly affect the flow of water from the Old

Withlacoochee to the Gulf of Mexico, a rather large surface water within the affected area of the proposed LNP. (**0030-1-19** [Bacchus, Sydney])

Comment: Ignored estuarine ecosystem impacts of proposed CFBC cooling-tower withdrawals - Although the DEIS acknowledged the increase in salinity that would occur in the CFBC solely from the proposed operation of LNP units, neither PEF nor the DEIS assessed or evaluated the adverse impacts of decreased freshwater discharges to the Gulf of Mexico from the construction and operation of the proposed LNP. Those decreased freshwater discharges would occur from altered groundwater discharges to the Gulf of Mexico as well as from decreased surfacewater discharges to the Gulf of Mexico. Although the hydrologic model files for the proposed LNP were not produced, there is no evidence that the "recalibrated" hydrologic model accounted for all of the alterations in water quantity and specifically hydroperiod alterations from the direct, indirect and cumulative impacts of the proposed LNP. (**0030-2-2** [Bacchus, Sydney])

Comment: It is submitted that the "description" ignores hydrosphere components which will be impacted and for which NRC has authority to examine. Per the DEIS, the Gulf of Mexico actually provides a substantial minority share of cooling water source versus being "the" source (DEIS Fig 5-4). NRC has not examined impacts to receiving waters and Preserves which will result from freshwater diversion for consumptive plant use. Reduced freshwater contribution from the Withlacoochee River system will precipitate degradation of coastal estuaries. The chosen site location for the Circulating Water Intake System (CWIS) will interfere with future resource development and facilitate degradation of aquatic systems within the 50 mile radius of the plant site as reviewed by the NRC. Due to this oversight, the determination by NRC related to environmental and economic impacts appears incomplete. (**0042-1** [Hilliard, Dan])

Comment: It is estimated that approximately 70% of the System flow originates from base flow and springs ((Trommer et al., 2009) Attachment P pg51)). The remainder is supplied by tributaries. The average System flow as outlined in the COLA and supported by the SWFWMD at the containment structures on the west end of Lake Rousseau approximates 1,460 CFS on an annual average basis (Attachment H-SWFWMD). This flow volume does not include unregulated flows which are referenced in the COLA and represented below. There is no discernable trend of decline in System flows over the period reviewed by regulatory authorities for this application. As described by various regulatory agencies and Applicant, the distribution of System flows through the containment and management structures at the west end of Lake Rousseau on an annual average are as follows:

Inglis Dam	423 CFS
Inglis Bypass Spillway	1037 CFS
Springs or leaks at the Inglis Dam	70 CFS
Applicant estimates of CFBC spring flows	50 CFS
TOTAL	1580 CFS

These figures can be misleading in context of this discussion because they do not represent extremes in seasonal or periodic system flows variations. Maximum and minimum average monthly flows are found in the COLA and are reasonably represented in Attachment H. They are:

Maximum -7000+ CFS
Minimum-~550 CFS

The Applicant has suggested a 50 CFS contribution originates "near" the Inglis Locks and this has been accepted by NRC in DEIS text. It is illustrated in Figure 5-4 of the DEIS. WAR finds the character of the submission vague and misleading, and the endorsement of NRC misguided. Due to potential impacts to State and Federal waters it is suggested that credible identification of location and quantification of supply from these spring features is merited. If assertions by the Applicant are correct there is additional spring flow contribution in the CFBC that is unaccounted for by the COLA and DEIS. If the Applicant is incorrect the hydrologic analysis of the CFBC is incorrect and conclusions in the DEIS are not supported. WAR is aware of spring vents visible at low minus tide scenarios that are located west of the US 19 Bridge that crosses the CFBC, or 3 - 5.6 statute miles west of the Inglis Locks. The clustered nature of these features implies that more are present yet unidentified. NRC cannot properly quantify estuarine impacts if the collective system contribution and Applicant's consumption of fresh water supply is unknown. (**0042-10** [Hilliard, Dan])

Comment: The Withlacoochee River system, inclusive of fresh water discharge through the CFBC is the dominant supply of fresh water to the coastal estuary system including the Withlacoochee Bay, Waccasassa Bay and the southern extremity of the BBSGP. The System provides fresh water throughout the year whereas the Waccasassa River does not during dry season or drought conditions. (**0042-12** [Hilliard, Dan])

Comment: The Applicant posits that 120 CFS freshwater supply originates within CFBC via springs and the upper segment of the Lower River, also described as the OWR in COLA submissions. This supply is dependable and largely uninterrupted. Fresh water supplies contributing to the CFBC water budget are thought to be of generally higher quality that System surface waters and this is supported by comparison of the PEF COLA Part 3 ER, Section 2.4.2.2.2.1 review of analytical parameters and water quality data from SWFWMD supplied for Rainbow Springs, Lake Rousseau and the Lower Withlacoochee River as Attachment K(data and map). The applicant further submits that inshore flows of seawater from the Gulf of Mexico will prevail in the CFBC except in high flow scenarios when managed discharges from the Inglis Dam occur. While WAR recognizes that mixing will occur in the salt water/freshwater interface along the wedge created in the CFBC by tides and source dynamics, without substantial forces to mix the different densities of water (salt & fresh) there is little reason to conclude mixing will occur on a large scale. This conclusion is supported by the presence of the wedge existing between the different densities as referenced in the COLA in spite of tidal action within the CFBC. Since the Applicant alleges a predominate easterly flow of sea water in the CFBC it is reasonable to conclude that the CWIS will capture approximately 120 CFS or more of fresh water on a daily average during low flow scenarios in the System. (DEIS Figure 5-4) (**0042-15** [Hilliard, Dan])

Comment: Because predominate flow in the CFBC will be eastward and because the CWIS will create a slight down gradient from west to east, it is not clear that any freshwater in the CFBC will escape the canal during low flow scenarios. During System low flow scenarios, the CWIS will remove from 120-190 CFS of freshwater supply to the estuary at times when the total System estuary contribution may be in the range of 550 CFS. This will amount to a seasonal or drought period loss of 21.8%-34.5% of freshwater contribution. Since the predominate inshore coastal currents at the mouth of the CFBC and Withlacoochee River are northward, or counter clockwise in the Gulf of Mexico (Attachment L-ULA-USGS Coastal Currents and DEIS figures 5.6, 5.7 and 5.8), this contribution will be removed from Withlacoochee Bay and the BBSGP, thus promoting altered water chemistry to include salinity and SO4 concentrations. This conclusion is supported in part because the plume graphics in the referenced figures is based on dispersal from a point approximately 2.4 miles south southeast of the point where the CFBC channel clears coastal islands and other obstructions. The influence of estuary chemistry alterations must be referenced to the CFBC mouth in this discussion and any future investigation into this issue. Because this diversion of fresh water has not been evaluated we question the validity of Florida's determination of consistency with the Clean Water Act and Coastal Zone Management Act (DEIS Section(s) 2.2.1 and 5.2). Because chronic modification of estuarine salinity and sulfate (SO4) levels has not been evaluated (Attachment M (FDEP RAI (DEP23)) we are concerned this consumptive use will violate the ESA and CWA, contrary to DEIS Section 2.3 which asserts State waters and waters under authority of Federal Statute will not be impacted by this project. We do not agree that estuarine impacts will be small. Furthermore, such determinations may contribute to economic loss due to degradation of State Class II and Class III shellfish waters in Waccasassa Bay. (**0042-17** [Hilliard, Dan])

Comment: The System and local estuaries are a stable and very productive ecosystem with tremendous economic value. Degradation caused by failure to fully evaluate water chemistry modification and resultant habitat alteration impacts is not consistent with the intent of the State or Federal regulation, nor are such impacts necessary. (**0042-18** [Hilliard, Dan])

Comment: There is brief mention within the DEIS of plans set forth by the Withlacoochee Regional Water Supply Authority (WRWSA) and the SWFWMD Regional Water Plan. Related determinations under way by SWFWMD for Withlacoochee River Minimum Flows and Levels will influence these plans. The Applicant's proposal will have direct and indirect impacts on such plans. Cumulative impacts from all planning processes under review at present will reduce System contribution to the coastal estuary by as much as ~22% during average annual flow scenarios and this may run afoul of Federal Statutes as previously listed. There is no discussion in the DEIS or by the Applicant to these points. (**0042-8** [Hilliard, Dan])

Comment: Draft Section 5.2 recognizes Florida's Clean Water Act Section 401 certification for this project, yet it is not clear to us this is justified. There is no information submitted by the applicant that addresses diversion of fresh water from coastal estuaries and the attendant modification of inshore water chemistry, which will result. Such impacts will directly increase average salinity in the lower reaches of the Withlacoochee River, Withlacoochee Bay, and by extension, adjacent estuaries and preserves. (**0044-4** [Hilliard, Dan])

Comment: Although the Applicant and Draft repeatedly represents that the source of cooling water for the plant is the Gulf of Mexico, in fact the majority supply will be fresh water contribution from springs in the Canal and leakage from the Inglis Dam. The questions unresolved at this point are what quantity of fresh water will actually be diverted for cooling water and what impacts, both environmental and economic, will follow. We ask if the chosen site location for the CWIS is so necessary that it may usurp rational water management practices. (**0044-6** [Hilliard, Dan])

Response: *The review team identified three common issues related to building and operating the proposed units that could potentially affect the salinity in the estuary: the capture of freshwater by the intake on the CFBC, the reduction in groundwater discharge through springs due to the proposed groundwater withdrawal, and the reduction in overland flow due to the LNP stormwater management system.*

The review team considered the effect of capture of freshwater in the intake. The review team acknowledges that operation of the plant would alter both the temporal and spatial patterns of the salinity regime in the CFBC and the region of the Gulf in the immediate vicinity of the mouth of the canal. This change in salinity would be complicated by tidal action, density differences in freshwater and saltwater, weather conditions, and the bathymetry in the region. The change in water quality in the canal and in the region of the mouth of the canal may alter the distribution and abundance of aquatic species; however, this change is expected to be inconsequential because these organisms inhabiting the estuary can tolerate a range of salinity conditions.

To address the effect of potential reduction in freshwater inflow to the estuary including the effect on salinity, the review team used, in part, predictors of regional water budget from the recalibrated model as described in Section 5.3.3.3. The review team determined that the proposed LNP withdrawal would be a small fraction of the regional water budget.

The review team further determined that the effect of groundwater withdrawal on salinity in the estuary would be de minimis given the very minor change in the regional water budget and the variability in other factors controlling the salinity in the estuary, such as tidal patterns, evaporation, and intense storm events. Even under the most conservative conditions, the observed natural variability in groundwater potentiometric surface is significantly larger than the change in potentiometric surface associated with operation of the proposed groundwater wells at the LNP site.

Finally, the review team determined that the effect of reduction in overland flow from the site on the salinity in the estuary due to implementation of the stormwater management plan would not be significant. BMPs have evolved into a reliable set of controls to ensure that large, irreversible, adverse environmental impacts do not occur. The stormwater management impacts associated with a nuclear facility are no different than the stormwater management impacts of any similar sized industrial or commercial facility. The FDEP is responsible for reviewing and monitoring stormwater management systems. The review team determined that the impacts associated with the stormwater runoff would be limited and mitigated by the stormwater management system.

One commenter raised a concern that the LNP intake would facilitate degradation of aquatic systems within 50 mi of the site. Section 5.3 describes the potential impacts associated with the intake structure located on the CFBC. The review team concluded that impacts on aquatic resources due to operation of the intake structure would be SMALL. One of the comments raised the issue of establishing minimum flow rates for the lower Withlacoochee River. The proposed units would withdraw water from the CFBC, not from the lower Withlacoochee River or Lake Rousseau and so would not have an impact on flow in the lower Withlacoochee River.

The review team considered the capture of freshwater in the intake to the condenser cooling system, the reduction in groundwater discharge through springs, and the reduction in overland flow due to the LNP stormwater management system on water quality in the estuary and determined that the cumulative impact of these three factors related to building and operating the LNP units would not detectably alter the salinity regime in Crystal and Withlacoochee bays. The comments provided no new information to refute the review teams assessment, therefore no changes were made to the EIS in response to these comments.

Comment: In addition, we would be seeking assurances that the Progress Energy plan would not adversely affect current water flow onto or through the Robinson tract, as a result of alteration and changes made to the Goethe State Forest. (**0002-6-3** [Smith, Charles])

Comment: Surface waters on the proposed LNP site – The two aerial photographs of the proposed LNP site that Ms. Casey also took during the "dry season" and included in her declaration (**Bacchus Exhibit C2**) show the extensive cypress wetlands that occur throughout that site and other areas of surface water. These photographs refute implications by PEF and the DEIS that significant surface waters do not occur on the proposed LNP site.

Significant surfacewater flow generated from the proposed LNP site – The two remaining ground photographs that Ms. Casey took between the proposed LNP site and the proposed Tarmac site during the "dry season" and included in her declaration (**Bacchus Exhibit C2**) document the significant flow of surface water generated from the proposed LNP site. The conceptual drawing of the proposed LNP project in DEIS Fig. 3-2; the floodplain map; the USGS topographic map; and wetland classification map, incorporated herein as **Bacchus Exhibits C3-C6**, further verify that this water is an integral part of the floodplains of the surrounding named streams and contributing a significant freshwater contribution to the Waccassassa Bay State Preserve. (**0020-20** [Bacchus, Sydney])

Comment: A certain amount of surface water flows naturally from the Robinson Property to the LNP Site. How will this flow of water be affected by the wetland impacts proposed by Progress Energy on the LNP site? (**0023-14** [Avery-Smith, Ellen] [Smith, Charles])

Response: *Surface water, including runoff discharging from the site, is described in Section 2.3.1.1. Wetlands on the LNP site are described in Section 2.4.1.1 of the EIS. The impact on wetlands of building the proposed units is presented in Section 4.3.1 of the EIS. The impact on wetlands of operating the proposed units is presented in Section 5.3.1. In Sections 4.2.1 and 5.2.1, the review team concluded that the impact of building and operating*

the proposed units at the LNP site to surface water would be minor. No change in surface water flow from the Robinson property to the LNP site is anticipated because no structures would be built near the Robinson property. No changes were made to the EIS in response to these comments.

Comment: The NRC has reviewed many aspects of the COLA within the 50 mile radius, but the focus of marine surface water impacts is limited to Crystal Bay and the Cross Florida Barge Canal (CFBC). We conclude the NRC has legal authority for expanded estuarine impact review as well as examination of long term economic and regional hydrology impacts based on Federal statutory provisions referenced is subsequent discussion. (**0042-2** [Hilliard, Dan])

Comment: After review of the Draft we were puzzled to find NRC identifies a graphically narrow scope of impact to surface waters as related to the intake of cooling water in the Cross Florida Barge Canal. (**0044-1** [Hilliard, Dan])

Response: *Surface-water impacts from operating the proposed units are described in Sections 5.2 and 5.3. The discussion is limited to the CFBC and the Gulf of Mexico in the vicinity of the discharge site because the expected impacts due to withdrawal of water and discharge of to these waterbodies are small and no impacts on aquatic resources are expected to be detectable to the marine environment outside the immediate area of the intake and discharge. No changes were made to the EIS as a result of these comments.*

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... The direct, indirect and cumulative impacts of the proposed project on the floodplain must be evaluated. (**0011-12** [Bacchus, Sydney])

Response: *Section 2.3 of the EIS discusses the location of the proposed units in relations to the 100-year floodplain. Section 4.2 describes the hydrologic impact of building the proposed units in the 100 year floodplain. Section 4.3 describes the ecological impact of building the proposed units in the 100-year floodplain. The State of Florida requires that any encroachment on the 100-year floodplain that may result in loss of flood storage be compensated (Fla. Admin. Code 40D-4.301 and 40D-4.302) such that no net encroachment occurs. The review team determined, based on its review of Florida regulations and PEF's description of the floodplain storage loss compensation, that sufficient onsite area is available to meet the requirements of the FDEP and SWFWMD. Section 7.2 was revised to describe the cumulative effects on the floodplain and mitigation actions due to building the proposed units on the LNP site and other past, present, and reasonably foreseeable actions.*

The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit to affect wetlands will be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and

regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements.

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... The full extent to which the proposed project would degrade water quality in the area must be evaluated. (**0011-13** [Bacchus, Sydney])

Response: *Water quality-related impacts associated with operation of LNP Units 1 and 2 are presented in Section 5.2.3 of the EIS. The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit to affect water quality will be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. No changes were made to the EIS in response to this comment.*

Comment: In the FDEP Electric Power Plant Site Certification, Staff Analysis Report (12 January 2009) it is clear that DEP did not expand CWA review beyond the CFBC insofar as examination of impacts related to cooling water intake in the CFBC, and thus we question consistency with Federal statute(s). At no place in either of these documents are the impacts of fresh water diversion evaluated or recognized. Admittedly there may be documents which we have not reviewed in this process, but based on our examination the certification does not appear sufficient in scope to satisfy standards set forth in Federal Statue(s). Finally, while the State may certify such consistency it is our understanding that ultimate responsibility for such determinations is within Federal jurisdiction. (**0037-3** [Hilliard, Dan])

Response: *This comment does not relate to the EIS, but to the Electric Power Plant Site Certification. The review team's EIS addresses the impact of freshwater withdrawal from groundwater and the capture of freshwater by the cooling-water intake in Section 5.2 of the EIS. The ecological impacts of that withdrawal are addressed in Section 5.3 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: The Draft mentions proposed water withdrawal from the Withlacoochee River watershed. It does not examine cumulative impacts which will result from the Applicant's diversion of fresh water resources and the state's obligation to provide water supply to the very development which provides the basis of need for this power plant. (**0044-3** [Hilliard, Dan])

Response: *Section 2.5.2.6 describes the anticipated increases in water consumption due to population growth in the region. Section 5.2.2.2 describes the anticipated reduction in groundwater discharge to surface water bodies due to operation of the proposed units. Figure 5.5 shows the areal extent of the impact of water withdrawal for operation of the*

proposed units. Section 7.2 describes cumulative impacts of water withdrawal for building and operating the proposed units. No changes were made to the EIS as a result of these comments.

Comment: Cedar Key is located on the northwest quadrant of Waccasassa Bay approximately 16.25 miles from the mouth of the Withlacoochee River. A comprehensive review of coastal estuaries with specific discussion of the Lower River, CFBC and Waccasassa Bay is provided as Attachment D (Packard, Vol. 2 of 3 volumes).

The original mouth of the Withlacoochee River (Outstanding Florida Water) channel is 1/3 mile north of the CFBC channel at its closest proximity on the south side of Chamber's Island. The mouth of the newer dredged channel serving for navigation to the Withlacoochee River is slightly over one mile north of the CFBC as it clears existing natural reefs and small islands. The mouth of Bennett's Creek is .38 miles from closest proximity to the CFBC and the Creek is a connected to the Withlacoochee River about 1/3 mile southwest of the Yankeetown municipal limits. (Attachment E-Map overview)

The closest proximity of the BBSGP to the Withlacoochee River mouth (new) is approximately 2.5 statute miles due west. Proximity to the mouth of the CFBC is approximately 3.2 miles west by northwest. (Attachment F (Waccasassa Bay Preserve State Park Mgmt Plan)). Additional coastal tributaries to the estuary discharge in direct and immediate proximity to the CFBC through State Preserve lands sited on the north shore of the CFBC and southwest of Yankeetown. Due to this close integration and for additional reasons discussed later, WAR disagrees with the conclusions in DEIS Section(s) 2.4.2 and 2.4.2.1.

This submission deals with impacts to surface waters and system flows and sources thereof, which includes ground water. The DEIS details components of the Withlacoochee River (System) in the form of upper, middle and lower river segments. The DEIS assigns values to System flows based on USGS flow gauges located at various sites and the values are represented as Mean Values. (**0042-6** [Hilliard, Dan])

Response: *The review team recognizes that the commenter disagrees with the review team's conclusions in Section 2.4.2 and 2.4.2.1; however, the commenter provides no specific information; therefore, no changes were made to the EIS in response to this comment.*

E.1.7 Comments Concerning Hydrology – Groundwater

Comment: Section 2.3.2, Page 2-29, Line 28: Statement beginning with "Most of the water is evaporated in the cooling tower ... " is not accurate. Only about 30 percent is evaporated and the rest is used to dilute the water for the blowdown. (**0010-1-5** [Kitchen, Robert])

Response: *Section 2.3.2 was revised in response to this comment.*

Comment: Section 4.2.1, Page 4-19, Line 7: Historic basin storage is a volume, not an effect. Replace "The second of these effects is ..." with "The second effect is on retention storage below the SHWL which is also called historic basin storage (HBS)."

Section 4.2.1, Page 4-20, Line 3: Recommend revising to read as "... estimated in the boundary analysis the maximum rise in the level of the 100-year flood ..."

Section 4.2.1, Page 4-21, Line 11: Delete reference to "Regional Offsite Mitigation Area plan" and replace with "LNP Mitigation Plan". (**0010-2-12** [Kitchen, Robert])

Response: *Section 4.2.1 was modified in response to this comment.*

Comment: Section 4.2.1, Page 4-21, Lines 15-31: This paragraph is confusing in that it implies building-related groundwater-use impacts from comparison with impacts from wells screened within the aquifer implying a well-field drawdown. The discussion provided in this paragraph refers to dewatering activities to support construction. It refers to the analysis of production wells which have been moved off-site being used to bound construction dewatering potential impacts on-site. The use of Figure 4-1 seems inappropriate since it shows drawdown for off-site production wells. Using the drawdown modeled for the production wells when they were on-site and more representative of the area to be impacted by construction dewatering would be more appropriate. The bounding analysis should note that the construction drawdown are still a fraction of the original production well analysis, temporary in nature, and would still not be expected to noticeably alter any aquatic resources. (**0010-2-13** [Kitchen, Robert])

Response: *Section, 4.2.1 Lines 15–31 refer to groundwater withdrawn to support building activities such as concrete preparation and dust suppression on roads. This water will be drawn from an offsite production well so the comparison made in the text is appropriate. This portion of the document does not refer to dewatering activities. Lines 1–14 refer to impacts from dewatering. Dewatering activities are not compared to the offsite production wells because dewatering will occur in the shallow aquifer, will be controlled with subsurface grouting and diaphragm walls, and will be of short duration. No changes were made to the EIS in response to this comment.*

Comment: In the groundwater modeling portion of the section written in support of Progress Energy's water use program application, it stated that -- and I'm quoting here: SWFWMD presumes an adverse impact to a wetland if the long term median water level falls below the minimum wetland level. The District has assigned the elevations to sentinel wetlands. The District states, -- and the district is SWFWMD -- that it can't extrapolate levels from wetlands that haven't had official levels set by similar wetlands in close proximity. Okay. It means they can make an average. And then you go ahead down a little ways and you read that: A minimum wetland level is at 1.8 feet below normal pool and with a one-to-one relationship. And it states that: The methodology works at areas -- in other areas, that there are no sentinel wetlands or published minimum wetland levels in Levy County. So, the data -- my statement is that the data that was used is based on estimations from other areas. (**0002-11-2** [Casey, Emily])

Comment: PEF's initial groundwater pumping models were judged to be too generic and the results were rejected (Page 5-5). It is unclear as to why NRC/USACE continue to refer to this inadequate modeling throughout the DEIS, especially when doing so just adds confusion. If PEF's initial modeling is to be included in the DEIS, it should be made clear as to why the data is still considered as being relevant. (**0008-14** [Hubbard, Michael])

Comment: Cumulative Impacts from groundwater pumping were not adequately addressed in the DEIS. Modeling using site-specific data predicted an impact of up to 2093 acres of wetlands from groundwater drawdown. The DEIS states on Page 7-15: ...the review team determined that the effects of water use at the Tarmac Mine site on the groundwater resource would be of the same order of magnitude as those predicted for the LNP wellfield located on the LNP site because both projects would withdrawal [sic] a comparable amount of groundwater. The review team informs us that water use at the Tarmac Mine "is expected to use less than 1 MGD of water..." (Page 7-15) and that "no specific evaluation of the impacts of water use at the Tarmac mine on groundwater levels and wetlands was performed for the LNP Units 1 and 2 DEIS..." (Page 7-15). This failure to evaluate cumulative groundwater impacts is unacceptable and incomprehensible. The amount of groundwater withdrawal from the Tarmac Mine is known and should be used (Page 7-15 states that the Tarmac mine is compiling a DEIS and that USACE is performing groundwater modeling.) (**0008-19** [Hubbard, Michael])

Response: *The cumulative impact of water use at the LNP site and at the Tarmac King Road Mine is included in Section 7.2 of the EIS. While the analysis of the impact of water use at the Tarmac mine is qualitative in the EIS, the staff determined that it is sufficient to determine the contribution of the mine to the cumulative impact to groundwater in the vicinity of the LNP site. No changes were made to the EIS as a result of this comment.*

Comment: Section 2.3.1.2, Page 2-24:... Section 4.2.1, Page 4-18: ... Section 5.2.1, Page 5-4: Progress Energy Florida (PEF) hired consultants that used the SWFWMD standard regional model to create the recalibrated groundwater model in response to NRCs request for a model that provided a better match to the 2007 USGS potentiometric map of the Upper Floridan aquifer and site-specific groundwater elevations in the surficial and Upper Floridan aquifers. In order to address this request, the consultants made changes to the lateral boundary conditions in the simulated Upper Floridan aquifer of the original model. Utilizing the higher boundary heads resulted in adjusting aquifer parameters for leakance and hydraulic conductivity to "force" the water levels to higher elevations and to reduce the horizontal gradient. The resulting water levels in the recalibrated model are now inconsistent with the DWRM2 regional model and would cause the regional model calibration to degrade. No changes were made to the lateral boundary conditions of the surficial aquifer in the original model because no information was available beyond that already incorporated into the DWRM2 model. Therefore, the changes to the boundary conditions of the Upper Floridan aquifer resulted in changes to the vertical gradients between the surficial and Upper Floridan aquifers and both dry and flooded cells in the simulated surficial aquifer. Dry and flooded cells are an indication of excessively high or low vertical flow between the surficial and Upper Floridan aquifers as a result of the boundary head changes. These excessive vertical flow differences are also inconsistent with the DWRM2

regional model and would cause the regional model calibration to degrade. The results of the recalibrated model are therefore less supported than the results of the original model. (**0010-1-4** [Kitchen, Robert])

Comment: Recalibrated groundwater model assessing operational impacts only - Despite the fact that the reviewing agencies apparently failed to require PEF to model or otherwise quantify or assess water-related impacts of any construction activities described for the proposed LNP site, it appears that they did recognize that PEF's original groundwater model of operational impacts (developed for state certification) was inadequate. Those inadequacies were referenced in LNP DEIS Section 2.3.1.2, page 2-28, lines 32-37, page 2-29, lines 1-6, as follows: Because the data submitted to the State of Florida was considered a poor fit with the LNP site, a corrected model was deemed necessary by Staff: ... to simulate predevelopment, current, and future potentiometric surfaces for the LNP site and vicinity (PEF2009e) ... Because this DWRM2 model was recalibrated to the USGS regional interpretation of the Upper Floridan aquifer potentiometric surface, which incorporated only limited information in the vicinity of the LNP site, a poor fit between simulated and observed heads in the vicinity of the LNP site was obtained ... To improve the goodness of fit over this portion of the model domain, which encompasses the proposed LNP well-field and thus is important to the assessment of groundwater impacts, the model was recalibrated by PEF using both site-specific and regional head data. A detailed description of this model and the recalibration process is provided by PEF (2009d). (**0020-27** [Bacchus, Sydney])

Comment: Failure of the LNP DEIS to require modeling or other quantification of impacts from passive dewatering - Another significant deficiency in the LNP DEIS is its failure to require detailed quantification of passive dewatering of the proposed LNP site and surrounding area. The irreversible direct, indirect and cumulative adverse impacts associated with passive dewatering are described in the 2006 peer-reviewed publication by Bacchus, incorporated herein by reference as Bacchus Exhibit D5. It is my professional opinion that the construction/preoperation site alterations described in the LNP DEIS will result in passive dewatering and "LARGE" irreversible direct, indirect and cumulative adverse impacts. (**0020-37** [Bacchus, Sydney])

Response: *These comments are related to the groundwater model for the LNP site. Results from the recalibrated groundwater model were used by the review team in its assessment of groundwater-use impacts at the LNP site. The model results were not the sole basis of the review team's assessment. Given the complex site hydrologic conditions, including natural annual variability in groundwater level, hydrogeologic heterogeneities, model parameter uncertainties, and the relatively small water-level changes that have been shown in the literature to result in wetlands impacts, the review team determined that the groundwater model alone was not sufficient for supporting a definitive assessment of wetlands impacts. This determination is consistent with the State of Florida's groundwater use permitting process that uses the model as a scoping-level assessment tool but relies on a State-mandated environmental monitoring program and mitigation plan to ensure no adverse impacts on wetlands. The review team did use results from the recalibrated model to (1) assess whether the applicant's proposed groundwater usage was plausible given the current understanding of*

site geohydrologic conditions and (2) evaluate the magnitude of the proposed groundwater usage in relation to the local-scale hydrologic water balance. The review team also performed simplified calculations based on surface recharge estimates extracted from the DWRM2 hydrology model to compare the proposed usage with local-area recharge. The NRC staff does not plan any further review of the groundwater model. However, USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the Least Environmentally Damaging Practicable Alternative (LEDPA). At this time, PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued. The impact on groundwater of building the proposed units is addressed in Section 4.2 of the EIS. The impact of operating the proposed units is addressed in Section 5.2 of the EIS. Section 2.3 was modified to clarify the role of the groundwater model in the review team's assessment.

Comment: We are working with Progress Energy right now and the Southwest Florida Water Management District to divert the effluent flow from our Waste Water Treatment Plant to their existing power facility. It will allow us to cease using a spray filled to displace the effluent. It will also allow Progress Energy to defer pulling about a million gallons a day of groundwater for their desulfurization process at their plant. (**0001-2-3** [Houston, Andy])

Response: *This comment applies to the CREC and does not apply to the proposed units at the LNP site. No changes were made to the EIS in response to this comment.*

Comment: The impacts of the power plant will impact ... our Florida aquifer underground. ... we don't have enough water for our projected future. (**0001-11-8** [Minno, Maria])

Comment: The aquifer is a great challenge. It's not just the power plant and the 22 million gallons of water from the rock mine up there we're worried about. But we have a horse hole mud bog that pumps out of two eight-inch pipes all day long. We have a shell factory that washes shells up there. We have agriculture with watermelon fields. So, we're really concerned about our water. (**0001-14-5** [Price, Sally])

Comment: This Tarmac Mine wants to pump 22 million gallons of water a day from there if they got through with their special exception. There won't -- you should turn on your faucet in Inglis, nothing will come out, is what I'm afraid of. And many people are of this opinion, because the water is so limited. (**0001-5-13** [Berger, Betty])

Comment: Water laws do not allow industry to affect other users. The threat of salt water intrusion into our drinking water and the increased usage from the aquifer could affect availability of four public water supplies and many private wells. (**0001-5-9** [Berger, Betty])

Comment: The groundwater consumption is my greatest concern. (**0001-6-3** [Cannon, Renate])

Comment: And I am concerned about where the water flows underground, conveying pollutants within it before it's released from the springs into protected water bodies, or is pumped out of the ground for use as domestic supplies. (**0001-9-7** [Hopkins, Norman])

Comment: And surface waters flow either, as I said, into the two rivers or sheet floods flow to the Gulf, and, the Gulf is also a very pristine estuary area and the Big Bend seagrass beds. Personally, I have observed water flowing from a high water lake that exists at the northeast corner of Progress Energy's property, flows under 19, and in a very short distance, it's flowing northwest and it goes into many swallets straight down into the aquifer. So, my question from there is, what will the quality of this water be in 10, 20 years? And also, what will the quantity of this water be? Or will there be any water? (**0002-11-4** [Casey, Emily])

Comment: Then, the water that flows into these swallets are most likely the water that feeds into the springs that are there. These two springs happen to be two out of the five known springs -- and I'd like to stress known because it is what we know, but there's kind of assumed that there's much more out there that is not known. Anyway, two out of the five springs provide the fresh water into the Waccasassa Bay/River area. The Waccasassa Bay River has already experienced a dramatic decline in the amount of water that flows from there. So, what will happen in 10, years? (**0002-11-5** [Casey, Emily])

Comment: Why I'm standing up here is to talk about water. And it is a scarce resource. We need to husband that scarce resource. We need to look after our wetlands for the job that they do to preserve the water which is in the aquifers of this country. (**0002-12-3** [Hopkins, Norman])

Comment: And fresh water is so precious on this planet. It's so precious here to our people here in Florida. And it's only really 1 percent of the water on the planet is fresh water and drinkable. So, I really think we need to protect it (**0002-5-2** [Jones, Art])

Comment: I'm originally from St. Petersburg. We've always had water problems. And it really scares me that at times -- at the end of the -- at the lower end of the beaches, south end of the beaches, you could turn on a water spigot, there would be hopefully a drop or two coming out. And now you're talking about covering up a way to redo our -- refill our aquifers. (**0002-9-7** [Seiling, Barbara])

Comment: I live in an area called Watermelon Pond. When I went to put in an ag well --for anyone who doesn't know what that is, it's a well so you can feed --have water for your animals - cows, horses, et cetera. EPA calls me because, guess what? Part of the property goes into -- actually has contact with Watermelon Pond. So, the EPA's calling me because, being part of SWFWMD and it's all State property, they want to come out and examine to see where I'm going to put my well -- not my septic, my well -- to make sure it's not going to impact the

property. Of course, I already had a well, so I didn't -- they said, oh, never mind then. But here we are trying to -- and I'm talking about a well. And EPA's in my -- coming to me. I had to make sure my septic tank wasn't too close. I had to make sure my property wasn't too -- my house wasn't too close. And here we are talking about putting a potential catastrophe waiting to happen on our -- on our water -- our whole water flow and the most important resource that we have. And I just don't understand. (**0002-9-8** [Seiling, Barbara])

Comment: It should also be noted that the availability of ground water from the surficial or Floridan aquifers in large quantities is also problematic. The SFWMD is currently investigating ground water availability within this area. (**0024-7** [Golden, James])

Comment: Surface waters flow either into the 2 rivers or as sheet flow to the Gulf and a pristine estuary. I have observed water flowing from a high water lake at the corner of P.E.'s property, under 19 and flowing NW until it finds many swallots and thus goes directly down into the Floridan Aquifer. What will the quality of this water be? (in 10, 20 years). What will the quantity of this water be?? (**0045-4** [Casey, Emily])

Comment: The water that flows into the swallots are most likely what feeds water to two springs close by. These two springs are two out of five Known springs 2/5's which provide fresh water into the Wacasassa Bay & River. The Wacasassa Bay & River have already experienced a dramatic drop in the flow Rate, what will happen if more water is taken out of the system? Due to many features that this area has it is not a place that can be compared to other places. I asked you to understand the Environmental Impacts this would have, would be devastating. (**0045-5** [Casey, Emily])

Response: *These comments express a concern about water availability, future water quality, and water supply in the vicinity of the LNP site. Impacts on water resources of building and operating the proposed units are discussed in Sections 4.2 and 5.2 of the EIS, respectively. Cumulative effects are addressed in Section 7.2. No changes were made to the EIS in response to these comments.*

Comment: [P]eople have addressed concerns about the wetland impact. And it is really unique because two -- surface water that flows between two water management districts and into two separate rivers, both the Waccasassa and the Withlacoochee. The site is located south and west of two separate potential high levels (sic). This would result in both the Floridan aquifer water being consumed from both the west and the east of this site. And what that ultimately would mean, that water that would flow, and should flow from the south -- to the south and/or to the west and/or to the north -- and the reason why I state it that way is because it's at kind of a confluence of the waters. And then it flows in many different directions; some flows north, some flows toward the Gulf, some flows towards the Withlacoochee River. You really can't predict at what point it's going to flow in which direction. (**0002-11-3** [Casey, Emily])

Comment: Levy Nuclear Plant site is located about ten miles inland and in the middle of a fresh water wetland. Yet, the cooling tower source will be salt water. This freshwater wetland is a recharge area for the drinking water for the people who are living in the surrounding area

since the upper Floridan aquifer is at ground level in this particular area of Florida. (**0002-2-1** [Foley, Beth])

Comment: And also the groundwater usage, will the pumping of water on the Progress Energy site draw down the wetlands and have other negative attributes on the Robinson Estate property? (**0002-7-7** [Avery-Smith, Ellen])

Comment: The DEIS states that up to 2092.9 acres of wetlands could be adversely affected over the course of the 60 years that ground water is pumped to support the LNP project. The FEIS should provide an analysis of other alternative sources of water to support the LNP project. (**0003-18** [Mueller, Heinz J])

Comment: Groundwater & Wetlands Impacts III(1). Basic Engineering Not Complete: a key element of environmental impacts revolves around adverse impacts from groundwater withdrawal for LNP service water. The DEIS implies that PEF has not determined whether these impacts will be incurred or if an alternative source for some or all the service water will be used. Impacts from groundwater pumping include up to 2093 acres of onsite and offsite wetland impact (p. 5-26), a 0.5-foot drawdown contour that extends up to 3 miles, increased likelihood and/or magnitude of saltwater intrusion (p. 2-38), decreased outflow of Big King and Little King Springs 2.5 miles from the wells, and decreased groundwater discharge to Withlacoochee River and Lake Rousseau (p. 5-54). (**0008-10** [Hubbard, Michael])

Comment: Groundwater pumping for service water will result in drawdown that could impact 2093 wetland acres, yet these impacts are not included in the discussion of compensatory mitigation, apparently because PEF has not decided if these impacts will occur or if an alternative supply for this water will be sought. There may be impacts from any alternative water supply source that should also be quantified for consideration in this DEIS. There is vast uncertainty as to where and how PEF will obtain a source of service water for the LNP. For example, SWFWMD standards relating to unacceptable levels of impact from groundwater pumping are summarized on Page 5-27 of the DEIS and include stipulations such as "Wet season water levels shall not deviate from their normal range." The SWFWMD standards also prohibit adverse effects to wetland hydroperiod and habitat functions. Since the DEIS states that a 0.6 to 1-foot drawdown negatively impacts certain wetlands (Page 5-24), one wonders if PEF can obtain much of the needed water from the Upper Floridan aquifer. It appears, from the information provided in the DEIS, that PEF may, to some extent, require an alternative water source, for which no impacts have been determined and no compensatory mitigation has been described. (**0008-30** [Hubbard, Michael])

Comment: While the water management district's standards seem to prevent allowing any changes of water levels or reductions in wetland function, Florida's Department of Environmental Protection (FDEP) appears to have granted PEF an opportunity to pump groundwater to levels that would have adverse environmental impacts if PEF merely supplies mitigation for such impacts. This "condition of certification" statement is used frequently throughout the DEIS when discussing groundwater, ecological, surface water, and other related impacts. An example typical of this claim from Page 5-43 is provided here:

Additional mitigation beyond that proposed by PEF is not warranted, however, as stated in the FDEP (2010) conditions of certification, PEF must monitor groundwater and, if substantial operational hydrological effects on wetlands are discovered, PEF must either mitigate or utilize an alternative water source.

Despite what the State of Florida believes it can grant to PEF, federal review of this proposed project must adhere to less fanciful allowances. In accordance with 40 CFR 1502.16, environmental effects which cannot be avoided, both direct and indirect, are to be included in the EIS. It is currently up to PEF to provide modeling results for state and federal agency approval that contradict the prediction that groundwater withdrawals from the Upper Floridan aquifer will adversely impact over 7000 acres, 2093 acres of which are wetlands. PEF's initial modeling was rejected for being too generic and because the "goodness of fit" required improvement (Page 5-24) and, despite NRC/USACE's insistence in including results and discussion of this model, the model results were basically rejected and further proof is required from PEF that the impacts will not occur, else compensatory mitigation for the impacts must be included in this DEIS. (**0008-31** [Hubbard, Michael])

Comment: Catastrophic destructive wildfires - The hydroperiod alterations that would result from the construction and operation of the proposed LNP project would cause catastrophic destructive wildfires in the area surrounding the proposed LNP site. The scientific basis for this conclusion is described in my 2007 peer-reviewed scientific publication incorporated herein as Bacchus Exhibit C7 and in my previous affidavit. (**0020-38** [Bacchus, Sydney])

Comment: Progress Energy will be using wells to provide fresh water for the facilities operated on LNP site. What effect will the use of these wells have on the wetlands associated with the Robinson Property? (**0023-13** [Avery-Smith, Ellen] [Smith, Charles])

Comment: Since the 5700 acre Robinson Tract will be affected by the draw down of fresh ground water used at the Levy site, will there be any monitoring devices used to determine the possible effects caused to the current wetlands on this site? (**0027-4** [Smith, Charles])

Response: *These comments express concern about the potential impacts on wetlands of building and operating the proposed units. The EIS discusses alternative water sources in Section 9.4.3. The review team recognizes that groundwater and surface water are interdependent resources and that potential impacts on wetlands due to groundwater withdrawal cannot be predicted with certainty using the available groundwater model. This determination is consistent with the State of Florida's groundwater use permitting process that uses the model as a scoping-level assessment tool but relies on a State-mandated environmental monitoring program and mitigation plan to ensure no adverse impacts on wetlands. USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the*

Least Environmentally Damaging Practicable Alternative (LEDPA). At this time PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued. The impact of building the proposed units on groundwater levels is addressed in Section 4.2 of the EIS; related wetland impacts are addressed in Section 4.3 of the EIS. The impact of operating the proposed units on groundwater levels is addressed in Section 5.2 of the EIS; associated impacts on wetlands are addressed in Section 5.3 of the EIS. Section 2.3 of the EIS was modified to clarify the role of the groundwater model in the review team's assessment. Section 5.3.1.1 addresses wildfires.

Comment: Missing Data in Section 5.2.1 - Hydrological Alterations: This section fails to list groundwater drawdown from groundwater pumping for service water as an hydrologic alteration. Since it is repeatedly stated in the DEIS that impacts due to drawdown are probable, it should be listed as an hydrological alteration in this section. (**0008-16** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Failure to include groundwater pumping as an hydrological alteration under Header 5.2.1. (**0008-60** [Hubbard, Michael])

Response: *Section 5.2.1 of the EIS was modified to include groundwater withdrawal for the service-water system as a hydraulic alteration. The impact of building the proposed units on groundwater levels is addressed in Section 4.2 of the EIS; related wetland impacts are addressed in Section 4.3 of the EIS. The impact of operating the proposed units on groundwater levels is addressed in Section 5.2 of the EIS; associated impacts on wetlands are addressed in Section 5.3 of the EIS.*

Comment: The DEIS fails to account for water quality impacts to the coastal estuary system due to consumption of substantial freshwater contribution at the CFBC. Due to this oversight, the review team's determinations regarding environmental and economic impacts and the alternatives analysis are incomplete. Freshwater input into Withlacoochee Bay will be reduced by two methods: 1) increased groundwater consumption for service water will reduce spring and base flows in the area, and 2) the Circulating Water Intake System (CWIS) will withdraw freshwater currently flowing to the estuary through the CFBC. Neither of these reductions in freshwater flow into the estuary appear to be accounted for in the DEIS. PEF failed to utilize extant technologies for a comprehensive review to determine groundwater inputs into the coastal estuary system. The DEIS describes freshwater contributions from springs "near" the Inglis Lock. One wonders how such a vague description and crude analysis was deemed

appropriate by the regulatory agencies. Impacts cannot be properly quantified if the collective system contribution of freshwater is unknown. The analysis should be more finely tuned by the use of airborne thermal imaging for locating springs in the area and Doppler technology for quantification of flows (as PEF used for evaluation of offshore currents in the COL application). Without the use of these technologies, the conclusions in the DEIS are based on guesswork. (**0008-26** [Hubbard, Michael])

Comment: The DEIS does not appear to take into account the decrease in freshwater input into the estuarine systems due to groundwater pumping of 1.58 Mgd, nor consider regional water supply impacts to freshwater contribution due to projected growth in the area, or from concurrent projects being developed nearby (i.e., Tarmac mine). Thus, determinations of impacts are incomplete and a Supplemental DEIS including a comprehensive review based on more precise technological evaluation and broader inclusion of impacts is requested. (**0008-28** [Hubbard, Michael])

Comment: There are also the consideration of impacts from groundwater pumping, the reduction of freshwater input into the estuary, and the adoption of Minimum Flow Levels in the area that render the viability of the proposed LNP questionable in light of federal and state regulations. (**0009-10** [Hubbard, Michael])

Comment: Multi-basin impacts on coastal discharges of surface and ground waters -Similarly, the LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on coastal discharges of surface and ground waters from the three sub-basins shown in LNP DEIS Figure 2-8 (Bacchus Exhibit D1b). In my professional opinion those impacts would exceed "LARGE" and would result in irreversible alterations of the chemical, physical and biological integrity of those national waters. (**0020-30** [Bacchus, Sydney])

Response: *These comments relate to impacts on the estuary due to water use associated with the operation of LNP Units 1 and 2. The review team recognizes that groundwater and surface water are interdependent resources, as are the aquatic and terrestrial resources that rely on these waters. The impacts of water withdrawal on the groundwater system are addressed in Section 5.2 of the EIS; cumulative impacts due to groundwater withdrawal to operate the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.2.1.2. The review team determined the impacts due to groundwater withdrawal would be SMALL. The impacts of surface-water use are addressed in Section 5.2 of the EIS; cumulative impacts due to surface-water use to operate the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.2.1.1. The review team determined the impacts due to surface-water use would be SMALL.*

Impacts on estuaries due to groundwater withdrawal and the capture of fresh surface water by the intake pumping station are considered in the assessment of ecological impacts presented in Section 5.3 of the EIS; cumulative impacts on aquatic ecological resources due to the operation of the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.3.2. The review team determined that the cumulative impacts on

aquatic ecological resources due to the operation of the proposed units and other past, present, and reasonably foreseeable actions would be SMALL.

The review team considered the effect of capture of freshwater in the intake in Section 5.2.3. The review team acknowledges that operation of the plant would alter both the temporal and spatial patterns of the salinity regime in the CFBC and the region of the Gulf in the immediate vicinity of the mouth of the canal. This change in salinity would be complicated by tidal action, density differences in freshwater and saltwater, weather conditions, and the bathymetry in the region. The change in water quality in the canal and in the region of the mouth of the canal may alter the distribution and abundance of aquatic species; however, this change is expected to be inconsequential because these organisms inhabiting the estuary can tolerate a range of salinity conditions.

The review team determined that the effect of groundwater withdrawal on salinity in the estuary would be de minimis given the variability in other factors controlling the salinity in the estuary, such as tidal patterns, evaporation, and intense storm events as described in Section 7.2. Even under the most conservative conditions, the observed natural variability in groundwater potentiometric surface is significantly larger than the change in potentiometric surface associated with operation of the proposed groundwater wells at the LNP site. The results of groundwater modeling are presented in Section 5.2 of the EIS.

Finally, the review team determined that the reduction in overland flow from the site on the salinity in the estuary due to implementation of the stormwater management plan would not be significant as described in Section 7.2. BMPs have evolved into a reliable set of controls to ensure that large, irreversible, adverse environmental impacts do not occur. The stormwater management impacts associated with a nuclear facility are no different than the stormwater management impacts of any similar sized industrial or commercial facility. The FDEP is responsible for reviewing and monitoring stormwater management systems. The review team determined that the impacts associated with the stormwater runoff would be limited and mitigated by the stormwater management system.

Impacts on estuaries due to groundwater withdrawal and the capture of fresh surface water by the intake pumping station are considered in the assessment of ecological impacts presented in Section 5.3 of the EIS; cumulative impacts on aquatic ecological resources due to the operation of the proposed units and other reasonably foreseeable activities in the region are addressed in Section 7.3.2. The review team determined that the cumulative impacts on aquatic ecological resources due to the operation of the proposed units and other past, present, and reasonably foreseeable actions would be SMALL. No changes were made to the EIS as a result of these comments.

Comment: Which way does the water -- this is for, I guess, the Army Corps of Engineers. Which way does the water flow underground in my area of the proposed site [the property lies to the north]? I have no answers. I don't know if it's running towards me, towards the ocean, or towards the Gulf or what. I'd like an answer on that. (**0001-7-3** [Smith, Robert])

Response: *Groundwater hydrology is presented in Section 2.3.1.2 of the EIS. This section indicates that in general water flows from the site toward the Gulf of Mexico. No changes were made to the EIS as a result of this comment.*

Comment: So, it makes sense to me that the plant, if it has to be built, should be built out at that site [Crystal River site]. So, I think that, you know, that -- how can anybody possibly say that the Levy site does not have environmental impacts that should stop the NRC from issuing the license for that location. Of course, that site would have a very bad environmental impact on many areas, you know, pumping over a million gallons a day out of the aquifer there is -- that's a million gallons less coming out of our springs. And it's been shown that it feeds two spring sheds. And then just right next to that location is the whole Rainbow River spring shed and estuary, one of the most beautiful spring-fed rivers, I think, in the world. So, I think that really needs to be protected. (**0002-5-4** [Jones, Art])

Response: Section 5.2.2.2 of the EIS addresses the impact of groundwater withdrawal on spring discharge. *Section 9.3 of the EIS considers alternative sites for location of the proposed nuclear units, including the Crystal River site. No changes were made to the EIS as a result of this comment.*

Comment: Failure of the DEIS to take a hard look the influence of karst conduits on simulated water-related model results -The DIES [DEIS] reveals that the NRC and Corps failed to take a hard look at - or even consider - the influence of karst conduits known to occur in the vicinity of the proposed LNP and mine sites on the simulated water-related model results. Furthermore, there is no evidence in the DEIS that the NRC and Corps attempted to locate and map the karst conduit system that they should have know existed at the proposed LNP site. (**0020-18** [Bacchus, Sydney])

Comment: Karst conduit systems mapped at similar sites in Florida -Karst conduit systems have been mapped at similar sites in Florida. Examples of such karst conduit systems that have been mapped in Florida are provided in Figure 3 of Bacchus Exhibit C2. As described in this peer-reviewed publication, similar karst conduits have been documented to extend for miles, including under natural stream channels. Adverse impacts of the proposed project on karst conduit flow - It is my professional opinion that similar karst conduits occur throughout the proposed LNP and proposed Tarmac sites, either at or below the surface. Furthermore, it is my professional opinion that the proposed LNP and proposed Tarmac projects would result it "LARGE" irreversible direct, indirect and cumulative adverse impacts to the chemical, physical and biological integrity of the nations waters, in part because of the presence of these karst conduits. (**0020-19** [Bacchus, Sydney])

Comment: LNP DEIS failed to consider fracture networks and relict sinkholes - Figure Fig 2.6-2 from PEF's Environmental Report, incorporated herein as Bacchus Exhibit C8, identified faults and sinkholes in the vicinity of the proposed project. There is no indication in the LNP DEIS that the water-related models incorporated preferential flowpaths from faults and sinkholes or other karst features known to occur at the proposed LNP site, such as fracture networks and relict sinkholes. The economic report included as Bacchus Exhibit A7 references

at least one source for mapped fracture networks in the vicinity of the proposed LNP site. The cypress wetlands occurring extensively throughout the forested floodplain where the proposed LNP would be constructed are known to be established in relict sinkholes. Sinkholes are known to be aligned along fractures. Relict sinkholes also are known to be destabilized as a result of the types of construction and operation activities described in the DEIS that would occur for the proposed LNP project. (**0020-22** [Bacchus, Sydney])

Comment: Geological conditions and constraints of the proposed LNP site -The geological descriptions in Chapter 2 -Site Characteristics of the LNP Fire and Safety Analysis Report [Final Safety Analysis Report] (FSAR) provide a revealing account of the conditions and constraints of the proposed LNP site and surrounding area. Some of the more salient excerpts from that chapter are provided in Bacchus Exhibit C12, incorporated herein by reference. Those descriptions suggest that the NRC and Corps failed to take a hard look at the how a proposal to construct a behemoth, multi-unit nuclear power plant on top of freshwater forested wetlands (one of our most effective carbon sinks) embedded in a fragile karst flood plain riddled with relict sinkholes interspersed with fracture networks in the midst of one of the most environmentally sensitive areas in the state could possibly meet the public interest test required for approval of the proposed LNP project. I encourage the reviewing agencies to read the FSAR excerpts in Bacchus Exhibit C12, particularly in consideration of the water-related models that are being used to predict impacts from the proposed LNP project. (**0020-26** [Bacchus, Sydney])

Comment: Concentric drawdown contours fail to account for karst preferential flow features - Figure 5-1 of the LNP DEIS, incorporated herein as Bacchus Exhibit C9, represents the model-simulated groundwater drawdown contours for the proposed LNP site. Obviously the concentric drawdown contours of this model simulation does not reflect the influence of linear fracture networks, anastomizing karst conduits or sinkholes. (0020-23 [Bacchus, Sydney]))

Comment: There is no evidence that the models or other information relied on by PEF or the DEIS accounted for the magnitude or extent to which characteristic karst features such as sinkholes and fractures increase the adverse environmental impacts of anthropogenic water quantity and water quality alterations such as those that would occur from the proposed LNP. Furthermore, there is no evidence that PEF or the DEIS has identified the location of fracture networks and associated karst features in the affected area of the proposed LNP. (**0030-1-9** [Bacchus, Sydney])

Response: *Sections 2.3.1.2 and 2.8 of the EIS discuss the current conditions of the site with regard to karst terrain. Section 5.3.1.1 discusses evidence for karst features from the terrestrial ecology perspective. As part of the environmental and safety reviews the review team reviewed Sections 2.4 and 2.5 of the Final Safety Analysis Report (FSAR) (PEF 2011a) and determined that the information presented there is consistent with the analysis presented in the EIS. As explained in Section 2.3.1.2 of the EIS, karst is a terrain in which near-surface carbonate rocks have been partially dissolved by rainwater and groundwater, producing large solution openings that can readily transmit groundwater and where sinkholes can provide easy connections between the surface and groundwater. Karst is a problem in many areas of Florida; however, few sinkholes occur near the LNP site and the regional transmissivity of the Upper Floridan*

aquifer in the area is less than would be expected for well-developed karst. No changes were made to the EIS as a result of these comments.

Comment: [T]he Environmental Impact Statement that has been published, and which we've reviewed, was based upon scoping data collected up till December 2008. Since then, a research study has been completed to find out how the water and where it travels to in the aquifer. There are artesian flows which are natural to balance the pressure within the aquifer, a confined aquifer, that is --an artesian aquifer. But when those flows -- and it's quite true that they flow from west to east across the -- sorry -from east to west across the LNP site, immediately to the west of that site is what is a fracture which will divert the water to the south. And the reason that I am concerned about that --and it is not mentioned in the Environmental Impact Statement draft -- is that the consequence of that, ignoring the fact that it flows towards the south, means that the whole of the Crystal River Kings Bay complex, as an impacted environment, is omitted from the Environmental Impact Statement. (**0002-12-4** [Hopkins, Norman])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] the exclusion of the Crystal River/Kings Bay area as Affected Environment, especially in view of the groundwater flow patterns into Citrus County, which have been brought to the attention of the NRC and USACE. (**0005-10** [Hopkins, Norman])

Comment: The DEIS documents reflect the scoping period only up to December, 2008. Research conducted in 2009, show paths taken by groundwater flows within and through areas impacted by accumulations into groundwater of effluent fallout of radionuclides. These would embrace Crystal River/Kings Bay presently excluded as Areas Impacted by LNP operations. A copy of a paper recording this research was handed to Mr Emsch [Emch] at the said meeting as follow up to earlier swubmissions [submissions]. Under artesian conditions, pressure gradients are induced. As these tend to equalize groundwater flows result. Such flows when intersecting with ancient rock fractures tend to take the path of least resistance and join water flowing within the fracture set. Within the regional karst terrain extending from the site of the proposed LNP, complex flow patterns are expected to convey contaminated groundwater considerable distances over time including to well sites used for extracting domestic supplies for consumption in local communities. (**0005-26** [Hopkins, Norman])

Response: *While the scoping period for the EIS ended in December 2008, data and information continued to be collected for inclusion in the EIS until a few weeks before its publication in August 2010. The research provided by Mr. Hopkins at the public meeting (ML102860837) indicates that the LNP site is outside the groundwater recharge basin for the Kings Bay springs. Section 2.3.1.2 addresses the extent to which karst development has occurred on the LNP site. No changes were made to the EIS in response to these comments.*

Comment: Additionally, the DEIS considers population growth but fails to consider the expected groundwater use associated with such growth in relation to the proposed LNP. Pages 7-13 and 7-14 state that the Northern Planning Region of the SWFWMD is expected to grow by nearly 50 percent by 2030 and that resulting water demand cannot be met by

groundwater from the Upper Floridan aquifer. What impact does this fact have on the proposed LNP and its use of the Upper Floridan aquifer? The DEIS refers to population growth considered within "the local-scale groundwater flow model domain," but such a restricted evaluation does not meet the intent of a cumulative impacts analysis as described by the U.S. Council of Environmental Quality (CEQ). (**0008-21** [Hubbard, Michael])

Comment: Per submissions by the Applicant, the DEIS and miscellaneous State documents, the Interstate 75 corridor north of Interstate 4 and west to the Gulf Coast is anticipated to be a region of substantial growth and development over the next fifty years (Attachment G-FWC 2060). Such considerations weighed heavily in findings of need by the State Public Service Commission for the Applicant. Water use planning necessary to support this growth lags behind the permitting processes of this application, but is not examined by the Applicant or NRC. Florida has several options for water supply to include ground water, surface water, reclaimed water and desalinization of sea water in ascending order of expense. The Applicant's proposal and the DEIS fail to recognize that misguided use of freshwater components within the CFBC will, in addition to impacts on the estuary, likely require the state to rely on ground water in the areas of The Villages and Ocala or other locations in the region. Increases in ground water consumption will impact spring flows within the 50 mile radius reviewed by NRC as submitted by the Applicant. These springs are dynamic economic engines within the region and support diverse ecosystems. Loss of spring/base flow contribution to the Withlacoochee River will precipitate degradation to the Lower River System and receiving Gulf estuaries. (**0042-9** [Hilliard, Dan])

Response: *Section 2.5.2.6 describes the anticipated increases in water consumption due to population growth in the region. Section 5.2.2.2 describes the anticipated reduction in groundwater discharge to surface water bodies due to operation of the proposed units. Figure 5.5 shows the areal extent of the impact of water withdrawal for operation of the proposed units. No population growth is expected on the site and little population growth can be expected between the site and the CFBC. The Florida State Conditions of Certification (FDEP 2011b) require that during operation of the LNP wellfield, PEF must monitor drawdown in the surficial aquifer. The State Conditions of Certification ensure that either mitigation or an alternative water supply will be required to address adverse impacts on the resource. Section 7.2 of the final EIS addresses the cumulative impact of reasonably foreseeable future action (including population growth and plant operation) on both surface and groundwater use and quality. No changes were made to the EIS as a result of these comments.*

Comment: Failure to identify the affected area - Neither PEF nor the DEIS identified the "affected area" of the proposed LNP, although the DEIS identifies a 20-mile "geographic area of interest." See Section H. (Cumulative Effects) in my affidavit, below. Documents submitted by PEF and the DEIS implied that the affected area was confined to the property boundaries of the proposed LNP site, as supported by the inferences that adverse impacts from groundwater pumping had been eliminated by PEF's revised plan to move the locations of the groundwater wells "offsite" to property adjacent to the proposed LNP site, then failing to address the adverse impacts of groundwater withdrawals at the newly proposed location. (**0030-1-1** [Bacchus, Sydney])

Response: *Chapter 2 of the EIS describes the affected environment of the proposed LNP project. The area described in Chapter 2 extends well beyond the property boundaries of the site. Groundwater well locations are shown in Figure 3.1 and are within the area described in Chapter 2. No changes were made to the EIS in response to this comment.*

Comment: Misrepresentation of Impacts: Page 5-16 refers to the amount of drawdown as "relatively small" and compares this amount to all the water in the ground. I don't care if the drawdown resulting from groundwater pumping is small compared to all the wells in the world. This DEIS should evaluate impacts due to construction and operation of the proposed LNP based on quantification of impacts. The DEIS does not quantify these impacts adequately and does not clearly discuss the impacts due to drawdown of the water table. Presenting such impacts as "relatively small" due to comparison of the withdrawal amount to all the water in the ground does not address the issue of impacts and does not reflect unbiased review. Please modify this discussion to meet the intent of an EIS. (**0008-18** [Hubbard, Michael])

Response: *The EIS compares the rate of water proposed for withdrawal to the regional groundwater flow rate, not to all the groundwater in the ground. Because the planned withdrawal is a small fraction of the flux through the system, the majority of the water remains available for other uses. Section 5.2.3.2 indicates that drawdown would be less than 2.5 ft at the wells and progressively less farther away from the wells. This is a small drawdown relative to the natural variability in water levels in the vicinity of the wellfield and relative to the thickness of the aquifer in the vicinity of the proposed wellfield. Section 5.2.3.2 addresses groundwater quality impacts due to operation of the proposed plants. No changes were made to the EIS in response to this comment.*

Comment: The entire discussion of compensatory mitigation is premature until the issue of service water supply is resolved and the impacts are determined. The DEIS is, therefore, incomplete until PEF chooses a source for service water and includes adequate quantification of adverse impacts from an alternative water source, from pumping 1.58 Mgd from the aquifer, or from any combination of the two. In accordance with 40 CFR 1502.9(c)(1)(ii): Agencies shall prepare supplements to either draft or final environmental impact statements if there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. Please prepare a Supplemental DEIS after the impacts from pumping groundwater, and/or impacts from an alternative water source, are known. (**0008-32** [Hubbard, Michael])

Comment: Incomplete Design - groundwater drawdown impacts and service water source are still undecided, which is essential in so many areas of the DEIS one wonders why the document was issued. The state has required PEF to complete three reports that are expected to resolve the service water supply issue. The DEIS should be reissued for public review and comment after completion of the Aquifer Performance Testing Plan, Alternative Water Supply Plan, and the Environmental Monitoring Plan, as discussed on Page 5-27, and the results included with the proposed project impacts. The environmental impacts from the proposed LNP cannot be determined for many of the impacts analyses in the DEIS until service water supply source and amount of drawdown are determined. (**0008-57** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Inclusion of misleading statements (natural water level variation amount compared to amount of drawdown; withdrawal amounts compared to all the water in the ground instead of evaluating impacts). (**0008-61** [Hubbard, Michael])

Response: *Sections 5.2.1, 5.2.2, and 5.3.1.1 of the EIS describe the proposed water withdrawals and the associated impacts as well as the constraints that have been put on PEF's withdrawal of water. Section 9.4.3 of the EIS also describes a possible alternative of desalinating water withdrawn from the CFBC to meet service-water needs. These alternatives bracket the possible impacts of operating the service-water system at the LNP site.*

The NRC implements Section 102 of NEPA through 10 CFR Part 51. According to 10 CFR 51.72, a supplement to the draft EIS will be prepared when either (1) there are substantial changes in the proposed action that are relevant to environmental concerns, or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The NRC staff may also prepare a supplement to the draft EIS when, in the staff's opinion, doing so will further the purposes of NEPA. There have been no substantial changes to the proposed action in PEF's COL application (PEF 2009a) that are relevant to environmental concerns and, the information in the comment did not provide any significant new information not considered by the NRC staff in the draft EIS, and the NRC staff did not find any new and significant information associated with environmental issues. No changes to the EIS were made as a result of these comments.

Comment: Misdirection due to data presentation: The review team presents data in a misleading manner by presenting the amount of surficial aquifer drawdown as being a certain percent of the amount of seasonal variation in the aquifer. The normal seasonal variability of 8 feet does not mean that a drawdown of, for example, 1 foot is minimal by comparison. The 8 feet of seasonal variability would still be the same, it would just occur at elevations 1 foot lower than was the case prior to drawdown impacts. Please clarify this in the DEIS at Page 5-5. (**0008-17** [Hubbard, Michael])

Response: *The comparison between anticipated drawdown and normal seasonal variability is provided in Section 5.2.1 to give the amount of anticipated drawdown some context. Additional information about the impacts of well operations is provided in Section 5.2.2. Section 5.3.1.1 of the EIS describes the proposed water withdrawals and the associated impacts as well as the constraints that have been put on PEF's withdrawal of water by FDEP. No changes were made to the EIS in response to this comment.*

Comment: The Cross-Florida Barge Canal was stopped at a depth of 12 feet, due to concerns of salt water intrusion into our drinking water; however, it brought salt water inland from the Gulf, a distance of 11 miles. It requires periodic flushing of fresh water from Lake Rousseau to dilute

the salt content. PEF plans to pipe salt water up the Barge Canal from the Gulf to an area just west of the lock, across Greenways and Trails, Greenways and Trails Recreation Tract 2000-1. There's planned a heavy-haul road crossing Highway 40 and up to their site; a distance of 15 miles. It's understood they plan to wash their cooling towers with it. Their site is within the Florida aquifer, which SWFMD says is fed only by rainfall. There's a hydrologic divide that prevents aquifer recharge from either surface or groundwater. Four public water supplies south of the site depend on that aquifer, plus thousands of private wells. PEF also plans to consume fresh water of an undetermined amount, but near 2 million gallons of water a day. There is a high risk of contaminating that aquifer with salt water by piping it in. (**0001-5-1** [Berger, Betty])

Response: *The cooling system proposed for the LNP site is a closed cycle system that brings water in through the CFBC and uses it to remove heat through the evaporation of water in the cooling towers. The water brought into the cooling towers is either lost to the atmosphere as steam or is piped back to the Gulf of Mexico through a pipeline discharging into the CREC cooling-water discharge facility. No saltwater from the cooling system is intentionally discharged to the surface water or groundwater at the LNP site. A small amount of water would leave the towers as drift that does contain salt. The impact of operating the cooling towers on water quality is presented in Section 5.2.3 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: This area of Levy County has no relevant excavation and ground water control experience in the limestone aquifers except for mining which is excavated subaqueously. The LPN site is in a transitional zone between the discharge and recharge gradients and thus there are many unknowns. The flow of ground water is through fractures and solutionized channels where the media is not porous thus making predictions difficult. The monitoring wells a located on the property had a larger than expected and instantaneous drawdown effect as per the Project Technical report -August 26. 2008. This is a good indications that groundwater will be affected by construction and increased use of it. These are two potentiometric highs and all the waters below them will be affected by the use of 5.86 mgd on the average within any 30 day period. One USGS monitoring well is in Tidewater -over the years it has already shown a decline in the amount of water flowing pass the gauge. The entire ecosystem including Goethe State Forrest will be affected by the extreme increase in the use of groundwater thus lower the available water over time. The water flows in a southwesterly direction and ultimately has an affect on the quality and quantity of water, flowing through the Crackertown ROMP 125 well. This is important because Yankeetown's public water supply is "downstream" from this area. The other potentiometric high is to the east of Progress Energy's property. It has not exhibited much of a decrease in water flowing across the gauge yet, however with the large amount of groundwater to be extracted by PE it will decline. The water flows in many directions from this area, providing water to the Rainbow Springs Watershed, the Withlacoochee River Watershed and also towards the Gulf. Keeping this area an intact whole ecosystem has not been address in PE's DEIS. Again pure, clean, radioactive effluent free, potable, fresh (not salt), drinkable flowing water is an extremely important commodity that all life depends on to live life as we know it today. Why should the generations to come have to experience a degradation in their quality of life? (**0029-3** [Casey, Emily])

Comment: During construction of the proposed LNP, two 100-foot deep pits would be excavated into the aquifer system, where the water table lies at or near the surface. Neither PEF's ER nor the DEIS provided detailed information regarding the exact surface area of this proposed excavations, although drawings suggest that each 100-foot deep excavation would cover approximately 1 acre. ... Although these 100-foot deep excavations are proposed to be mechanically dewatered, then filled, it is my professional opinion that the proposed excavations also will result in passive dewatering of on-site and off-site wetlands and other waters of the U.S. and sinkholes/subsidence/collapse events similar to the ones described above at the Parkway. Additionally, the DEIS suggests that water from these excavated pits would be pumped to temporary ponds. It is my professional opinion that those temporary ponds will result in additional passive dewatering. It also is my professional opinion that those proposed actions would result in both significant adverse water quantity (e.g., hydroperiod) and water quality impacts, altering the chemical, physical and biological integrity of the nation's waters. These adverse environmental impacts also not addressed by PEF or the DEIS. (**0030-1-10** [Bacchus, Sydney])

Comment: Sinkholes/subsidence/collapse caused by dewatering associated with mines in vicinity, similar to 100-foot deep excavations - The 100-foot excavations at the proposed LNP site would be similar to, but deeper than existing and proposed mine pits in the immediate vicinity of the proposed LNP. (**0030-1-11** [Bacchus, Sydney])

Response: *Section 3.2.2.3 of the EIS describes the dewatering that is expected during the excavation for the proposed reactor buildings. The excavation would be 75 ft deep, not 100 ft as stated in the comment. The region to be excavated would be enclosed with diaphragm walls that limit or prevent the flow of water laterally into the excavation; the area would be grouted below to minimize the water that needs to be removed during dewatering. The impact of dewatering on groundwater is addressed in Sections 4.2.1 and 4.2.3.2. Monitoring during dewatering is addressed in Section 4.2.4. Potential impacts on wetlands are addressed in Section 4.3.1.1. No changes were made to the EIS in response to these comments.*

Comment: [H]is [Howroyd's in the CH2M Hill affidavit dated August 17, 2010 to support PEF's Motion for Summary Disposition] statements in the DEIS that salt is not expected to impair freshwater ecosystems completely ignores the fact that the rain simply will transfer the salt into the soil, where it will... contaminating the freshwater aquifer system. (**0030-3-19** [Bacchus, Sydney])

Comment: What About the Salt Drift? The Levy Nuclear Plant (LNP) site is located approximately 10 miles inland and in the middle of a freshwater wetland yet the cooling towers' source will be salt water. This freshwater wetland is a recharge area for the drinking water for the people living in the surrounding area since the upper Floridan Aquifer is at ground level in this particular area of Florida. Despite this unique location, the introduction of salt via drift from the Levy Nuclear Plants' cooling towers to the environment, approximately 31 pounds of salt daily or 6.72 million pounds over the 60-year life of the two nuclear plants, is only assigned a small impact in Progress Energy's (PE) Draft Environmental Impact Study (DEIS). (**0043-1** [Foley, Beth])

Comment: When addressing the effect of salt drift in the Levy Nuclear Plant Draft Environmental Impact Study, vegetation comparisons with the Crystal River Nuclear Plant that is located on the Gulf of Mexico are made. The results of salt drift at this plant should not be equated with two nuclear plants located 10 miles inland in the middle of a aquifer recharge wetland. A search for other U.S. nuclear plants located inland and using salt water for their cooling towers results in none. Because of the unique circumstances of the Levy Nuclear Plants 1 & 2 location, scientific modeling must be arduously done to assure that drinking water and personal property and nearby conservation areas will not be adversely affected by the unnatural spreading of approximately 3,360 tons of salt by the cooling towers drift over a period of 60 years. The necessary modeling has not been done and the 'apples and oranges' comparison used in the Progress Energy Draft Environmental Impact Study is completely inadequate. (**0043-2** [Foley, Beth])

Response: *Section 5.2.3.2 presents the impact of plant operation on groundwater quality. This section was modified to more clearly describe the potential impact of salt deposition on groundwater quality. Section 5.3.1.1 presents impacts of salt deposition on terrestrial resources. No changes were made to Section 5.3.1.1 in response to these comments.*

Comment: In the original application to NRC and state regulatory agencies, the location of the proposed wells was within the proposed LNP site. In the DEIS those proposed wells have been relocated adjacent to and south of the proposed LNP site (Bacchus Exhibits C-2 and C-4). It is my professional opinion that the relocation of these proposed wells will not reduce the off-site adverse environmental impacts of the proposed LNP project. In fact, the new proposed location of those wells will increase the speed with which the springs discharging to the CFBC will cease to flow and the speed with which adverse impacts to the endangered manatees will be initiated. Neither the DEIS nor PEF conducted a comprehensive cumulative impacts assessment to determine "affected area" of the proposed LNP. It is my professional opinion that the "affected area" where adverse environmental impacts would occur, including catastrophic wildfires, will extend for many miles beyond the "LNP project site," via surfacewaters, fractures, relict and present-day sinkholes and other karst features. Further, it is my professional opinion that the "affected area" where the adverse environmental impacts of the proposed LNP would occur include, but are not limited to the following State Forests, Outstanding Florida Waters (OFW) and Shellfish Harvesting Areas (SHA) and other public lands and waters:

Levy Blue Spring and associated wetlands and uplands
Withlacoochee River (OFW) and associated wetlands and uplands
Waccasassa River (OFW) and associated wetlands and uplands
Waccasassa Bay (SHA) and associated wetlands and uplands
Gulf Hammock
Big Bend Seagrasses Aquatic Preserve (SHA)
Waccasassa Bay Preserve State Park
Goethe State Forest
Big King Spring and associated wetlands and uplands
Little King Spring and associated wetlands and uplands
Turtle Creek and associated wetlands and uplands
Spring Run Creek and associated wetlands and uplands

Smith Creek and associated wetlands and uplands
Demory Creek and associated wetlands and uplands
Tomes Creek and associated wetlands and uplands
Ten Mile Creek and associated wetlands and uplands
Withlacoochee Bay (SHA) and associated wetlands and uplands (**0030-2-4** [Bacchus, Sydney])

Response: *This comment expresses concern that environmental impacts associated with groundwater withdrawal at the wells proposed for supplying water to the service-water system would extend many miles beyond the LNP site and include impacts on springs and wetlands and Outstanding Florida Waters. Many of the locations identified in the comment are well beyond the region of interest for hydrology and a detectable impact is unlikely. Chapter 2 of the EIS describes the affected environment of the proposed LNP project. The area described in Chapter 2 extends well beyond the property boundaries of the site. The review team recognizes that groundwater and surface water are interdependent resources, as are the aquatic and terrestrial resources that rely on these waters. The impacts of groundwater withdrawal on the groundwater system are addressed in Section 5.2 of the EIS. The review team determined the impacts due to groundwater withdrawal would be SMALL. The impacts on wetlands of operating the proposed units are addressed in Section 5.3 of the EIS, as are impacts on aquatic biota. The review team determined the impacts on aquatic ecology and terrestrial ecology would be SMALL to MODERATE. The review team determined the region of interest for the cumulative effects assessment for each resource area based on the potential for impact. The region of interest for cumulative effects assessment on surface water is described in Section 7.2.1.1 and for groundwater in Section 7.2.1.2. No changes were made to the EIS as a result of these comments.*

Comment: Surface water which accumulates in a pond located on the northwest corner of PE's property drains directly into the aquifer as shown by the video clips attached (See attachment # 2){Pictures will be mailed} is a phenomenon which has not been addressed in the draft EIS. The many various size swallets are indicators of how the Floridan Aquifer is directly connected to surface waters in this area, They are also features of a karst landscape. The water, which flows along a small ephermis creek bed, enters the ground on the northwest side of Highway 19 and can flow in many directions. It can be part of the aquifer water flowing toward Inglis/ Yankeetown area or it can be part of the water which flows to 2 of the known springs (King Spring and Little King Spring). This uniqueness is shown in THE INTERGRATED WILDLIFE HABITAT RANKING SYSTEM 2009 (attachment # 3){the report can be accessed at http://research.mvfws.com/features/view article.asp?id=35544.} The value function of keeping the ecosystem intact has not been addressed, this is important when drinkable water is becoming an expensive commodity and yet it is necessary for all life and there are other alternative means to produce energy! (**0029-2** [Casey, Emily])

Response: *The review team recognizes groundwater and surface water are interdependent resources. The review team discusses the Integrated Wildlife Habitat Ranking System Map for Levy County in Sections 2.4.1, 4.3.1, and 5.3.1 of the EIS. Sections 2.1.3.2 and 2.3.3.2 describe the processes by which precipitation and surface-water recharge the groundwater system in the vicinity of the LNP site. The review team determined in Sections 4.2 and 5.2 of*

the EIS that the groundwater withdrawal for the LNP units would not significantly affect available groundwater resources in the region. The review team has expanded EIS Section 5.2 to further discuss how wetlands and other natural habitats would be protected so as to ensure their continued function in groundwater recharge and in protecting groundwater quality.

Comment: Multi-basin impacts on waters governed in part by the Suwannee River Water Management District - Additionally, the LNP DEIS failed to take a hard look at the direct, indirect and cumulative adverse impacts from the proposed LNP project and unidentified mine site on waters governed in part by the Suwannee River Water Management District. For example, the Suwannee River Water Management District Water Supply Assessment Report 2010 (Bacchus Exhibit D1e). Table 2-12 of that report clearly shows that "0.00" million gallons per day (MGD) of water will be used for thermoelectric power generation in Levy County for the years spanning 2010 through 2030. Clearly that analysis contradicts description of the construction and operation of the proposed LNP project in the LNP DEIS, which would capture and hold captive on-site and/or use as cooling tower water all natural overland flow currently supplying water to surrounding ecosystems in Levy County. That "0.00" MGD of water used also does not recognize the diversion of groundwater, as described in this comment letter, that would result from the construction and operation of the proposed LNP project. This grave inadequacy reinforces the conclusion that the DEIS failed to address direct, indirect and cumulative adverse impacts beyond the on-site, surface footprint of the proposed LNP project. This is additional evidence that a supplemental DEIS is required to prepare a more realistic model of all water-related impacts as a first step in assessing the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project. (**0020-32** [Bacchus, Sydney])

Response: *The review team took a hard look at direct, indirect, and cumulative impacts from building and operating the proposed units at the LNP site. Direct and indirect impacts from building the proposed units are presented in Section 4.2.1. Direct and indirect impacts from operating the proposed units are presented in Section 5.2.1. Cumulative impacts for the site are presented in Section 7.2.1.2.*

Table 2-12 of the Suwannee River Water Management District Water Supply Assessment Report 2010 presents projections of agricultural demands (SRWMD 2010). Table 2-8 presents Low-Range Thermo-Electric Power Generation Demand Projections. A footnote for Table 2-12 makes it clear that the projections only include water demands for the portion of Levy County that is included in the Suwannee River Water Management District. The LNP site is within the SWFWMD so future water demands for the site would not be addressed in the Suwannee River Management District water supply assessment.

The NRC implements Section 102 of NEPA through 10 CFR Part 51. According to 10 CFR 51.72, a supplement to the draft EIS will be prepared when either (1) there are substantial changes in the proposed action that are relevant to environmental concerns, or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The NRC staff may also prepare a supplement to the draft EIS when, in the staff's opinion, doing so will further the purposes of NEPA. There have been no substantial changes to the proposed action in PEF's COL

application (PEF 2009a) that are relevant to environmental concerns; the information in the comment did not provide any significant new information not considered by the NRC staff in the draft EIS; and the NRC staff did not find any new and significant information associated with environmental issues. No changes to the EIS were made as a result of this comment.

Comment: Additional inadequacies of the LNP DEIS regarding adverse impacts to Waters of the U.S. -The following statement on page 4-20, beginning on line 28 of the LP DEIS reveal additional "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal:

The local groundwater aquifers that could be affected by the building of proposed LNP Units 1 and 2 are the surficial and Upper Floridan aquifers. Surface modifications will alter the thickness of the surficial aquifer and the nature and location of recharge and discharge zones. During building, anticipated hydrologic alterations include temporary [sic] changes in the groundwater levels associated with dewatering of excavations for the proposed structures. The current conceptual foundation design calls for substantial dewatering of each nuclear island area (containing the containment vessels, shield building, and auxiliary building) to depths of approximately 100 ft below the existing grade (PEF 2009b). Under this design, subsurface grouting and diaphragm walls would be used to isolate the excavation and minimize the impacts of dewatering on surrounding groundwater levels. Grouted diaphragm walls would be installed to minimize lateral groundwater inflow, and grout would be injected into the carbonate rock below the planned excavation depth to minimize upward groundwater flow into the excavation. These two engineered barriers would allow the excavation to be dewatered and minimize the amount of drawdown that occurs outside the grouted excavation. Thus, the impact of nuclear island dewatering on the surrounding groundwater system is expected to be minor.

The LNP DEIS fails to produce any peer-reviewed publications of studies evaluating the degree to which such an engineering fantasy minimized environmental impacts. In fact, the LNP DEIS failed to provide any examples of other locations where such a large scale grouting scheme has been conducted successfully in a karst aquifer system such as the one at the proposed LNP site. A supplemental DEIS is required to provide such information so that it can be reviewed by the public and affected agencies. (**0020-41** [Bacchus, Sydney])

Response: *Section 4.2.1 of the EIS explains that the hydrologic alterations created by excavation and dewatering would be temporary and localized to the LNP site, and the actions proposed by PEF are standard engineering practices successfully used at construction sites all over the United States. The excavation would be 75-ft deep not 100-ft deep as stated in the comment. The region to be excavated would be enclosed with diaphragm walls that limit or prevent the flow of water laterally into the excavation. The area would be grouted below to minimize the water that needs to be removed during dewatering. The final dewatering plans would require the approval of FDEP and SWFWMD. Section 4.2.4 of the EIS describes the monitoring program that would be required during dewatering activities. No changes to the EIS were made as a result of this comment.*

Comment: Dewatering of proposed LNP site via transfer of cooling water to Crystal River power plant -Page 3-8 of the LP DEIS, lines 23-33, state that there would be no discharge of cooling water from the proposed LNP site. Instead, all water extracted from groundwater wells and the Cross Florida Barge Canal would be permanently removed from the associated ecosystems. In my professional opinion, this diversion of water would magnify the irreversible hydroperiod alterations beyond the proposed LNP site. (**0020-43** [Bacchus, Sydney])

Response: *The commenter is correct that blowdown from the cooling system would be transported to the CREC for discharge through the discharge structure there. Groundwater extracted for the service-water system at the plant is discharged to the cooling system after use and so it is sent to the CREC along with the water taken from the CFBC for condenser cooling. Section 5.2 of the EIS describes the impact of these aspects of operating the proposed units. Section 5.3.1.1 describes the monitoring program imposed by the State of Florida that State regulators would rely on to ensure no adverse impacts on wetlands occur. USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the Least Environmentally Damaging Practicable Alternative (LEDPA). At this time, PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued. No changes were made to the EIS in response to this comment.*

Comment: The LNP DEIS failed to take a hard look at impacts on the potentiometric high - The potentiometric high for the area occurs east of the proposed LNP site, as shown in the King Road mine Figure 11, incorporated herein as Bacchus Exhibit C11. Therefore, a supplemental DEIS is required to assess the adverse direct, indirect and cumulative adverse impacts of the proposed LNP project and proposed Tarmac mines on the potentiometric high. (**0020-25** [Bacchus, Sydney])

Response: *In Section 2.3.1.2 of the EIS the review team discusses the existence of a potentiometric high in the vicinity of the site. The assessment of the impact of operating the proposed units is presented in Section 5.2 of the EIS and indicates that the region potentially influenced by drawdown is limited in extent. The potentiometric high is located outside the anticipated drawdown shown in Figure 5.1 and would not be affected. The cumulative impacts of operating the proposed units and other past, present, and reasonably foreseeable future projects including the Tarmac King Road Mine proposed to be located approximately 2 mi west of the LNP site is presented in Chapter 7 of the EIS.*

The NRC implements Section 102 of NEPA through 10 CFR Part 51. According to 10 CFR 51.72, a supplement to the draft EIS will be prepared when either (1) there are substantial changes in the proposed action that are relevant to environmental concerns,or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The NRC staff may also prepare a supplement to the draft EIS when, in the staff's opinion, doing so will further the purposes of NEPA. There have been no substantial changes to the proposed action in PEF's COL application (PEF 2009a) that are relevant to environmental concerns; the information in the comment did not provide any significant new information not considered by the NRC staff in the draft EIS; and the NRC staff did not find any new and significant information associated with environmental issues. No changes to the EIS were made as a result of this comment.

Comment: The location of springs as presented in the COLA is vague, as is quantification of contribution to the System as accounted for by the Applicant and NRC review. Estimates are a crude measure as compared to technology which may finely evaluate such hydrologic considerations. The technology to identify all such sources of fresh water supply to the CFBC exists in the form of airborne thermal imaging (Attachment J-Raabe-Bialkowska-Jelinska) for location, and Doppler technology for quantification. Such technology or variations thereof was used by the Applicant for evaluation of offshore currents. (COLA Part 3 ER, Chapter 6, 6.3.1.4) (**0042-11** [Hilliard, Dan])

Comment: The estimate of spring contribution to the CFBC from sources "near" the Inglis Locks is imprecise because the applicant has only estimated the volume of this contribution and has not examined the scope of the CFBC to locate such features although the technology exists to do so for both visible and submerged discharge points. WAR contends there are submerged vents discharging undetermined volumes of fresh water in the CFBC and given that technological means exist to quantify this contribution. Lacking concise evaluation DEIS conclusions are little more than a guess as are the impact conclusions represented within. (**0042-16** [Hilliard, Dan])

Comment: It is not clear the Commission understands fresh water supply source locations within the Canal as we do, or what quantity of supply may be provided by springs within the canal. We are providing information about substantial spring flows in the Canal that are apparently not addressed by the Applicant or Draft. (**0044-5** [Hilliard, Dan])

Response: *These comments express concern about the impact of building and operating LNP Units 1 and 2 on freshwater springs. The impact on spring discharge of building the units is addressed in Section 4.2 of the EIS. The impact on spring discharge of operating the units is addressed in Section 5.2. The review team acknowledges that a more precise measurement of the freshwater discharge from these springs into the CFBC is possible; however, the review team based its analysis on salinity measurements in the canal, which integrate the effect of saline and freshwater mixing. Furthermore, the review team relied on estimates of spring discharge documented by the U.S. Geological Survey (USGS 2009). Given this analysis, the*

review team determined that any additional detail provided by more precise measurements would not alter its conclusions. No changes were made to the EIS in response to these comments.

Comment: Page 2 -18, vol 1 of this DEIS, for example, shows run off from the LNP site westwards to the Gulf of Mexico. At best this is misleading as the unconfined aquifer system would not support such run off. Although aquifer flows across the site would be E to W, a fracture is indicated to the west of the site which would divert flows southward toward the Crystal River/Kings Bay system and other Citrus County spring fed coastal river systems. All of which are omitted from the DEIS as Affected Environment. [commenter attached a Google Earth map overleaf] (**0005-28** [Hopkins, Norman])

Response: *The figure referenced in the comment was created using data from the FDEP obtained at ftp://ftp.dep.state.fl.us/pub/gis/data. It is included to show the location of the LNP site relative to the sub-basins of the Waccassasa River identified by the FDEP. The USGS identifies this sub-basin as the "Thousandmile Creek" sub-basin in their basin delineation data. These sub-basins are for surface water only and are not meant to delineate groundwater flow patterns. Information about the groundwater flow system in the vicinity of the LNP site is included in Section 2.3.1.2 of the EIS. The caption for Figure 2.8 was modified to make it clear that the sub-basins identified are for surface-water runoff.*

Comment: The DEIS is so incomplete that adverse impacts from the proposed LNP could not be quantified due to failure to determine service water source and the amount of drawdown impacts and failure to consider loss of freshwater input into the estuary system, among other exclusions and misrepresentations. The PIR should, therefore, be delayed until a Supplemental DEIS is issued. According to 33 CFR 320.4(a)(1), probable impacts, including cumulative impacts, of the proposed activity are to be the basis of whether to issue a permit. The DEIS is incomplete and does not provide ample quantification of impacts or cumulative impacts and should not be used as a basis for the PIR until completed. (**0009-15** [Hubbard, Michael])

Response: *The comment alleges inadequacies in the draft EIS of the review of potential adverse impacts of groundwater drawdown from the pumping of service water. The impact of withdrawing groundwater for the service-water system at the proposed units is presented in Section 5.2.2.2 of the EIS. This section describes both the reduced discharge to surface water as a result of groundwater withdrawal and the impact on water levels in the vicinity of the wellfield. Groundwater discharge to surface water would be reduced by about 2 percent of total modeled groundwater discharge. The EIS acknowledges that the groundwater model cannot be used to predict drawdown accurately enough to accurately predict impacts on wetlands. This determination is consistent with the State of Florida's groundwater use permitting process that uses the model as a scoping-level assessment tool but relies on a State-mandated environmental monitoring program and mitigation plan to ensure no adverse impacts on wetlands. The monitoring program is described in Section 5.3.1.1.*

The USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the Least Environmentally Damaging Practicable Alternative (LEDPA). At this time, PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued. The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit will be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. No changes to the EIS were made as a result of this comment.

Comment: Model grid alignment and scales fail to account for karst preferential flow features - Figure 2-12 of the LNP DEIS, incorporated herein as Bacchus Exhibit C10, illustrates the model grid alignment and generalized scales. The model alignment on a north/south-east/west orientation clearly is inappropriate for assessing impacts related to preferential flow through documented faults and fracture networks that are oriented northeast/southwest and northwest/southeast. Additionally, model cells appear to be far too large to detect preferential flow through karst conduits and activated relict sinkholes. Therefore, even in the absence of model files, you can conclude that the model design was inappropriate for the proposed LNP site. Therefore, a supplemental DEIS is required to prepare a more realistic model and design as a first step in assessing the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project. (**0020-24** [Bacchus, Sydney])

Comment: Supplemental DEIS required based on unavailable hydrologic model files and other data related to adverse water quantity and quality impacts - Clearly a supplemental DEIS is required to provide the Intervenors and remaining public an opportunity to submit meaningful comments regarding the environmental impacts of the proposed LNP, based solely on the on unavailable hydrologic model files and other data related to adverse water quantity and quality impacts of the proposed LNP to determine the full magnitude and extent of the adverse environmental impacts. Furthermore, the DEIS failed to include detailed proposed conditions and monitoring requirements for construction and operation of the proposed LNP and associated mining operations to permit public comment. (**0030-2-6** [Bacchus, Sydney])

Response: *This comment is related to the groundwater model for the LNP site. As presented in Section 2.3 of the EIS, the review team recognizes that potential impacts on wetlands and other resources due to groundwater withdrawal cannot be predicted with certainty using the available groundwater models. This determination is consistent with the State of Florida's groundwater use permitting process that uses the model as a scoping-level assessment tool but relies on a State-mandated environmental monitoring program and mitigation plan to ensure adverse impacts are identified and mitigated. The impacts of building the plant on groundwater are addressed in Section 4.2 of the EIS. The effects of operating the plant on groundwater are addressed in Section 5.2 of the EIS.*

The NRC implements Section 102 of NEPA through 10 CFR Part 51. According to 10 CFR 51.72, a supplement to the draft EIS will be prepared when either (1) there are substantial changes in the proposed action that are relevant to environmental concerns, or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. There have been no changes to the proposed action in PEF's COL application, the information in the comment did not provide any significant new information not considered by the NRC staff in the draft EIS, and the NRC staff did not find any new and significant information associated with environmental issues. No changes to the EIS were made as a result of these comments.

Comment: Giant l00-foot deep holes in the karst flood plain refilled with aggregate mined as additional giant holes in the karst flood plain - The LNP DEIS failed to include any conceptual renderings of the giant 100-foot deep holes that would be excavated into the flood plain during construction of the proposed LNP project or the similar permanent giant holes that would be excavated in the floodplain to mine aggregate for fill and raw materials to construct the proposed LNP project. The lack of such an image prevents the public from adequately comprehend the full magnitude of the direct, indirect and cumulative adverse impacts from just that aspect of the proposed project that will exceed "LARGE". The photograph from a similar nuclear power plant under construction in Georgia is included in Bacchus Exhibit D2 and incorporated herein, to provide that perspective. Note the miniscule appearance of the large earthmoving equipment in that photograph that is dwarfed by the size of that hole. It is my professional opinion that the mere excavation of those giant holes, ignoring the myriad other impacts from discharge of fill in floodplain wetlands would result in "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal. Therefore, a supplemental DEIS is required to adequately illustrate how these excavations will be accomplished in a flood plain replete with relict sink wetlands and fracture networks without resulting in myriad "LARGE" direct, indirect and cumulative adverse impacts, including irreversible degradation of the chemical, physical and biological integrity of national waters. (**0020-34** [Bacchus, Sydney])

Response: *Sections 2.3.1.2 and 2.8 of the EIS discuss the current conditions of the site with regard to karst terrain. The excavation for the nuclear powerblocks would be 75 ft deep, not 100 ft as stated in the comment. Section 3.2.2 of the EIS describes the dewatering that is expected during the excavation for the proposed reactor buildings. Section 4.2.1 describes how subsurface grouting and diaphragm walls would be used to minimize dewatering needed. The*

impact on groundwater is addressed in Section 4.2.1 and Section 4.2.3 including chemical and physical effects. Monitoring is addressed in Section 4.2.4. Potential impacts on wetlands are addressed in Section 4.3.1. No changes to the EIS were made as a result of this comment.

Comment: NRC has published a DEIS and has done so without comprehensive review of water related impacts that will arise during the operational phase of the project life. The DEIS has been apparently formulated prior to determinations by the Army Corps of Engineers related to the Clean Water Act or other Federal Statutes related to water quality and environmental impacts, so far as can be determined. It has reached conclusions based on narrow scope and in possible conflict with NEPA and other Federal Statutes. It has issued findings and recommendations in the DEIS that do not appear based on complete examination of State findings or projects related to the development of water resources. These conflicts are not necessary, nor are the issues at hand of minor importance. WAR makes recommendation that NRC review the findings of the DEIS in context of concerns expressed in this document and accompanying references and reevaluate its position. We view this project as a long term enterprise and the operational consequences will exist for the life of the plant. Increasing demands on water resources are inevitable and over the life of the plant it will be far cheaper to make the right decisions now rather than correct mistakes later. (**0042-23** [Hilliard, Dan])

Response: *The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit will be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. The commenter makes a number of assertions about the inadequacy of the review team's review without providing specifics. Water-related impacts associated with operation of LNP Units 1 and 2 are presented in Section 5.2 of the EIS. No changes were made to the EIS in response to this comment.*

Comment: WAR recognizes the order of appearance and priorities associated with the process at hand, but ultimately this is a matter of economic and environmental significance which falls within the purview of NRC. We conclude such issues merit full and proper review. We note the SWFWMD recommended to FDEP in review of water permitting for plant use that the Applicant be required to examine alternative sources for plant water use. Were the State not required to overcome the obstruction as presented by the proposed CWIS location with processes described in Condition J of the Site Certification, it will likely be less encumbered and therefore more inclined to take action to capture freshwater within the CFBC when needed. Action by the State to restore the Lower River and/or capture water for beneficial use and development will provide the Applicant with a viable alternative to ground water supply for plant use. See DEIS Section 7.2.1.2 (**0042-20** [Hilliard, Dan])

Response: *Alternatives to groundwater for use in operating the proposed units are discussed in Section 9.4.3 or the EIS. The review team is not aware that committed funding for a*

restoration project exists and the review team finds that this project is not at this time reasonably foreseeable. No changes were made to the EIS as a result of this comment.

Comment: To our knowledge, Progress Energy has not provided any study that analyzes the adverse effects the plant development will have on our property, either hydrologically or ecologically. We are seeking assurances from Progress Energy, the Corps of Engineers and the Nuclear Regulatory Commission (NRC) that construction of the plant and its related facilities will not adversely affect the wetlands, soils or hydrology of our property. (**0023-3** [Avery-Smith, Ellen] [Smith, Charles])

Response: *Neither the USACE or the NRC can provide assurances that the construction of the LNP would not affect the wetlands, soils, or hydrology of private property. What the NRC and the USACE can provide under NEPA is an unbiased, in-depth assessment of potential impacts associated with the project that may or may not predict impacts on private property.*

The USACE cannot assure property owners that any specific project that it may permit would not affect the value of usage of adjacent land. Authorization of works or structures by a DA permit does not convey a property right, nor does it authorize any injury to property or invasion of other rights. Impacts of developing the site and building the plant are presented in Chapter 4 of the EIS. Section 4.2 presents impacts on water availability and quality; Section 4.3 presents impacts on ecology including wetlands. No changes were made to the EIS in response to this comment.

Comment: Surface water flows between 2 water management districts and into 2 separate rivers (The Wacasassa and the Withlacoochee). The site is located South and West of 2 separate potentimetric highs which will result in the Floridan Aquifer water being consumed from both the North and East, which means that what water flows south and/or west and/or north will not be available to other users and/or the environment since 1.85 mgd is projected to be withdrawn. (**0045-3** [Casey, Emily])

Response: *The review team believes the commenter is concerned that operation of the wellfield would intercept water flowing from the potentiometric highs to users to the south and west. Operation of the wellfield would intercept some of the water flowing from the potentiometric highs. Operation of the wellfield could depress the water level in the vicinity of the pumping wells, but is unlikely to significantly reduce water availability west and south of the LNP site. The projected amount of drawdown is 1.58 million gallons per day (Mgd) and not 1.85 Mgd. The review team agrees that the proposed 1.58 million gallons per day (Mgd) withdrawal would not be available to other users or the environment, but this represents a small fraction of the available groundwater in the region. Groundwater use in the region is discussed in Section 2.3.2.2 of the EIS. No changes were made to the EIS in response to this comment.*

Comment: Failure to consider passive dewatering associated with excavation of cooling tower canal, ditches and swales - Neither the DEIS nor PEF, including the affidavit submitted

by Griffin addressed the adverse direct, indirect and cumulative impacts of passive dewatering of the canal permitted by FDEP on March 11, 2009 for the proposed LNP cooling towers. (**0030-1-12** [Bacchus, Sydney])

Comment: [N]either PEF, nor the DEIS acknowledged the fact that the ditches and swales that would be excavated throughout the proposed LNP site and vicinity also would result in passive dewatering, in addition to pirating historic overland flow that is essential for maintaining surrounding ecosystems. It is my professional opinion that the excavation of that canal and the proposed ditches and swales would result in adverse direct, indirect and cumulative environmental impacts including, but not limited to the cessation of fresh groundwater discharge to the CFBC and adverse impacts to the manatees and other federally listed species. (**0030-1-13** [Bacchus, Sydney])

Comment: Passive dewatering is inherent in the proposed LNP design. In addition to the stormwater ponds, the below-ground excavation of the nuclear islands also will result in both mechanical and passive dewatering. Additionally, those areas where the water normally would have flowed through as historic overland flow will be inaccessible after construction of the proposed LNP, resulting in another form of passive dewatering. Further, the proposed below ground "footings" will act as immense plugs blocking down-gradient flow of ground water, while the above-ground structures will be huge obstructions to the historic overland flow. Anywhere that water would have gone prior to the Levy construction will be dewatered. No scientific documentation is presented by Griffin or the DEIS as support for that statement. (**0030-1-7** [Bacchus, Sydney])

Comment: Griffin's affidavit and the DEIS also failed to address passive dewatering that would occur from any of the other features resulting directly, indirectly or cumulatively from the construction or operation of the proposed LNP. In fact, Griffin's following statement ([paragraph] 23) suggests that he is unaware that ecosystems are composed of living organisms for which "long-term average" availability of water has no relevance: Direct precipitation on the ponds will offset evaporation over a long-term average by 3 to 7 inches. Long-term averages ar[e] purely mathematical calculations with little or no relevance to living ecosystems. Such averages are irrelevant to living organisms struggling for survival under periods of droughts with man-induced hydroperiod alterations. Under the guise of "long-term average," the wetlands and other ecosystems affected by salt drift could die from the combined impacts of drift and dewatering, while the long-term average rainfall remained theoretically adequate. As stated in my affidavit, there is no expectation that the rainfall averages of the past will project into the future. (**0030-1-8** [Bacchus, Sydney])

Response: *The review team uses the term “passive dewatering” to refer to the drainage of groundwater into structures such as drain pipes, high-conductivity conduits, and ditches below the adjacent groundwater level, and the subsequent flow of this water to lower elevations under the influence of gravity. This is in contrast to “active dewatering,” which involves drainage of groundwater into structures, such as sumps and wells, from which it is removed by active pumping using an external source of power. In the draft EIS, the review team did not mention ”passive dewatering,“ because the applicant did not propose to use such structures in its*

design. The review team considers stormwater management to be separate from active or passive dewatering. Stormwater management systems route precipitation away from structures and into landscape features and structures such as detention and recharge basins. These stormwater management features and impervious surfaces may reduce recharge to the subsurface in the immediate vicinity of the plant structure. However they do not drain water from the subsurface environment, in particular because all elements of the stormwater management system would be at too high an elevation to drain groundwater passively. Stormwater management systems relocate recharge in a manner to restore much of the normal pattern of surface water and groundwater away from the structures. The stormwater management system for the LNP site is described in Section 3.2.2.1. The EIS considers direct, indirect, and cumulative impacts on all Federally listed species from preconstruction, construction, and operation of the proposed plant in Sections 4.3.2 and 5.3.2. The FWS was consulted for concurrence with the review team's BA. On December 1, 2011, the FWS concurred with the review team's assessment of no jeopardy to the manatee (FWS 2011).

In Section 5.3.1.1 of the EIS the review team discusses its independent assessment of the impact of salt drift deposition on the water quality of wetlands near the LNP site. The review team based its conservative assessment on the maximum onsite salt deposition rate and the lowest mean monthly precipitation and did not rely on the long-term average precipitation rate. No changes were made to the EIS in response to these comments.

Comment: [T]he rainfall data for Levy County provided by SWFWMD reveals that annual rainfall was less than 53 inches per year for 45 years and less than 50 inches per year for 34 years during the period of record, providing additional support that the proposed LNP "wet ponds" will dewater the aquifer system. (**0030-1-16** [Bacchus, Sydney])

Response: *The review team acknowledges that during certain portions of the year water would be removed from the aquifer through evaporation from the wet ponds; however the loss associated with evaporation from these ponds would be smaller than a natural system such as an equivalent-sized saturated wetland due to the additional loss due to transpiration in the wetland. No changes were made to the EIS in response to this comment.*

Comment: It is my professional opinion that the so-called "above ground" stormwater ponds that would be excavated "below the natural groundwater level" for the proposed LNP will dewater the aquifer system and result in "large" irreversible adverse environmental impacts directly, indirectly and cumulatively. (**0030-1-20** [Bacchus, Sydney])

Response: *The applicant has proposed to use BMPs that include construction of aboveground stormwater recharge basins. BMPs are a reliable set of controls to ensure that large, irreversible, adverse environmental impacts do not occur. The stormwater management impacts associated with a nuclear facility are no different than the stormwater management impacts of any similar sized industrial or commercial facility. The FDEP is responsible for reviewing and monitoring stormwater management systems. The review team determined that*

the impacts associated with the stormwater runoff would be limited and mitigated by the stormwater management system. No changes were made to the EIS in response to this comment.

Comment: It is my professional opinion that the descriptions of the karst characteristics and other descriptions of the proposed LNP site and vicinity support my conclusion that the wetlands on and surrounding the proposed LNP site are critical for maintaining the chemical, physical and biological integrity of the nation's waters, which is the intent of the Clean Water Act (CWA), 33 U.S.C. Section 1251. (**0030-1-3** [Bacchus, Sydney])

Response: *The review team agree that the wetlands on and around the LNP site are important to maintaining the quality of the nation's waters. No changes were made to the EIS in response to this comment.*

Comment: Minimum flows and levels for surface waters and the aquifer system in Levy County not established and segmentation of hydroperiod components unjustified - Florida law requires that the water management districts, including the Southwest Florida Water Management District (SWFWMD), establish minimum flows and levels for surface and ground waters to ensure that environmental harm does not occur from proposed alterations of natural flows and levels (Bacchus Exhibit D-I). The SWFWMD has failed to establish those required minimum flows and levels for Levy County in the vicinity of the proposed LNP and associated Tarmac mine. In fact, the SWFWMD has not even proposed establishing those levels (Bacchus Exhibit D-2 and D-3). Therefore, there is no scientific basis for claims by PEF and the DEIS that alterations to flows and levels of surface and ground waters that would result from the proposed LNP and associated Tarmac mine would be "small." Just as segmentation of integral project components such as mined aggregate required to construct the proposed LNP is unjustified, segmentation of hydroperiod components is unjustified. Alterations of the natural hydroperiod and subsequent adverse environmental impacts that would result from the construction and operation of the proposed LNP occur from the combined direct, indirect and cumulative impacts of "passive dewatering" and mechanical extractions of ground and surface waters. Therefore, there is no scientific basis for segmenting adverse environmental impacts due to "passive dewatering" from those due to other alterations of the natural hydroperiod such as mechanical extractions of ground and surface waters. Thus, segmenting adverse environmental impacts from passive and active dewatering associated with the proposed LNP is arbitrary and capricious. (**0030-1-6** [Bacchus, Sydney])

Response: *The responsibility for establishing minimum levels and flows belongs to the Florida water management districts. Sections 4.2 and 5.2 provide the basis for the review team's determination that the impact of building and operating the proposed units at the LNP site on groundwater and surface water would be SMALL. Section 7.2.1.2 provides the basis for the review team's determination that the cumulative impact of building and operating the proposed units at the LNP site and all other past, present, and reasonably foreseeable future activities, including the mining of fill material for use at the site on groundwater and surface water, would be SMALL. Because the applicant does not propose to use passive dewatering at the site, it is not discussed in the text. The review team recognizes that the stormwater management system*

ponds would alter the surface and groundwater resources in the vicinity of the site; however, as discussed in Sections 5.2 and 7.2, the review team determined that these alterations would not result in significant impacts. No changes were made to the EIS in response to this comment.

Comment: [C]atastrophic wildfires result in irreversible adverse environmental damage to the ecosystems and areas listed in a. above, and increased air pollution, they will result in loss of public and private property and lives. [Ecosystems and areas included from previous text include:
Levy Blue Spring and associated wetlands and uplands
Withlacoochee River (OFW) and associated wetlands and uplands
Waccasassa River (OFW) and associated wetlands and uplands
Waccasassa Bay (SHA) and associated wetlands and uplands
Gulf Hammock
Big Bend Seagrasses Aquatic Preserve (SHA)
Waccasassa Bay Preserve State Park
Goethe State Forest
Big King Spring and associated wetlands and uplands
Little King Spring and associated wetlands and uplands
Turtle Creek and associated wetlands and uplands
Spring Run Creek and associated wetlands and uplands
Smith Creek and associated wetlands and uplands
Demory Creek and associated wetlands and uplands
Tomes Creek and associated wetlands and uplands
Ten Mile Creek and associated wetlands and uplands
Withlacoochee Bay (SHA) and associated wetlands and uplands] (**0030-2-21** [Bacchus, Sydney])

Response: *This is not a comment about the EIS but a comment about an affidavit dated August 17, 2010 by George C. Howroyd, vice president of CH2M Hill. This comment implies concern about the alteration of wetlands as a result of building and operating the proposed units. The review team recognizes groundwater and surface water are interdependent resources. In Sections 5.2 and 5.3 the review team discusses its evaluation of the impacts of building and operating the proposed unit on wetlands. The potential for wildfires and their impact on the ecological resources at the LNP site are addressed in Section 5.3.1.1. No changes were made to the EIS in response to this comment.*

Comment: In addition to surface water and ground water, stormwater is proposed to be used as a source of water for the cooling towers (Griffin affidavit ¶ 24). In addition to introducing additional contaminants to the airborne drift from the cooling towers, diverting stormwater to the cooling towers would dewater the stormwater ponds excavated into the aquifer system resulting in dewatering of the aquifer system from this on-site action. (**0030-2-22** [Bacchus, Sydney])

Response: *Section 3.4.2.4 of the EIS (and the Griffin affidavit item 24) indicate that stormwater would be pumped to the cooling system only if that infiltration and directing water from the ponds to wetlands via sheet flow is inadequate to safely distribute the water. Water could then be pumped to the cooling-tower basins for disposal through the blowdown discharge line.*

Neither the EIS nor the Griffin affidavit proposes to use stormwater as a basic source of cooling water. No changes were made to the EIS in response to this comment.

E.1.8 Comments Concerning Ecology – Terrestrial

Comment: The impacts of the power plant will impact wetlands on the surface. (**0001-11-6** [Minno, Maria])

Comment: With water being the most important yet limited resource, I am appalled at the lackadaisical attitude I see towards these wetlands. Florida has suffered from water shortages for years, even decades. And now the destruction of our needed wetlands and the effect on our aquifers is unacceptable. (**0002-9-3** [Seiling, Barbara])

Response: *The applicant performed a rigorous assessment of wetland impacts for the LNP project and strived to develop a site layout that minimized wetland encroachment. The review team independently evaluated the assessment and summarized the potential impacts in Sections 4.3.1 and 5.3.1 of the EIS. The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit to affect wetlands will be documented in a separate USACE ROD after issuance of the final EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. No change was made to the EIS in response to these comments.*

Comment: Someone mentioned earlier the effects of the salt from this being dispersed from the plant. And I'm speaking, when I talk about these, specifically the impacts on the Robinson tract property, which is the largest, most heavily impacted property out there. (**0002-7-12** [Avery-Smith, Ellen])

Response: *The comment expresses concern that salt drift released by the cooling towers and carried by winds could adversely affect the privately owned Robinson property, which lies immediately east of the LNP site. The Robinson property consists primarily of pine plantations and other undeveloped forestland. The potential effects of salt drift on vegetation are described in Section 5.3.1.1 of the EIS. Based upon modeled salt drift isopleth maps prepared by PEF (PEF 2009a) showing projected salt drift dispersion around the LNP site under normal plant operation, the maximum predicted monthly average deposition rates for total dissolved solids (TDS, primarily salts) is expected to be less than 1.0 kg/ha/mo at that portion of the Robinson property maximally affected by modeled salt drift (which is at the extreme western boundary of the property). Salt-drift deposition progressively declines with increasing distance from the LNP property boundary. NRC guidance for evaluating the effects of salt-drift deposition on plants indicates that rates below 1 to 2 kg/ha/mo are generally not damaging to plants and that rates approaching or exceeding 10 to 20 kg/ha/mo could cause leaf damage in many species (NRC 2000). Using a TDS deposition rate of 10 kg/ha/mo as a threshold limit above which adverse impacts on vegetation could occur, salt-drift modeling suggests that no damage would occur to vegetation on the Robinson property. This conclusion is consistent with monitoring results from*

various operating nuclear power plants, as well as literature review and information provided by natural resource and agricultural agencies in states with nuclear power plants, which have revealed no measurable degradation to the health of natural plant communities from cooling-tower operations (NRC 1996). No changes were made to the EIS in response to this comment.

Comment: [T]he siting board, when they were reviewing all of these documents also, they were basing their opinion on that particular 2009 Wetlands Mitigation Plan. And, so, any discussions that would have been taking place between the public, or anybody else at that time, would have been based on the 2009 Mitigation Plan. And in that Plan, where they're talking about their own piece of property, it says, because much of the LNP site is proposed for development, infrastructure, transmission corridors, security buffers, and potential future development, there are few areas available for mitigation. (**0002-10-3** [Seymour, Mike])

Comment: [I]f you really want to look at what I think Danny would have been proud of, or the community would have been proud of, is to look at the ... the alternative plans that they had in the 2009 Mitigation Plan versus the 2010 Mitigation Plan that they're planning on using now. (**0002-10-5** [Seymour, Mike])

Comment: I'd like to start with talking about your Draft Environmental Impact Statement, starting with the wetland mitigation. As I said, the original Mitigation Plan dated January 2009, Progress Energy proposed 764 acres of wetland impacts, which resulted at a functional loss under UMAM, or the Uniform Mitigation Assessment Methodology, which is the recognized method in the State of Florida under law, of 411 units. The revised Plan, which is dated April 23rd, 2010 -- I have a copy here. In that, Progress Energy proposed 722 acres of wetland impacts, with the resulting functional loss of 289 UMAM units. So, that was a reduction of 41 acres of proposed wetland impacts, which is a 5.5 percent reduction. But the proposed mitigation went down 121.7 units, which is almost 30 percent. So, we're questioning the UMAM scores that are presented in the April 23rd, 2010 Mitigation Plan. (**0002-7-1** [Avery-Smith, Ellen])

Comment: [I] point you to page (ii) of the Revised Mitigation Plan. And it does say it focuses on enhancing and restoring ecological functions to large areas of wetland habitat and supporting uplands. It provides landscape level ecosystem benefits that exceed the value that would accrue if similar mitigation activities were to occur on a piecemeal, localized basis, without considering the values that come from improving large blocks of habitat and habitat corridors. And we question whether this Plan actually achieves that. (**0002-7-2** [Avery-Smith, Ellen])

Comment: We would ... invite you to take a closer look at this, this report [Revised Mitigation Plan], because it does not provide adequate mitigation to offset the impacts. And it certainly is not equal to some of the other wetland mitigation alternatives that were provided in the January of 2009 report. (**0002-7-5** [Avery-Smith, Ellen])

Comment: Our family's concern is that the State of Florida's Final Order Approving Certification included the Original Wetland Mitigation Plan, which stated that our property would be utilized for wetland mitigation because Progress Energy felt its own property would not be suitable for that purpose. While we understand that Progress Energy has the right to amend its

wetland mitigation plan, it should be required by law to provide equal mitigation to offset its proposed wetland impacts. It cannot simply curtail its wetland mitigation obligations in order to save money on such mitigation. (**0023-1** [Avery-Smith, Ellen] [Smith, Charles])

Comment: We are curious about the reduction in proposed mitigation in relation to the planned wetland impacts. In the Original Wetland Mitigation Plan, Progress Energy was proposing 764 acres of wetland impacts, with a resulting functional loss, as calculated under the Uniform Mitigation Assessment Method (UMAM), of 411 units. The Revised Mitigation Plan states that Progress Energy will impact 721.9 acres of wetlands, but the resulting UMAM functional loss is only 289.3 units. Somehow, the elimination of 42.1 acres of planned wetland impacts has yielded a reduction in the proposed mitigation of 121.7 functional loss units. In percentages, a 5.5 percent reduction in the number of proposed wetland acres impacted has yielded an almost 30 percent reduction in the proposed mitigation. Additionally, we question the value of some of the proposed mitigation sites. Since the Goethe State Forest is already preserved, the restoration or enhancement of that land should not be provided as much mitigation credit as the preservation, restoration or enhancement of privately-owned property. (**0023-2** [Avery-Smith, Ellen] [Smith, Charles])

Comment: What has changed, since the Original Wetland Mitigation Plan, that make the Corps and NRC believe that Progress Energy can now achieve the same long-term benefits to the ecosystem required by law by using on-site mitigation in lieu of the alternative sites selected in the Original Wetland Mitigation Plan? (**0023-5** [Avery-Smith, Ellen] [Smith, Charles])

Response: *The mitigation plan, referred to in the comments as the "Original" or "2009" wetland mitigation plan, was a conceptual plan that included a menu of potential wetland mitigation alternatives for implementation on public and private lands immediately around the LNP site, and was required by Florida Administrative Code 62-345. The plan was not intended to be a commitment to perform any of the specific mitigation measures outlined. The USACE expressed concerns about the need for mitigation to occur in all of the watersheds that were affected by the proposed actions. In response, the applicant withdrew its original plan and submitted a revised mitigation plan (Entrix 2010). The USACE will evaluate the applicant's revised wetland mitigation plan to determine whether it complies with USACE's regulations, including whether it adequately compensates for regulated impacts on wetlands in each watershed. Whatever mitigation plan is ultimately implemented by the applicant would provide the environmental lift (i.e., gain) required by the USACE. In addition, the USACE does not typically grant Uniform Mitigation Assessment Method (UMAM) lift for preservation of land already under public protection but it does sometimes grant lift for restoration or enhancement of wetlands on publicly protected land if those improvements would not have otherwise been publicly funded.*

Unlike the USACE, the NRC does not have the authority to require wetland mitigation or approve wetland mitigation plans; however, the NRC does account for wetland mitigation proposed by an applicant when evaluating potential wetland impacts for an EIS. No changes were made to the EIS in response to these comments.

Comment: [I]f you look at page 1-11 of that Plan [Revised Mitigation Plan], it specifically calls for mitigation to be provided in the Goethe State Forest. The Goethe State Forest is publicly owned land. And, so, we question why the State of Florida and why the U.S. Army Corps of Engineers would allow Progress Energy to swap mitigation out to provide that mitigation on lands that are already publicly-owned and therefore protected, instead of buying privately-owned properties and protecting larger areas of watershed, larger ecosystems, larger wildlife habitat. (**0002-7-3** [Avery-Smith, Ellen])

Response: *Compensatory mitigation may be located on public lands. The USACE's regulations titled "Compensatory Mitigation for Losses of Aquatic Resources" at 33 CFR 332.3.a(3), specifically states: "Compensatory mitigation projects may be sited on public or private lands. Credits for compensatory mitigation projects on public land must be based solely on aquatic resource functions provided by the compensatory mitigation project, over and above those provided by public programs already planned or in place. All compensatory mitigation projects must comply with the standards in this part, if they are to be used to provide compensatory mitigation for activities authorized by DA permits, regardless of whether they are sited on public or private lands and whether the sponsor is a governmental or private entity." The applicant's final wetland mitigation plan will be evaluated by the USACE in light of NEPA's objectives, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other requirements of the USACE's regulatory authorities. This evaluation and final determination of the acceptability of the final mitigation plan will be documented in the USACE's ROD.*

Unlike the USACE, the NRC does not have the authority to require wetland mitigation or approve wetland mitigation plans; however, the NRC does account for wetland mitigation proposed by an applicant when evaluating potential wetland impacts for an EIS. No changes were made to the EIS in response to this comment.

Comment: Confirmation of Permanent Protection. In order for PEF to claim the use of lands for compensatory mitigation, some type of legal instrument must protect such areas in perpetuity. At 33 CFR 332.3(h)(1)(v) the use of preserved areas as compensatory mitigation is prohibited unless "permanently protected through an appropriate real estate or other legal instrument." This requirement is repeated at 33 CFR 332.7(a)(1). The DEIS never states that PEF will place all areas used for providing compensatory mitigation under a Conservation Easement or other legally binding instrument. Please confirm that PEF will comply with this requirement and include a statement to that effect in the Supplemental DEIS. (**0008-29** [Hubbard, Michael])

Response: *The applicant's obligations to secure real estate access is not within the scope of the NRC's environmental review. The applicant's final wetland mitigation plan will be evaluated by the USACE pursuant to NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, the "Mitigation Rule" found at 33 CFR Part 332, and other requirements of the USACE's regulatory authorities. This evaluation and final determination of the acceptability of the final mitigation plan will be documented in the USACE's ROD. Specifically in regard to preservation of lands proposed by PEF to be the sites for compensatory mitigation projects, the latest mitigation plan (ESI and TEI 2011) calls for privately held mitigation lands to be placed*

under conservation easements, while mitigation projects proposed on public lands would be on public lands preserved for conservation purposes. These arrangements are subject to the regulations of State and local government agencies. No changes to the EIS were made as a result of this comment.

Comment: [T]he proposed on-site mitigation, which has been heavily increased, talks about a UMAM lift of 180.6 wetland UMAM lift units and 145 upland UMAM lift units. And so, I'm curious as to why uplands are being counted, because I don't see that -- it says rehabilitation and enhancement and preservation as the action. I don't see any wetland creation that's listed. And so, again, why are you giving credit under UMAM for upland rehabilitation and not wetland creation in those areas? (**0002-7-4** [Avery-Smith, Ellen])

Response: *Table 4-9 of the EIS summarizes the expected UMAM functional losses projected to occur with the proposed LNP project and the UMAM functional gains to be achieved under the applicant's wetland mitigation plan (ESI and TEI 2011). The USACE does not accept direct upland mitigation credits as compensation for wetland impacts, and therefore would not accept the upland UMAM credits identified in the plan, even if the overall mitigation plan is found acceptable to the USACE. The USACE does, however, accept the functional lift provided to wetlands by the preservation, restoration, or enhancement of uplands that are located adjacent to the wetlands being assessed. This lift is accounted for in the UMAM scoring of the wetlands. Unlike the USACE, the State of Florida does accept upland UMAM mitigation credits as compensation for wetland impacts under the State environmental resource permit process. Unlike the USACE, the NRC does not have the authority to require wetland mitigation or approve wetland mitigation plans; however, the NRC does account for wetland mitigation proposed by an applicant when evaluating potential wetland impacts for an EIS. No changes were made to the EIS in response to this comment.*

Comment: The proposed site in Levy County … is an extremely unique greenfield and really cannot be compared to other wetland areas throughout the northern Tampa Bay. (**0002-11-1** [Casey, Emily]) (**0045-1** [Casey, Emily])

Response: *Wetlands and other natural habitats on the LNP site are described in Section 2.4.1.1 of the EIS. As is true for many privately owned lands in the surrounding landscape, most wetlands and adjoining uplands on the site have been altered by years of intensive forest management that has included logging of the original timber, conversion of native habitats to planted pine plantations, extensive soil disturbance, and modifications of localized drainage patterns. These actions have degraded the quality of most wetlands on the site, reducing their ability to achieve optimal ecological functions. Even though the wetlands on the LNP site have been disturbed and degraded, Section 2.4.1.1 acknowledges that they still provide important functions such as groundwater recharge and habitat for a wide variety of wildlife species, although not at an optimal scale. No changes were made to the EIS in response to these comments.*

Comment: And when I asked that question, you know, we're going to lose 720 acres of fresh water wetlands and how many acres would we lose out at the Crystal River site, I think they kind

of dodged my answer. I was expecting, you know, a number of acres of fresh water wetlands that would be impacted, and I think the answer would have been that it would have been zero. There are no fresh water wetlands out there right on the Gulf Coast. Those are salt water marshes. (**0002-5-3** [Jones, Art])

Response: *The environmental impacts of siting a new two-unit nuclear power plant adjacent to the CREC as an alternative to siting the reactors at the LNP site are addressed in Section 9.3.2 of the EIS. Table 9-8 indicates that approximately 27 ac of wetlands would be affected at the CREC site if that alternative site were used. The estimate is derived using available Florida Land Use, Cover and Forms Classification System (FLUCFCS) mapping available from the SWFWMD. Even if the proposed new reactors were sited at CREC, any wetland impacts would likely be to fresh-water wetlands, because the new reactors would likely be sited further inland from the existing CREC facilities and thus away from salt marsh habitats. As for the proposed LNP site and other alternative sites, additional wetland impacts would be incurred offsite to build the associated transmission lines. No changes were made to the EIS in response to this comment.*

Comment: I understand a little bit more now since the last couple of people talked, that part of Goethe State Park is going to be involved in the construction or at least the water flow. (**0002-9-4** [Seiling, Barbara])

Comment: I live in Alachua County, barely, and part of Goethe State Park is up there, too. And, so, I went online when I first moved up there and found that Goethe State Park and most of Goethe State Park has foxtail squirrels, gopher turtles, and other endangered or protected animals in the park. And I'm wondering if --not that I wouldn't trust a corporation and that I would ever think they would do something like make sure they are all eliminated before the actual other people go out and check it. But with gopher turtles, I didn't think there was a way around them, so they would have to have been removed. (**0002-9-5** [Seiling, Barbara])

Response: *Any construction or water flow impacts within the Goethe State Forest would be related to proposed wetland mitigation. PEF proposes to partner with the Florida Department of Agriculture's Division of Forestry (DOF) to implement LNP-associated wetland mitigation activities in the Goethe State Forest (Entrix 2010; ESI and TEI 2011) (no part of the Goethe State Forest is a State park). As stated in the applicant's wetland mitigation plan (Entrix 2010; ESI and TEI 2011), the wetland mitigation would be consistent with the DOF's established goals and objectives for the Forest and with management objectives for the Forest established under the Federal Endangered Species Act. The applicant would work with the DOF to ensure that wetland mitigation activities do not adversely affect sensitive species in the Forest, including the gopher tortoise and other Federally and State-protected species. If gopher tortoises are documented to occur in any area where mitigation activities are proposed, the applicant would follow the Florida Fish and Wildlife Conservation Commission (FFWCC 2008a) Gopher Tortoise Permitting Guidelines. No changes were made to the EIS in response to these comments.*

Comment: EPA's review has identified environmental impacts that should be avoided, minimized, or mitigated in order to fully protect the environment, and additional information is

requested in the FEIS. Impact to wetlands is a primary concern that needs to be further addressed in the ongoing process. Corrective measures may require changes to the current site layout or application of mitigation measures that could reduce the environmental impacts. EPA would like to work with the NRC and COE to reduce these wetland impacts. (**0003-1** [Mueller, Heinz J])

Response: *This comment expresses EPA's concerns regarding protection of the wetlands and other waters of the United States on and in the vicinity of the LNP site. The NRC and USACE worked with the EPA to identify further reductions of such impacts, and these have been incorporated into Section 4.3.1 of the EIS. In addition, Section 4.3.1.7 outlines wetland mitigation activities proposed by the applicant (Entrix 2010). Since the draft EIS PEF has further developed the wetland mitigation plan (ESI and TEI 2011) and has continued to work to minimize impacts to wetlands. The USACE would have to approve the proposed wetland mitigation before issuing a DA permit to the applicant. Section 4.3.1.7 has been revised to reflect this new information.*

Comment: In order to avoid and minimize impacts in high quality wetland systems associated with the pipeline installation, EPA recommends the FEIS provide an analysis of other alternatives such as tunneling or horizontal directional drilling. (**0003-4** [Mueller, Heinz J])

Response: *On January 25, 2011, the State of Florida accepted a modification to the corridor certified by the State for the heavy-haul road, cooling-water makeup pipelines, and the blowdown pipelines to be constructed between the LNP site and the CREC (FDEP 2011b). The purpose of the modification was to provide more flexibility in minimizing impacts on wetlands and other natural resources when siting these facilities, to reduce the use of State-owned lands along the CFBC, and to minimize disruption of recreational activities along the CFBC. A revised route for the blowdown pipeline was established that would avoid impact on 4.5 ac of high-value salt marsh wetland. The USACE recently completed a jurisdictional verification that identifies wetlands along the revised route subject to USACE regulation (USACE 2011a,b,c). The revised route for the blowdown pipeline would still affect 11 freshwater wetlands (totaling about 4.28 ac), 1 USACE isolated (nonjurisdictional) freshwater wetland (about 0.24 ac), and cross the CFBC (about 300 lineal ft). |Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with submittals dated September 20 and October 20, 2011 with an analysis concluding that tunneling or horizontal directional drilling would not be practicable (PEF 2011b,c). The USACE will evaluate PEF's response in its ROD. No changes were made to the EIS in response to this comment.*

Comment: 3.2 Figure 3-4; LNP Units 1 and 2 Detailed Layout (pg 3-7) The FEIS should clarify the reasons why PEF selected the detailed site layout as it is presently configured. It appears that by shifting the project further south, overall wetland impacts would be lessened. Moving the site layout southward appears to reduce the length of the transmission line corridor and reduce impacts to other onsite wetlands. (**0003-9** [Mueller, Heinz J])

Response: *Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with submittals dated October 20, 2011 with an*

analysis concluding that moving the project site further south would not be practicable (PEF 2011b). The USACE will evaluate PEF's response in its ROD. No changes were made to the EIS in response to this comment.

Comment: The DEIS states "Approximately 150 ac on the site would be disturbed for temporary facilities, such as material storage areas, laydown areas, parking areas, and a temporary buffer surrounding the construction zone. Areas temporarily disturbed while creating these facilities would revert to open grassy areas after use of such facilities are completed, which would be a permanent conversion from pine plantations, forested wetlands, and mixed forested." EPA requests these areas be restored back to forested and mixed forested wetland systems if there are no safety or other serious operational reasons that would require these areas to be open grassy areas. (**0003-11** [Mueller, Heinz J])

Comment: The DEIS states that impacts will temporarily occur to 149.6 acres of wetlands that will later be allowed to regenerate naturally from the existing wetland seed bank. EPA believes theses wetland impacts will become permanent if the forested systems are not replanted and restored to their original condition. Therefore, EPA recommends forested wetland systems be replanted in order to insure impacts are temporary only. (**0003-14** [Mueller, Heinz J])

Response: *Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with submittals dated November 10, 2011 agreeing to replant temporarily disturbed forested wetlands (PEF 2011d). No changes were made to the EIS in response to this comment.*

Comment: Table 4 -1; LNP Onsite Land Use Impacts by Major Component (pg 4-5) Please provide clarifying information for the impacts associated with the items listed under the "Facility" heading. It is unclear what specific wetlands are associated with Miscellaneous Fill, Miscellaneous Pipeline, and Miscellaneous structures. (**0003-12** [Mueller, Heinz J])

Response: *In response to the USACE's June 23, 2011 position letter (USACE 2011d), PEF submitted detailed site plans showing impacts to jurisdictional wetlands from project elements. The EIS was updated to quantify impacts to jurisdictional and nonjurisdictional wetlands identified in the USACE approved jurisdictional determinations completed in November of 2011 (USACE 2011a,b,c).*

Comment: The DEIS states "Initially proposed routing of the blowdown pipeline south of the CFBC crosses several tidal creeks and would adversely impact approximately 4.5 acres of salt marsh habitat. The staff is aware that PEF has proposed to the FDEP an alternative route to avoid this important habitat." EPA concurs that an alternate route should be established to avoid these 4.5 acres of salt marsh wetland. (**0003-13** [Mueller, Heinz J])

Response: *On January 25, 2011, the State of Florida accepted a modification to the State-certified corridor for the heavy-haul road, cooling-water makeup pipelines, and the blowdown pipelines to be constructed between the LNP site and the CREC (FDEP 2011b).*

Section 4.3.1.2 of the EIS has been updated to incorporate changes resulting from the revised route for the blowdown pipeline.

Comment: The DEIS states the LNP project would result in the loss of 289 UMAM functional units and the mitigation plan would generate 490 UMAM Units. The FEIS should provide a detailed mitigation plan and the UMAM scores for the impact and mitigation sites. (**0003-16** [Mueller, Heinz J])

Response: *Section 4.3.1.7 of the EIS has been updated to reflect revised UMAM scoring.*

Comment: The FEIS should also provide more specific information on the wetland functions and values that would be impacted at the non-preferred alternative site locations. It is difficult to determine the quality of wetland impacts associated with the alternative sites when a reasonable wetland functional analysis has not occurred. (**0003-25** [Mueller, Heinz J])

Response: *Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with a submittal dated September 20, 2011 containing an analysis of wetland functions and values of the alternative sites. The USACE will evaluate PEF's response in its ROD (PEF 2011c). No changes were made to the EIS in response to this comment.*

Comment: Avian Protection Plan Table 10-2 (p. 10-10) lists bird collisions with power lines and other structures as an unavoidable project impact, and cites implementation of an Avian Protection Plan (APP) as the mitigation for this impact. Section 4.2 of the BA (p. F-141-142) also refers to development of an APP to address power line impacts, but an APP is apparently not included in the DEIS. Parts of the project are in close proximity to known concentration areas of migratory birds, such as Lower Suwannee and Cedar Keys National Wildlife Refuges; therefore, the FWS would support development of an APP before any construction commences. We recommend that the action agencies and Progress Energy Florida coordinate with the FWS, as well as the Florida Fish and Wildlife Conservation Commission, in the development of an APP for this project. The Department is the principal Federal agency charged with protecting and enhancing populations and habitat of migratory bird species (e.g., waterfowl, shorebirds, birds of prey, songbirds) that spend all or part of their lives in the U.S. The Migratory Bird Treaty Act (MBTA) prohibits take of migratory birds except when specifically authorized by the Department of the Interior. The regulations implementing the MBTA (50 CFR Part 21) do not provide for permits authorizing take of migratory birds that may be killed or injured by activities that are otherwise lawful, such as by the construction and operation of power transmission lines. The Bald and Golden Eagle Protection Act, however, provides for very limited issuance of permits that authorize take of eagles when such take is associated with otherwise lawful activities, is unavoidable despite implementation of advanced conservation practices, and is compatible with the goal of stable or increasing eagle breeding populations. (**0007-2** [Hogue, Gregory])

Response: *The applicant would be responsible for complying with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The Final Order of Certification issued by the State of Florida for the PEF Levy Nuclear Power Plant project includes State Conditions of*

Certification (FDEP 2011b) requiring PEF to prepare an Avian Protection Plan (APP) to reduce the risk posed to birds by the operation of the Levy electric utility facilities, including the transmission lines. As stated in Section 4.3.1.7, the APP is to be prepared in coordination with the FFWCC and the U.S. Fish and Wildlife Service (FWS) during the design phase for the transmission lines. The specific mitigation measures to be included in the APP would be developed concurrently with final design of the transmission lines before the applicant begins building the lines. Because of the lack of substantial expanses of open water on or adjacent to the LNP site, the site does not provide quality aquatic foraging habitat for the bald eagle, and nesting is not documented there, but bald eagle nests are known to occur near the LNP site and the associated offsite facilities, including the transmission lines. PEF intends to avoid impacts on nesting bald eagles by following the Eagle Management Guidelines outlined in the FFWCC (2008b) Bald Eagle Management Plan and the FWS (2007) Bald Eagle Monitoring Guidelines, as conditioned by the FDEP in the Final Order of Certification issued by the State of Florida for the PEF Levy Nuclear Power Plant. If impacts on bald eagle nests cannot be avoided by following FWS and FFWCC guidelines, and take could occur, PEF would obtain a FFWCC Eagle Permit as conditioned by the FDEP (2011), and FWS authorization under the Bald and Golden Eagle Protection Act. Potential impacts on bald eagles from LNP construction are discussed in Section 4.3.1.3 of the EIS; potential impacts from LNP operation are described in Section 5.3.1.3 of the EIS. No changes were made to the EIS in response to this comment.

Comment: In Section 5.3.1.1 (Terrestrial Resources – Site and Vicinity), specific methods for minimizing the impact of plant lighting are described (Page 5-31). No regulatory requirement for PEF to follow these minimization techniques is provided. No statement from PEF that such techniques will be applied is included. (**0008-2** [Hubbard, Michael])

Response: *The Final Order of Certification issued by the State of Florida for the PEF Levy Nuclear Power Plant project includes Conditions of Certification requiring PEF to prepare an APP to reduce the risk posed to birds by the operation of the LNP electric utility facilities. The applicant (PEF 2010) indicated that the APP would address lighting impacts on wildlife and identify measures to mitigate these potential adverse effects on wildlife. Sections 4.3.1 and 5.3.1 of the EIS were clarified to reflect this commitment.*

Comment: Control of exotic/invasive species is never specifically discussed or required. (**0008-3** [Hubbard, Michael])

Comment: The DEIS describes 1790 acres (Page 4-15) of disturbance to both wetland and upland areas in corridors for transmission lines. These areas will be maintained for at least the proposed facility's life (40-60 years), representing continued disturbance to many of the areas such as forested lands that will be kept to low shrubs or grasses. Corridor maintenance activities are described in several parts of the DEIS, but PEF never specifies that non-native invasive species in these areas will be controlled.
(**0008-4** [Hubbard, Michael])

Comment: The transmission lines will cross and disturb habitat in public forests, preserves, and parks; yet no impact is discussed regarding such disturbances in light of the large invasive

plant problem in Florida. Minimization of soil and vegetation disturbance impacts should include an ongoing program for control of invasive species. This is usually addressed in Florida by requiring active control of species listed by the Florida Exotic Pest Plant Council's (FLEPPC) most recent List of Invasive Plant Species. PEF has not committed to controlling invasive plant species in its Environmental Report (of COL application) or the DEIS. In accordance with both state and federal regulations, minimization of unavoidable impacts is required and clearly should include ongoing control, in both wetland and upland habitats, of FLEPPC's List of Invasive Plant Species. Since control of invasive plant species is not specified in the DEIS, the small benefits for certain wildlife discussed on Pages 7-23 and 7-25 cannot be claimed because there is no assurance that these areas will not be overcome by invasive species and, therefore, be unable to provide the benefit to native species described in the DEIS. (**0008-5** [Hubbard, Michael])

Comment: Please revise the DEIS to reflect proper minimization of impacts due to vegetation removal and perpetual maintenance activities in all corridors associated with the proposed project. (**0008-6** [Hubbard, Michael])

Response: *A commitment by PEF to monitor for and control invasive species in areas temporarily disturbed during development of the LNP project (including the transmission lines), and at wetland and upland mitigation sites is stated in Sections 4.3.1.6 and 4.3.1.7 of the EIS. More specific information about control of nuisance plants at mitigation sites is provided in the LNP wetland mitigation plan (ESI and TEI 2011). The complete plan is publicly available on the NRC website. Impacts on terrestrial ecological resources from transmission-line maintenance activities are described in Section 5.3.1.2 of the EIS. Vegetation management is the primary maintenance activity that may affect terrestrial resources on the transmission-line rights-of-way. The potential for invasive species problems along the transmission-line rights-of-way has been minimized by collocating more than 90 percent of the new transmission lines with existing PEF transmission lines, thereby reducing the extent of new vegetation clearing needed to site the lines. BMPs described in Section 5.3.1.2 of the EIS limiting the placement of new access roads along the rights-of-way, and reducing soil disturbance in wetlands and other sensitive areas during maintenance, would also minimize the opportunities for invasive species establishment. PEF frequently works with public land managers to control invasive species where their rights-of-way cross public lands. Additional information about invasive species control is provided in Sections 4.3.1.7 and 5.3.1.2 of the EIS. Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with a submittal dated November 1, 2011 an Invasive and Exotic Species Management Plan (PEF 2011d). No changes were made to the EIS in response to this comment.*

Comment: Inadequate Minimization of Impacts to Temporarily Disturbed Wetlands: NRC/USACE plan to allow PEF to disturb wetlands and merely re-grade to previous elevation to allow natural recruitment to hopefully re-seed these areas. I do not understand why PEF is being given preferential treatment. There is not a developer in Florida that can disturb wetlands, re-grade, and walk away. Other entities temporarily disturbing wetlands in Florida must re-plant and monitor and meet restoration success criteria for impacted wetlands. State and federal regulations require minimization of unavoidable impacts. PEF should re-plant temporarily disturbed wetlands with representative native species, control invasive species, and conduct a

monitoring program until such time as the temporarily disturbed wetlands are restored in order to minimize this impact. Please address this necessary minimization step in a Supplemental DEIS, or include an explanation of why this is not being required of PEF. (**0008-15** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Failure to demonstrate minimization of impacts (i.e., invasive species control, replanting of disturbed wetlands). (**0008-58** [Hubbard, Michael])

Response: *A commitment by PEF to monitor the restoration of wetlands temporarily disturbed when building LNP project features (including the transmission lines), and to control invasive species in these areas is stated in Sections 4.3.1.6 and 4.3.1.7 of the EIS. The commenter is also directed to the LNP wetland mitigation plan (Entrix 2010; ESI and TEI 2011) for more specific information about control of nuisance plants at mitigation sites. The complete plan is publicly available on the NRC website. Additional information about restoring temporarily disturbed wetlands is included in Section 4.3.1.7 of the EIS. Although the EIS describes a conceptual approach for restoring existing topographic and hydrological conditions to temporarily disturbed wetlands followed by natural regeneration, the USACE and FDEP will require the applicant to prepare more detailed plans for restoring these wetlands and carrying out other elements of the wetland mitigation plan (Entrix 2010). These agencies may require the applicant to outline more specific planting procedures, which may include methods such as topsoiling, seeding, or planting, and may require specific monitoring requirements to ensure the long-term success of the restored wetlands. No changes to the EIS were made as a result of these comments.*

Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with submittals dated November 1, 2011 agreeing to replant temporarily disturbed forested wetlands and to implement an invasive plant species monitoring and control plan (PEF 2011d). No changes were made to the EIS in response to this comment.

Comment: Perhaps most importantly, the review team should review Table 4-3 of the Cumulative Effects Report [CEQ's January 1977 report, *Considering Cumulative Effects Under the National Environmental Policy Act*] where an example narrative description of effects is provided which illustrates how the significant cumulative loss of wetlands occur. (**0008-24** [Hubbard, Michael])

Response: *The review team is familiar with the Council on Environmental Quality's (CEQ's) guidance regarding the assessment of cumulative impacts and how that guidance applies to wetlands. The review team's process for evaluating cumulative impacts is consistent with CEQ guidance. As discussed in Section 7.3.1, the review team considered the geographical area of interest for assessing cumulative impacts on terrestrial ecology (including wetlands) to be the*

20-mi radius around the LNP site, plus the proposed corridors for the transmission lines and other offsite linear features. The review team considers this area sufficiently large to capture any cumulative impacts on wetlands and other terrestrial ecological resources. Within this geographic area of interest, the review team considered past, present, and reasonably foreseeable future actions affecting wetlands and other terrestrial resources. No change was made to the EIS as a result of this comment.

Comment: Section 2.4.1.1, Page 2-47, Lines 1-3: Notes that the Utilities FLUCFCS code 830 is represented by a natural gas pipeline. There is also a transmission line in this area covered by this code. (**0010-1-9** [Kitchen, Robert])

Response: *The description of the Utilities (FLUCFCS code 830) cover type for the LNP site was revised in Section 2.4.1 of the EIS to note the presence of an existing transmission line in addition to the existing natural gas line.*

Comment: Section 4.1, starting on Page 4-3: Section 4.1 of the document discusses the land use impacts for the project. The impacts discussed are based on data from the Environmental Report and Request for Additional Information responses from Progress Energy Florida (PEF). These impacts represent the maximum impact from the project and in the case of the transmission line corridors, the final impacts will be a subset of the impacts currently evaluated in the DEIS. The refinement of the corridors to the rights of way will not change the final conclusion regarding the impact level of the project. The same comment can be made of the refinement of the wetland impact acreage. In preparing the impact data for the ER and RAI requests, PEF used a conservative approach in order to ensure that the bounding impacts would be included and as the project was refined, impacts/acreages would be reduced rather than increased. As a result, PEF believes the information presented in the DEIS is adequate to address the maximum impacts from the project and further refinement of this data is not necessary for the Final Environmental Impact Statement (FEIS). The wetland impacts described in the April 23, 2010 Wetland Mitigation Plan submitted to the State of Florida provides the most up-to-date quantification of wetland impacts and is consistent with those noted in the USACE 404 Public Notice; however, as noted above, this level of detail should not be needed for the FEIS. (**0010-2-10** [Kitchen, Robert])

Response: *Sections 4.1 and 4.3.1 in the EIS were revised to reflect new wetland impact data.*

Comment: Section 4.3.1.7, Page 4-67, Lines 37-38: Notes that "the lift would be spread over all five affected watersheds, although not in exact proportion to the impacts." This statement is not accurate - the updated mitigation plan (April 23, 2010) does have impacts/mitigation based on watersheds. (**0010-2-14** [Kitchen, Robert])

Response: *Section 4.3.1.7 was revised to reflect updated wetland mitigation information (ESI and TEI 2011). The current mitigation plan proposes sufficient compensation for wetland impacts in each watershed.*

Comment: Section 5.3.1.1, Page 5-27, Lines 1-9: Discusses how differences in model values (such as the original Levy groundwater model and the recalibrated groundwater model) can lead to uncertainty. Starting on Line 6, the DEIS says "Because of this uncertainty, and to ensure that the proposed use of groundwater for the LNP project does not cause adverse impacts on wetlands and surface waters, the State of Florida imposed the following conditions in the final site certification issued under the PPSA ... "This implies that the State of Florida imposed the conditions of certification because of the uncertainty between these two models. The conditions of certification were imposed independent of the recalibrated groundwater model and even before the recalibrated model was completed. Please clarify that the State of Florida imposed the conditions of certification because of the inherent uncertainty that exists for groundwater models in general. (**0010-3-2** [Kitchen, Robert])

Response: *The review team agreed with the need for clarification and the statement in Section 5.3.1.1 of the EIS was reworded.*

Comment: Section 5.3.1.1, Page 5-28, starting at Line 15: The DEIS fails to recognize that PEF is required to develop an Avian Protection Plan (APP) which covers both the site and transmission lines to help mitigate for the potential collisions issues. As part of the PPSA Conditions of Certification (Condition XXIX.A.6 and XXXIX.F), PEF is required to develop an Avian Protection Plan for the project that will address potential avian issues from the power plant and transmission lines. This plan will address potential collision issues. (**0010-3-3** [Kitchen, Robert])

Response: *Section 5.3.1.1 of the EIS entitled "Bird Collisions with Cooling Towers and Structures" was modified to include a discussion of the Avian Protection Plan Condition of Certification. The modification clarifies that the APP would address mitigation for potential avian collision issues at both the LNP site and in offsite transmission-line corridors. The portion of Section 4.3.1.7 entitled "Avian Protection Plan" was clarified.*

Comment: Section 5.3.1.1, Page 5-31, starting at Line 6: The DEIS fails to recognize that PEF is required to develop an Avian Protection Plan (APP) which covers both the site and transmission lines to help mitigate for the potential collisions issues. As part of the PPSA Conditions of Certification (Condition XXIX.A.6 and XXXIX.F), PEF is required to develop an Avian Protection Plan for the project that will address potential avian issues from the power plant and transmission lines. This plan will address potential light pollution issues. (**0010-3-4** [Kitchen, Robert])

Response: *EIS Section 5.3.1.1, titled "Light Pollution During Facility Operation," was modified to include a discussion of the APP Condition of Certification. The revision clarifies that the APP would address mitigation for light pollution that could adversely affect birds. Section 4.3.1.7, titled "Avian Protection Plan," was clarified.*

Comment: Section 7.3.1.2, Page 7-27, Lines 14-26: We disagree with the discussion of habitat fragmentation on the utility corridors. The utility corridors are being collocated with existing lines which allows the amount of ROW to be reduced or eliminated. In the area for the common route, the habitat is already fragmented due to the subdivision layout of Crystal Manor.

The roads/canals of the subdivision already fragment this habitat. The pipeline is adjacent to the barge canal in previously impacted areas and then on existing linear features which have already fragmented the habitat. The Levy utility corridors do not significantly add more fragmentation. (**0010-4-2** [Kitchen, Robert])

Response: *The discussion in Section 7.3.1.2 is addressing cumulative effects from fragmentation when considering the proposed LNP project with past, present and reasonably foreseeable actions in the geographic area of interest for terrestrial ecological resources (i.e., a 20-mi radius around the LNP site, plus the corridors associated with the transmission lines and other offsite linear features). Within this cumulative context, the review team believes the discussion appropriately describes the effects of fragmentation; however, the review team agrees that the incremental increase in fragmentation resulting from the LNP project is minimized by the collocation of multiple linear features exiting the southern boundary of the site using a single "common corridor." Fragmentation of terrestrial habitats has been further reduced by collocation of more than 90 percent of the new transmission lines with existing PEF transmission lines, and routing of much of the blowdown pipeline across habitat already disturbed by construction of the Cross Florida Barge Canal. Section 7.3.1.2 of the EIS was modified to clarify this issue.*

Comment: Biological Assessment, Section 5.0, Page F-155, starting at Line 32: With regard to the piping plover - it should be noted that although the transmission line crosses portions of Hillsborough and Pinellas counties, they are miles away from the designated critical habitat areas. (**0010-4-13** [Kitchen, Robert])

Response: *The review team prepared a Biological Assessment (BA) for the FWS that considered all Federally protected species that potentially could be affected by LNP construction and operation. The review team met with FWS during the review and has extensively documented all Section 7 consultation efforts. On December 1, 2011, the FWS concurred with the review team's assessment and acknowledges no effect on piping plover (FWS 2011).*

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... The value of conserving the wetlands that would be destroyed must be evaluated. (**0011-11** [Bacchus, Sydney])

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... A detailed discussion should be included regarding what the long-term effect on wetlands and wildlife habitat value in the area would be from the proposed project. (**0011-18** [Bacchus, Sydney])

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... The Clean Water Act provides that conservation of these wetlands is important to the public interest. Therefore, a detailed analysis regarding public interest of conservation must be included. (**0011-19** [Bacchus, Sydney])

Response: *Section 4.3.1.7 has been revised to include updated UMAM analyses. Impacts on wetlands, wildlife, and wildlife habitat expected from the proposed LNP project are presented in Sections 4.3.1 and 5.3.1 of the EIS. The UMAM evaluation process considers the benefits that assessed wetlands provide to fish and wildlife resources as a part of the scoring process.*

The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements; and will be based on information provided in the EIS for this project, and any additional information required by the USACE for final evaluation in the USACE's ROD.

Comment: Progress Energy is proposing to enhance and restore portions of the Goethe State Forest to obtain mitigation credits for those activities. What is the estimated cost of those enhancement and restoration activities? (**0023-9** [Avery-Smith, Ellen] [Smith, Charles])

Response: *The evaluation of the environmental impacts of the proposed action does not consider the monetary costs of proposed mitigation. No changes were made to the EIS as a result of this comment.*

Comment: [O]ur family [Robinson Estates] objects to the wetland mitigation plan proposed by Progress Energy, as detailed in the Draft EIS. We also believe that the Corps of Engineers and the NRC have failed to require Progress Energy to address drainage, wildlife, security and other issues related to the proposed nuclear power plant. (**0023-16** [Avery-Smith, Ellen] [Smith, Charles])

Response: *The USACE and the FDEP are evaluating the applicant's mitigation plan (ESI and TEI 2011) for compliance with the Federal CWA Section 404 and the Florida Environmental Resource Permit (ERP) permitting processes. The mitigation plan is summarized in Section 4.3.1, and the complete plan is available on the NRC website. The applicant's updated wetland mitigation plan, along with the impacts that the plan would propose to compensate, will be evaluated by the USACE in light of NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other requirements of the USACE's regulatory authorities. The USACE's ROD will reference information presented in this EIS and present any additional information required by the USACE to support its permit decision, including evaluation and final determination of the acceptability of the final mitigation plan. The NRC is not responsible for the approval or enforcement of the final wetland mitigation plan. This responsibility lies with the FDEP and the USACE. Drainage issues are addressed in Sections 2.3.1 and 4.2.1; the wildlife of the site is described in Sections 2.4.1, 4.3.1, and 5.3.1; security issues are not covered in the EIS, but are covered as part of the NRC safety review. No changes were made to the EIS in response to this comment.*

Comment: The environmental costs as stated are simply too high. We cannot afford to lose any more wetlands, nor fragment any more rare habitats. (**0031-5** [Thuemler, Ronald])

Response: *A rigorous assessment of wetland impacts and impacts on other terrestrial and aquatic habitats has been conducted for the LNP project. The NRC and USACE worked with the EPA to identify further reductions of wetland impacts, and these were incorporated into Sections 4.3.1 and 5.3.1 of the EIS. The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit to affect wetlands will be documented in a separate ROD by the USACE after issuance of the EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements. Fragmentation of habitats is discussed in Sections 4.3.1.1 and 4.3.1.2 of the EIS. The greatest potential for habitat fragmentation exists from the new transmission lines. This potential has been greatly reduced by collocating more than 90 percent of the new transmission lines with or immediately adjacent to existing PEF transmission lines. No changes were made to the EIS in response to this comment.*

Comment: [W]hat kind of effect is it [salt] going to have on my vegetable garden? I mean, what --the salt, anything that gets from that, the water and stuff like that, is it -- is it going to, you know, affect my garden? Has there been any studies done on people living within a mile and a half that have gardens or small farms, not including tree farms? I'd like to know if there's been any effect on them or they've come up with any results so we know what's going on there. (**0001-7-7** [Smith, Robert])

Response: *The comment expresses concern that salt drift released by the cooling towers could cause damage to local vegetable gardens. Salt-drift modeling presented in Section 5.3.1.1 of the EIS indicates that damage to vegetation off the LNP site is unlikely. Scientific literature and monitoring results from operating nuclear power plants suggest that no measurable productivity losses to agricultural crops, ornamental plants, or native species were detected from cooling-tower operations (NRC 1996). Section 5.3.1.1 of the EIS was updated to include additional discussion on potential effects of salt drift on vegetable gardens.*

Comment: The DEIS states temporary dewatering of wetlands may occur in order to install the blowdown pipelines and other structures. The document also states that this may occur for 2 to 4 year period and no long-term effects on adjacent wetlands are anticipated. EPA recommends that a wetland functional analysis be conducted on the adjacent wetlands and any adverse wetland impacts that are identified due to dewatering be mitigated. (**0003-15** [Mueller, Heinz J])

Response: *Since the publication of the draft EIS, PEF responded to this comment pursuant to a USACE "position letter" (USACE 2011d) with a submittal dated September 20, 2011 describing the effects of temporary dewatering as being temporary, short-lived and minimal (PEF 2011c). The USACE will evaluate PEF's response in its ROD. Section 4.3.1.1 reflects this information.*

Comment: [I]t does not appear that drawdown impacts were considered for many, if any, of the environmental impact analyses. For example, neither FWS or the National Marine Fisheries Service (NMFS) mention the broad loss of function of the wetlands affected by drawdown for listed species in their respective Biological Assessments, nor does the DEIS consider drawdown

impacts to wetlands when evaluating impacts to "important" species. However, Page 5-37 of the DEIS states: Listed species that use wetland habitats on the LNP site could be affected by hydrological impacts on wetlands caused by groundwater withdrawal. This lack of basic engineering completeness prevents quantification of adverse impacts, cumulative impacts, and required compensatory mitigation. (**0008-11** [Hubbard, Michael])

Comment: If any drawdown impacts are allowed, the functional gain of onsite wetlands proposed for use as compensatory mitigation will need to be decreased due to these adverse impacts, which would result in an increase in the amount of compensatory mitigation required (p. 5-24 and 5-26 Table 5-2). Until drawdown impacts are quantified, minimization and avoidance, listed species evaluations, cumulative impacts, and compensatory mitigation cannot be fully addressed. Nor can the alternatives analysis be considered as inclusive. (**0008-12** [Hubbard, Michael])

Response: *The areas of wetland potentially affected by groundwater drawdown are identified in Section 5.3.1.1 of the EIS. The potential effects of these wetland impacts on listed species are considered in Section 5.3.1.3 of the EIS. All mitigation wetlands would be monitored as a condition of the USACE permit and the FDEP Conditions of Certification (FDEP 2011b). The USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the Least Environmentally Damaging Practicable Alternative (LEDPA). At this time, PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued. The USACE's final evaluation of the proposed project including proposed groundwater withdrawal for plant operations and proposed compensatory mitigation for project impacts to wetlands, and the final decision whether to issue a USACE permit, will be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements.*

Comment: Section 5.3.1.6, Page 5-43, Lines 21-30: The DEIS notes that terrestrial ecological resources (including wetlands) impacts would be SMALL to MODERATE and that a range is provided to account for the uncertainty that exists regarding the potential effects of groundwater withdrawal on wetlands and associated biota. However, as noted earlier in DEIS Section 5.3.1.1, the State of Florida has imposed Conditions of Certification which require PEF

to develop and implement an Environmental Monitoring Plan (EMP) for the proposed operational groundwater well-field to monitor the hydrology and ecology of wetlands in the vicinity of the well-field that could potentially be affected by groundwater drawdown resulting from operation of the LNP. In accordance with SWFWMD's review criteria, groundwater withdrawal cannot cause unacceptable adverse impacts on wetlands or other surface waters. Consequently, any potential impact to wetlands from groundwater withdrawal would be only temporary and therefore would not destabilize nor noticeably alter the wetland resource. PEF recommends that this impact be revised to "SMALL" from "SMALL to MODERATE". Similarly, PEF recommends that this same impact be revised in the following sections:
Table 5-23 on Page 5-129
Section 7.3.1, Page 7-20, Lines 23-25
Section 7.3.1.3, Page 7-28, Lines 17-22
Section 7.12, Page 7-52, Lines 30-31
Table 7-4 on Page 7-53
Table 10-2 on Page 10-10 (**0010-3-6** [Kitchen, Robert])

Response: *The review team has determined that the operational impacts on terrestrial ecological resources should remain SMALL to MODERATE. As noted in Section 5.3.1.6 of the EIS, this range acknowledges the uncertainty that exists regarding the potential effects of groundwater withdrawal on wetlands and associated biota.*

Comment: Disregarding the inadequacies above, the DEIS does not appear to include a detailed mitigation plan. The DEIS for the proposed project will not be complete until such time as a detailed and complete mitigation plan has been developed and submitted for review as part of the EIS review process. Please note that the mitigation plan should include extensive hydrologic data pertaining to the natural and existing hydroperiods of the proposed project site, in addition to wetlands offsite that the project may adversely affect. (**0011-5** [Bacchus, Sydney])

Response: *Section 4.3.1.7 of the EIS summarizes a detailed wetland mitigation plan prepared by the applicant for the proposed LNP project (ESI and TEI 2011). The complete plan is available to the public on the NRC website. The plan was designed to compensate for the loss or impairment of functions to wetlands affected by proposed activities on the LNP site and the associated offsite facilities, including the transmission lines, pipelines, and heavy-haul road. The USACE and the FDEP are evaluating the applicant's mitigation plan for compliance with the Federal CWA Section 404 and the Florida ERP permitting processes. As part of the review process, the applicant will submit sufficient hydrological data to the USACE to demonstrate that the proposed mitigation is feasible. The USACE's final evaluation of the proposed plan and final decision whether to issue a USACE permit to affect wetlands will be documented in a separate USACE ROD after issuance of the EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. The NRC is not responsible for the approval or enforcement of the final wetland mitigation plan, but does consider mitigation proposed by an applicant when evaluating potential environmental impacts. No changes were made to the EIS in response to this comment.*

Comment: ENDANGERED AND THREATENED SPECIES -The DEIS failed to consider adverse impacts on and un-permitted "takings" of federally endangered and threatened species ("federally listed species") from off-site, direct, indirect and cumulative impacts from the proposed project. For example, based on information in the DEIS, it appears that the applicant did not even conduct site-specific surveys or provide species-specific data for federally listed species that occur within or utilize the proposed transmission-line corridors. Therefore, any biological assessment prepared in accordance with Section 7 of the Endangered Species Act (ESA) could not be valid. Based on the type of wetlands on and surrounding the proposed project site and knowledge of habitat surrounding the proposed project, examples of un-permitted takings of federally listed species resulting from the proposed project could include wood storks, manatees and sea turtles, constituting a violation of the takings prohibition of Section 9 of the ESA. (**0011-7** [Bacchus, Sydney])

Comment: Inadequate assessment of environmental impacts prevents determination of unpermitted "taking" - Because PEF and the DEIS have failed to identify, describe and consider all of the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP, required to determine the "affected area" of the proposed project, the affected public and regulatory agencies have been precluded from providing meaningful comments regarding the unpermitted "taking" of federally listed endangered and threatened species. In fact, because of the gross inadequacies of the DEIS, agencies such as the U.S. Fish and Wildlife Service (USFWS) and the U.S. Environmental Protection Agency (USEPA) are incapable of determining the total number of individuals of federally listed species such as manatees, sea turtles that will be "taken" (killed) and other environmental effects as a result of the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP. (**0030-3-8** [Bacchus, Sydney])

Response: *Since the draft EIS the FWS has issued its Biological Opinion dated December 1, 2011 (FWS 2011).. The NMFS concluded that no adverse effect and no incidental take would result from the proposed action (NMFS 2010a). Sections 4.3.1 and 5.3.1 were updated to reflect the Biological Opinion.*

Comment: SIGNIFICANT DEGRADATION OF THE WATERS OF THE UNITED STATES-The DEIS of the proposed project is inadequate in its discussion of whether and to what extent this proposed project will cause or contribute to significant degradation of the waters of the United States, as required by 40 C.F.R. 230.10(c). Federal law requires that the cumulative, direct, and indirect impacts of this proposed activity, and its concomitant loss of wetlands and wetland function, on this nationally vital watershed, including the aquifer, must be analyzed comprehensively.

The dewatering of the area resulting from the proposed project also would result in adverse impacts to upland wildlife habitat in surrounding uplands, but those impacts were not addressed. The DEIS also provides no discussion of how wetlands and other wildlife habitat surrounding the proposed site would be fragmented by this proposed project and how the resulting fragmentation would affect the function of those wetlands and other wildlife habitat. The DEIS

fails to address how the remaining wetlands could continue to serve other wetlands functions such as provision of water purification. (**0011-8** [Bacchus, Sydney])

Response: *Detailed assessments of wetland impacts associated with construction and operation of the LNP project are presented in Sections 4.3.1, 5.3.1, and 7.3.1 of the EIS. Detailed assessments of impacts on other waters of the United States are presented in the aquatic resource assessments in Sections 4.3.2, 5.3.2, and 7.3.2 of the EIS. Included in Section 4.3.1.7 is a summary of the wetland mitigation plan (ESI and TEI 2011) prepared for the project. As a part of the wetland mitigation plan, a UMAM assessment (presented in Table 4-9) was completed to evaluate wetland functional losses due to the proposed LNP project, and to estimate wetland functional gains that could be realized with implementation of the mitigation plan. The UMAM evaluation process considers the value that affected wetlands provide to fish and wildlife resources as a part of the scoring process. The commenter is directed to the wetland mitigation plan for more specific information on functional wetland losses and gains predicted for the proposed LNP project. This plan is publicly available. With respect to potential dewatering impacts, the review team concluded in Section 4.3.1 of the EIS that construction dewatering would have temporary and minor impacts on wetlands. Because upland habitats are less directly influenced by the water table, they are less likely to be substantially affected by temporary construction dewatering than are wetlands. Section 5.3.1 provides a discussion of impacts on wetlands and uplands from groundwater drawdown during operations.*

The effects of habitat fragmentation on wildlife are discussed in Sections 4.3.1.1 and 4.3.1.2 of the EIS. Habitat fragmentation effects have been greatly reduced by collocating more than 90 percent of the new transmission lines with existing PEF transmission lines. In addition, the routes for several transmission lines, pipelines, and a heavy-haul road exiting the southern boundary of the site have been collocated into a single "common corridor" that minimizes fragmentation of forest cover between the site and the proposed Citrus substation.

The ability of wetlands to perform functions such as water purification is evaluated as part of the UMAM scoring process. The UMAM assessment considers losses of wetland functions, and the wetland mitigation proposed in the wetland mitigation plan (ESI and TEI 2011) provides for enhancement of those functions in the affected watersheds.

The USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the Least Environmentally Damaging Practicable Alternative (LEDPA). At this time, PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued.

The USACE's final evaluation of the proposed project including proposed groundwater withdrawal for plant operations and proposed compensatory mitigation for project impacts to wetlands, and the final decision whether to issue a USACE permit, will be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements.

Comment: Floodplain wetlands are Waters of the U.S. - Even if the floodplain wetlands throughout the proposed LNP site and the proposed Tarmac mine site were not navigable, those wetlands would be regulated under the CWA pursuant to U.S. v. Banks (873 F. Supp. 650). It is my professional opinion that the cypress wetlands throughout the proposed LNP site are comparable to the cypress wetlands described in Bacchus Exhibits C7 that are regulated under the CWA. (**0020-21** [Bacchus, Sydney])

Comment: Failure of the LNP DEIS to require documentation of multi-year preconstruction baseline conditions - One of the most significant deficiencies in the LNP DEIS is its failure to require detailed, multi-year documentation of baseline conditions, prior to any construction or operation activities associated with the proposed LNP project and the interlinked proposed Tarmac mine. The Assessment of Baseline Conditions and Change in Wetlands Associated with Groundwater Withdrawal and Diversion is described in the 1995 peer-reviewed publication by Bacchus, incorporated herein by reference as Bacchus Exhibit D4. (**0020-36** [Bacchus, Sydney])

Comment: In U.S. v. Banks (873 F.Supp. 650), incorporated herein as Bacchus Exhibit D-8, the federal courts established that wetlands connected to navigable waters primarily by ground water rather than surface water are regulated under the CWA as "adjacent wetlands." More specifically, U.S. v. Banks found:

> ... no hydrological connection to other waters is required for a wetland to be considered to be adjacent. (¶ 15.) [emphasis added]
>
> More importantly, however, in this case, the government established that such a connection exits through ground water ... Such a hydrological connection to neighboring navigable waters primarily consisting of ground water rather than surface water, except in times of storms, such as hurricanes, therefore further supports a finding of adjacency. (¶ 15.) [emphasis added]
>
> A finding of adjacency may be bolstered by a showing of ecological links with neighboring navigable waters, such as serving as wetland habitat for wading and non-wading birds, reptiles and fish as well as by testimony regarding the performance of water quality filtering functions. (¶ 16.)

It is my professional opinion that the wetlands on and surrounding the proposed LNP site are, at the least, "adjacent wetlands" which meet the criteria above from U.S. v. Banks (Bacchus Exhibit D-8). Furthermore, it is my professional opinion that the wetlands on and surrounding the proposed LNP site are critical for maintaining the chemical, physical and biological integrity of the nation's waters, which is the intent of the CWA, 33 U.S.C. Section 1251, "a comprehensive effort by Congress to restore and maintain the chemical, physical and biological integrity of the nation's waters." Specifically, those wetlands are essential for maintaining the chemical, physical and biological integrity of Withlacoochee and Waccasassa Rivers and other waters within the affected area. (**0030-1-17** [Bacchus, Sydney])

Response: *As a requirement of FDEP Conditions of Certification, PEF would be required to perform multiple years of preoperational groundwater monitoring (FDEP 2011b). Wetlands of the LNP site and their supporting hydrology are described in Sections 2.3 and 2.4 of the EIS. The USACE issued approved jurisdictional determinations for the LNP project (USACE 2011a,b,c). Updated information is provided in Section 4.3.1 of the EIS.*

The proposed Tarmac King Road Limestone Mine is an independent action separate from the proposed LNP project. Information available to the review team suggests that the mine would be developed irrespective of whether the LNP project were implemented. Impacts that could result from construction and operation of the Tarmac Mine will be addressed in a separate EIS being prepared by the USACE. Information about the status of this EIS can be found at http://www.kingroadeis.com; however, because of its location near the LNP site, the proposed Tarmac Mine could cumulatively affect many of the same wetlands and other habitats that could also be affected by the LNP project. Section 4.3.1.5 of the EIS discusses the potential impact from the acquisition of fill from the Tarmac Mine. A discussion of potential cumulative impacts from the proposed LNP project, proposed Tarmac King Road Limestone Mine, and other past, current, and reasonably foreseeable projects on terrestrial, wetland, and aquatic habitats in the area is presented in Sections 7.3.1 and 7.3.2 of the EIS. No changes were made to the EIS in response to this portion of the comment.

Comment: Filling forested floodplain wetlands -The conceptual drawing of proposed LNP project in DEIS Fig. 3-2, incorporated herein as Bacchus Exhibit C3, also illustrates the culmination of part of the filling of those cypress wetlands to construct the proposed LNP. For example, page 4-4 of the LNP DEIS, lines 20-22 states:

> The ground elevation of the reactors and cooling towers, which is currently located within the 100-year floodplain, would be raised 8 ft. above the existing grade, so that the structures would be above the 100-year floodplain.

The proposed stormwater ponds are not shown in that figure. Ms. Casey's declaration includes a copy of Figure 3-4 from the LNP DEIS, which shows the location of the four proposed stormwater ponds that would include both filling and excavation of those floodplain wetlands. The following statement from page 4-10 of the LNP DEIS, lines 23-27 confirms that the source of the fill has not been finalized:

PEF has not made a final determination regarding the source of the fill material for the LNP site. To provide additional context for the potential impacts of fill mining, the review team considered the impacts if the proposed Tarmac King Road Limestone Mine provided the source of fill. The proposed mine would be located 1 mi west of the intersection of U.S. Highway 19 (US-19) and King Road in Levy County, about 2 mi west of the LNP site.

It is my professional opinion that the filling of those floodplain wetlands and the excavation of the fill material, whether independently or cumulatively, would result in "LARGE" and irreversible adverse impacts to the chemical, physical and biological integrity of the nations waters, both inland and coastal. (**0020-39** [Bacchus, Sydney])

Response: *Impacts on wetlands, including wetlands in the 100-year floodplain, are discussed in Sections 4.3.1 and 5.3.1 of the EIS. As shown in Figure 4-2, the LNP disturbance footprint used to quantify wetland impacts accounts for the stormwater retention ponds proposed for the project. The review team concluded that impacts on terrestrial ecological resources, which include wetlands, would be MODERATE for construction and preconstruction, and SMALL to MODERATE for operation of the proposed LNP project. A summary of these findings is presented in Sections 4.3.1.8 and 5.3.1.6 of the EIS. These determinations consider the applicant's wetland mitigation plan (ESI and TEI 2011) developed to compensate for the loss or impairment of functions of wetlands affected by the project (see EIS Section 4.3.1.7). After analyzing potential effects on terrestrial ecological resources (including wetlands) from the proposed LNP project and considering actions to avoid, minimize, and mitigate these impacts, the review team concluded that impacts would be expected to be minor due to the requirements of the FDEP Conditions of Certification (FDEP 2011b), but could be noticeable. Impacts from the project would not destabilize important components of terrestrial resources. This conclusion reflects the existing impairment of the affected wetlands caused by past intensive forestry management practices; the abundance of similar wetlands in the surrounding landscape, including but not limited to the adjacent Goethe State Forest; and the proposed wetland mitigation and accompanying analysis demonstrating a net gain in UMAM function for the project.*

The proposed Tarmac King Road Limestone Mine, which could provide a source of fill and aggregate used in construction of the LNP project, is an independent action separate from the proposed LNP project. Impacts that could result from construction and operation of the Tarmac Mine will be addressed in a separate EIS being prepared by the USACE. Information about the status of this EIS can be found at http://www.kingroadeis.com. Because of its location near the LNP site, the proposed Tarmac Mine could cumulatively affect many of the same terrestrial habitats as affected by the LNP project. A discussion of these potential impacts is presented in Sections 4.3.1.5 and 7.3.1 of the EIS. No changes were made to the EIS in response to this comment.

Comment: Neither PEF nor the DEIS evaluated or addressed the impact of relative humidity on chloride absorption by plants by conducting comparable experiments on native plant species representative of the ecosystems within the impact area (also undetermined) of the proposed LNP. (**0030-2-14** [Bacchus, Sydney])

Response: *Humidity is identified in Section 5.3.1.1 of the EIS as one of a number of factors that can influence the effect of salt drift on plants. The "Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)", NUREG-1437 (NRC 1996) notes that high humidity can enhance salt uptake by plants because salt on foliage is apparently absorbed from solution, and high humidity retards evaporation and leaf drying. Many of the salt-drift studies evaluated in the GEIS, which serves as the basis for the threshold for visible leaf damage from salt drift (10–20 kg/ha/mo) used by the NRC (2000) for this and other nuclear power plant licensing EISs, were from power plants near the coast or in other areas where high relative humidity is regularly expected during the growing season. Thus, some of the interaction between salt-drift effect and high relative humidity is indirectly captured in this threshold. Conducting experiments to assess the effects of chloride absorption by plant species native to the LNP site under differing relative humidity is, therefore, not necessary, considering the conservatism inherent in the thresholds for plant injury used in the EIS. No changes were made to the EIS in response to this comment.*

Comment: No basis for conclusion that impacts from aerial deposition will be "SMALL"-The 26 paragraphs provided in my affidavit dated 11/12/10, included in Bacchus Exhibit A2 and incorporated herein by reference, provide extensive scientific basis for concluding that the direct, indirect and cumulative adverse impacts from aerial deposition of salt and other contaminants from the proposed LNP project would exceed "LARGE." (**0020-44** [Bacchus, Sydney])

Comment: No scientific basis for conclusion that quantity of "drift" from proposed LNP cooling towers is "very small" - It is my professional opinion that there is no scientific basis for conclusions by PEF and the DEIS that the quantity and adverse environmental impacts from cooling tower drift from the proposed LNP would be "very small" or "small". Additionally it is my professional opinion that the quantity and adverse environmental impacts from salt and other contaminants in cooling tower drift from the proposed LNP would be large and irreversible and would result in large-scale death of forests and other native vegetation for many miles beyond the site boundaries of the proposed LNP, similar to the death and destruction of native vegetation that has occurred in the vicinity of the Crystal River nuclear facility in adjacent Citrus County. (**0030-2-7** [Bacchus, Sydney])

Comment: The DEIS (p. 5-80) also acknowledges that these emissions would represent a "major source of emissions "ranging from 115.7-154.26 lb/hr of PM emissions. Therefore, there is no scientific basis for this statement inferring that the proposed LNP cooling towers would emit a very small quantity of what is often referred to as 'drift.'" Neither Howroyd's affidavit [CH2MHill August 17, 2010 affidavit to support PEF's Motion for Summary Disposition] nor the DEIS produced any studies that sampled/measured drift from relevant cooling towers. (**0030-2-8** [Bacchus, Sydney])

Comment: Importance of site-specific measurements of air concentration, vertical deposition and sedimentation - Neither PEF nor the DEIS appears to have even a single year of air concentration and vertical deposition data or sedimentation measurements from a comparable site as support for allegations that drift from the proposed LNP cooling towers would not result in significant adverse environmental impacts. (**0030-2-9** [Bacchus, Sydney])

Response: *The potential effects of salt drift on terrestrial ecological resources are discussed in Section 5.3.1 of the EIS. As stated in Section 5.7.2 of the EIS, salt drift represents less than 0.0005 percent of the water flowing through the circulating-water system.*

Section 5.3.1.1 of the EIS does, however, state and support a conclusion that salt drift is not expected to significantly affect terrestrial resources because salt deposition onto vegetation is expected to be minor, adverse impacts on vegetation from drift-related soil salinization is not expected, and increases in the salinity of surface water from drift would be low and not expected to impair freshwater ecosystems on the LNP site. This conclusion is further supported by studies from operating power plants in various geographic regions across the United States. According to GEIS Section 4.3.5.1.3 (NRC 1996), monitoring results from operating nuclear power plants, as well as literature review and information provided by natural resource and agricultural agencies in states with nuclear power plants, have not documented any measurable degradation of the health of natural plant communities from cooling-tower operations. This additional information was added to Section 5.3.1 to support the salt-drift conclusion.

Section 5.3.1.1 of the EIS summarizes the findings of a 14-year salt-drift study at the nearby CREC facility as corroborating support for the conclusion that potential salt-drift effects on plant communities at the LNP site would be minor. Air concentration data were not collected as part of the CREC study, but salt-deposition data were collected monthly using bulk precipitation collectors, and salt deposition onto plant foliage was periodically measured. Although the CREC is located on the coast (versus 7.9 mi inland for the LNP site), the review team believes certain aspects of the study provide useful supporting information about the potential for salt drift to affect plant species and plant communities that are common to both the CREC and LNP sites. No changes were made to the EIS in response to this portion of the comment.

Comment: It is my professional opinion that the proposed mitigation plan, which was not included in the DEIS, is not a scientifically viable plan, includes proposed action that will be scientifically impossible to implement and is otherwise grossly inadequate to compensate for the irreversible adverse environmental impacts of the proposed LNP singly, as well as the proposed LNP and proposed Tarmac mine projects. (**0030-3-18** [Bacchus, Sydney])

Response: *The wetland mitigation plan (ESI and TEI 2011) prepared for the proposed LNP project is summarized in Section 4.3.1.7 of the EIS. The plan is publicly available. The USACE and the FDEP are evaluating the applicant's mitigation plan for compliance with the CWA Section 404 and Florida ERP permitting processes. The USACE's final evaluation of the proposed plan and final decision whether to issue a USACE permit to affect wetlands will be documented in a separate USACE ROD after issuance of the EIS. Feasibility of implementation will be part of USACE's evaluation of the plan. The final evaluation and determination in the*

ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. The NRC is not responsible for the approval or enforcement of the final wetland mitigation plan, although it does consider mitigation proposed by the applicant when evaluating potential environmental impacts. This responsibility lies with the FDEP and the USACE. No changes were made to the EIS in response to this portion of the comment.

The proposed Tarmac King Road Limestone Mine is an independent action separate from the proposed LNP project. Impacts that could result from construction and operation of the Tarmac Mine will be addressed in a separate EIS being prepared by the USACE. Information about the status of this EIS can be found at http://www.kingroadeis.com. Because of its location near the LNP site, the proposed Tarmac Mine could cumulatively affect many of the same terrestrial habitats as affected by the LNP project. A discussion of these potential impacts is presented in Sections 4.3.1.5 and 7.3.1 of the EIS. No changes were made to the EIS in response to this portion of the comment.

Comment: Mitigation infers significant adverse environmental impacts - The DEIS Abstract (paragraph 2) states: The EIS includes the review team's analysis that considers and weighs the environmental impacts of constructing and operating two new nuclear units at the LNP site and alternative sites, and mitigation measures available for reducing or avoiding adverse impacts. If the adverse environmental impacts of the proposed LNP project truly were small, as PEF and the DEIS claim, then no mitigation would be required. In reality, a proposed mitigation plan that is approximately 1-inch thick was proposed and referenced in the DEIS, despite the fact that no copy of this proposed plan was incorporated as part of the DEIS. Therefore, the general public did not have access to the proposed mitigation plan to provide comments. (**0030-3-15** [Bacchus, Sydney])

Response: *The draft EIS does not claim that all of the potential adverse environmental impacts from the project would be SMALL. The review team concluded that impacts on terrestrial ecological resources, which include wetlands, would be MODERATE for construction and preconstruction, and SMALL to MODERATE for operation of the proposed LNP project. A summary of these findings is presented in Sections 4.3.1.8 and 5.3.1.6 of the EIS. PEF developed a wetland mitigation plan to compensate for the loss or impairment of functions in wetlands affected by development. The wetland mitigation plan (ESI and TEI 2011) is summarized in Section 4.3.1.7 of the EIS. The complete plan is publicly available through ADAMS on the NRC website. No changes were made to the EIS in response to this comment.*

Comment: In the ground water modeling portion of the section written in support of P.E.'s water use permit application it is stated that the SWFWMD "presumes an adverse impact to a wetland if the long-term median water level falls below the Minimum Wetland Level (MWL). The District has assigned these elevations to "sentinel" wetlands. "The District states that it can extrapolated levels for wetlands that haven't had official levels set by similar wetlands in close proximity. "A MWL is at 1.8 ft below normal pool and with a 1:1 relationship a 1.0 ft decline translates into a decline in wetland water levels. It is stated the methodology works in other

areas but there are no sentinel wetlands or published MWL's in Levy County so data was based on estimations from other areas. (**0045-2** [Casey, Emily])

Response: *The review team's approach did not rely on the use of sentinel wetlands or published minimum wetland levels for Levy County to estimate potential impacts on wetlands. The comment addresses the estimation of potential wetland impacts under the DWRM2 groundwater model prepared by PEF for the water-use permit application submitted for the LNP project. As noted in Sections 5.2.2 and 5.3.1.1 of the EIS, the review team requested that the model be recalibrated for the EIS to improve model fit to water level observations in the vicinity of the LNP site. The recalibrated model contributed to the evaluation of the potential effects of operational groundwater use on wetlands. The review team used a decline of 0.5 ft in the surficial aquifer as being indicative of potential wetland impacts, following Mortellaro et al.'s method (1995). As noted in Section 5.3.1.1, the State of Florida imposed conditions in the Conditions of Certification issued for the LNP project that would require an EMP to determine whether groundwater withdrawals have or are predicted to have an adverse effect on wetlands or other surface waters (FDEP 2011b). The EMP would require monitoring of both groundwater and wetlands on the LNP site. The USACE is continuing its evaluation of groundwater withdrawal for service water for plant operations. If PEF can demonstrate to the USACE that operational groundwater withdrawals at the LNP site would not result in greater adverse impacts on wetlands in comparison to practicable alternative sites or to practicable alternatives to groundwater withdrawal for operational water supplies at the LNP site (such as desalination), then the LNP site with groundwater withdrawals could be acceptable as the Least Environmentally Damaging Practicable Alternative (LEDPA). At this time, PEF is developing a groundwater testing and monitoring plan in order to demonstrate to the USACE that the LNP site with groundwater withdrawal for service water for plant operations would be the LEDPA. The groundwater testing and monitoring plan must be submitted by PEF to the USACE for USACE's review and approval before a Department of the Army (DA) permit could be issued. If PEF's groundwater testing and monitoring plan receives USACE approval, implementation of the plan would be required by special conditions of a DA permit, if issued. No changes were made to the EIS in response to this comment.*

Comment: Failure of the LNP DEIS to consider highest ranked critical wildlife habitat - The LNP DEIS failed to take a hard look at, or even consider, the myriad "LARGE" direct, indirect and cumulative adverse impacts, including irreversible degradation of the chemical, physical and biological integrity of national waters on the highest ranked critical wildlife habitat which surrounds the proposed LNP site. The location of this critical wildlife habitat in Levy County is depicted in Bacchus Exhibit D3, which is incorporated herein by reference. The ranking was a result of The Integrated Wildlife Habitat Ranking System 2009 report for Florida (Endries et al., 2009). The map was produced from the GIS shape file provided by the Florida Wildlife Commission's web site at: http://research.myfwc.com/features/view_article.asp?id=35544 It is my professional opinion that construction and operation of the proposed LNP project alone would result in "LARGE" and irreversible adverse impacts to not only the high-ranked wildlife habitat in Levy County, but all wildlife habitat in Levy County by altering the chemical, physical and biological integrity of the nations waters, both inland and coastal. Therefore, a supplemental DEIS is required to adequately illustrate how the myriad direct, indirect and

cumulative adverse impacts, including irreversible degradation of the chemical, physical and biological integrity of national waters will affect Levy County's wildlife habitat. (**0020-35** [Bacchus, Sydney])

Response: *The information provided by the commenter on the Integrated Wildlife Habitat Ranking System Map for Levy County indicates that the habitat quality is much higher in the areas surrounding the LNP site than on the LNP site itself. The habitat quality on the LNP site is described in Section 2.4.1. As described in Sections 4.3.1 and 5.3.1, minimal impacts from construction or operation would occur in areas beyond the LNP site boundaries. Sections 2.4.1, 4.3.1, and 5.3.1 have been changed to reflect this information and analysis.*

Comment: Another shortcoming of the cumulative impacts analysis relating to groundwater and wetland impacts is found on Page 7-15. The DEIS states: "Since no other past, present, or reasonably foreseeable actions with significant impacts were identified..." The statement is puzzling because the review team makes the point repeatedly throughout the DEIS that past activities (i.e., commercial forest management) have greatly degraded almost the entire onsite area and large tracts of land in the region. For example, in discussing the condition of onsite wetlands on Page 4-31, the DEIS states:

These wetlands have been historically degraded by commercial forest management, generally are of lower quality and provide reduced functions relative to natural wetland cover types.

This clearly appears to be a past impact. Yet the fact that forest management activities have increased drainage, which has reduced aquifer recharge and diminished water quality in the past is not considered in the evaluation of cumulative impacts as is specified by the CEQ. (**0008-22** [Hubbard, Michael])

Response: *Section 7.3.1.1 describes past impacts to wetlands due to forestry, agriculture, urbanization, and other activities. No changes were made to the EIS in response to this comment.*

Comment: The DEIS (p. 5-28) further suggests that the proposed "wetland mitigation plan" (Entrix, 2010) for the proposed LNP proposes "controlled burns" to "reduce fuel loads in upland and wetland areas on and around the LNP site" and that rapid fire response would be expected if "wildfires unexpectedly occur around the LNP project" for "offsite fire-proctection" resources. In reality, similar attempts by federal, state and private control-burn/wildfire experts have been unable to achieve those same goals due to hydroperiod alterations. Therefore, it is my professional opinion that those claims have no scientific basis and will be impossible to achieve. Neither the DEIS nor PEF evaluated the adverse environmental impacts of decreasing or "putting out" wildfires that are beneficial and essential to the ecosystems surrounding the proposed LNP site and the inability for such beneficial fires to continue. (**0030-2-5** [Bacchus, Sydney])

Response: *Prescribed fire is a component of the applicant's wetland mitigation plan proposed for the LNP project (Entrix 2010; ESI and TEI 2011), which is summarized in Section 4.3.1.7 of the EIS. The complete mitigation plan is publicly available on the NRC website. The EIS*

makes no assertion as to how ecologically successful the use of prescribed fire would be; however, prescribed fire is frequently used to improve habitats in the Goethe State Forest, located immediately north and northwest of the LNP site. PEF currently uses prescribed fire as a management tool at its nearby CREC facility (PEF 2009c). Regular use of prescribed fire on the LNP mitigation lands would lessen fuel loads, which should reduce the likelihood of severe ecological damage if an uncontrolled wildfire were to burn across these lands. Use of prescribed fire to introduce frequent but light controlled burns would help to simulate the presettlement fire regime at the mitigation sites and help prevent accumulation of fuel loads consisting of leaf duff and dense undergrowth that would increase the likelihood of unplanned severe "crown" fires that could severely damage the forest canopy. The EIS does not discuss the ecological ramifications of controlling natural wildfires on public and private lands surrounding the LNP site. Decisions to control wildfires on surrounding lands would be made by the appropriate State and local agencies. No changes were made to the EIS in response to this comment.

Comment: What kind of effect is the nuclear plant going to have with the salt on the animals that are around me? The deer -- I see some of the stuff, comments that they put in the environmental list, but on the deer, the turkeys, the squirrels, the rabbits, and all the other animals. I mean, the salt air, I know it kills a lot of things. Deer do like salt licks and stuff, but it does kill vegetation and stuff, because I know a lot of the islands northwest of Turkey -- or nuclear -- of Crystal River have some dead trees. And I'd like to know why that's happening. (**0001-7-6** [Smith, Robert])

Response: *The comment expresses concern that salt drift released by the cooling towers could have an adverse effect on animals that live in the area around the LNP site. As noted in Section 5.3.1.1 of the EIS, dissolved salt from drift would be deposited in a localized area around the proposed cooling towers. Salt-drift modeling suggests that minor leaf damage to some vegetation may at times occur on the LNP site, but damage to offsite vegetation is unlikely. This minor leaf damage would not be expected to noticeably affect habitat for wildlife that reside in this area.*

Wildlife that reside in areas where salt drift occurs could ingest salt at levels that exceed natural background levels. It is expected that sodium chloride (NaCl) would compose most of the salt in drift because NaCl accounts for about 85 percent of the dissolved salt in seawater, the cooling-water source proposed for the LNP. Drift-derived salt available to animals would vary with changing weather conditions and the amount of forage and surface water consumed. Incidents of salt toxicity in animals that reside around the LNP site would be highly unlikely. It is expected that physiological processes would compensate for increased salt consumption by birds and mammals. Amphibians could be more susceptible to salt because their permeable skin is involved with regulating salt balance, they produce unprotected (unshelled) aquatic eggs, and have aquatic larval stages; however, little impact is expected because the likelihood of substantial salt concentration in surface waters on the LNP site is low. To date, the NRC has not identified drift-associated salt toxicity in animals as a problem at any operating nuclear power plant in the United States (NRC 1996, 2000). Section 5.3.1.1 of the draft EIS was updated to include information on the potential effects of salt drift on wildlife.

The comment also notes that trees are dying on islands northwest of the CREC, and asks why. A long-term study conducted at the Waccasassa Bay Preserve State Park between 1992 and 2005 revealed a pattern of declining tree regeneration and increasing tree mortality in coastal forests that was attributed to the combined effects of salinity stress from sea-level rise and a La Nina-associated drought (DeSantis et al. 2007). Section 5.3.1.1 of the EIS was updated to include this information.

Comment: Monitoring of Salt Drift Impacts at Crystal River Nuclear Power Plant-Additional evidence of the adverse impact of salt drift on native vegetation is seen in the excerpts from the 1995 monitoring report for the Crystal River Nuclear Power Plant in adjacent Citrus County incorporated herein as Bacchus Exhibit E7. Despite the list of inadequacies of that study, the dramatic irreversible damage to native vegetation can be seen in Figures 13a and 13b of that report described as "Areas of Heavy Cabbage Palm Stress and Mortality in the Brackish Marsh Zone West of the Coastal Control Site." (**0020-45** [Bacchus, Sydney])

Response: *The comment asserts that cooling-tower drift at CREC is contributing to severe stress and death of native vegetation, and that similar salt-drift impacts could occur at the LNP site. The CREC salt-drift study did document stress and death of native vegetation in the coastal transition zone between upland forest and estuarine marsh (PEF 2009b,c); however, these impacts were attributed to sea-level rise and saltwater intrusion, not cooling-tower salt drift. This was corroborated by a long-term study conducted at the Waccasassa Bay Preserve State Park between 1992 and 2005 that revealed a pattern of declining tree regeneration and increasing tree mortality that was attributed to the combined effects of salinity stress from sea-level rise and a La Nina-associated drought (DeSantis et al. 2007). Section 5.3.1.1 of the EIS was updated to include this information.*

Comment: Cumulative impacts of salt and other airborne contaminants in drift from proposed LNP cooling towers not quantified or assessed - Because PEF and the DEIS failed to identify and quantify and all of the components that would occur in "drift" from the proposed LNP cooling towers using comparable existing cooling towers, the cumulative impacts solely from contaminants in that drift cannot be determined. (**0030-2-13** [Bacchus, Sydney])

Response: *The potential effects of salt drift on terrestrial ecological resources are discussed in Section 5.3.1.1 of the EIS. Chemical salts found in brackish seawater (mainly NaCl) are expected to be the primary components of TDS in the LNP drift. Other compounds that may occur in drift include biocides added to the circulating-water system and possible contaminants in stormwater ponds that may be used as a source of makeup water during extended wet periods. Section 5.3.1.1 of the EIS was updated to include an evaluation of the potential effects of added biocides and other compounds to terrestrial resources. The potential effects of biocides are also addressed for aquatic ecology in Section 5.3.2 of the EIS and in the GEIS (NRC 1996) as a potential cooling-water discharge impact. Discharge of effluents from nuclear power plants are regulated under NPDES permits.*

Comment: Acute and chronic effects of salt deposition and other airborne contaminants from the proposed LNP cooling towers - The DEIS and PEF also failed to quantify and

address the distinction between acute and chronic effects that would result from drift from the proposed LNP cooling towers. (**0030-2-15** [Bacchus, Sydney])

Response: *A discussion of the potential acute (short-term) and chronic (long-term) exposure effects of salt drift on vegetation was added to Section 5.3.1.1 of the EIS.*

Comment: There was no consideration in Howroyd's affidavit [CH2MHill August 17, 2010 affidavit to support PEF's Motion for Summary Disposition] by PEF, or in the DEIS of how plants and animals subjected to a reduced availability of uncontaminated fresh water resulting from passive and active dewatering, particularly during drought conditions, or other periods of limited rainfall, will be affected by the additional stressor of salt drift. In fact, both PEF and the DEIS consistently look at each impact as a discrete problems. Clearly a more holistic approach is required for compliance with NEPA regarding cumulative impacts. (**0030-2-19** [Bacchus, Sydney])

Response: *Section 5.3.1.1 of the EIS was modified to include a discussion of how wildlife that reside in areas where LNP salt drift occurs could be expected to respond to increased exposure to salt.*

Comment: The threshold salt deposition rate used to identify a potential impact to vegetation off-site at Levy is 10 kg/ha/mo. This threshold for potential impact was derived from an agricultural crop, specifically corn, which is intensely irrigated. There are no cornfields in the vicinity of the proposed LNP, as noted by PEF. Therefore, that threshold is an inappropriate level for adverse impacts to native vegetation and ecosystems in the vicinity of the proposed LNP, which must survive without agricultural irrigation. Neither PEF nor the DEIS provided any scientific support for using a threshold salt deposition rate based on corn. Indeed, there is none. (**0030-2-20** [Bacchus, Sydney])

Response: *As discussed in Section 5.3.1.1 of the EIS, the potential effects of salt drift on vegetation at the LNP site was assessed using a threshold for visible leaf damage from cooling-tower salt deposition of 10–20 kg/ha/mo. The threshold is based on the responses of relatively sensitive plant species (both cultivated and native) reported in the scientific literature, as summarized in the GEIS (NRC 1996). Corn is reported to be one of the more sensitive cultivated species relative to salt deposition, while flowering dogwood and white ash are relatively sensitive native species. Although the sensitivity of corn to salt deposition is factored into the threshold, the threshold is derived from the response of a variety of native and cultivated species to salt deposition. Many native and agricultural plants considered in the salt-drift analysis in the GEIS did not display foliar injury to salt drift at rates multiple orders of magnitude higher than the 10–20 kg/ha/mo threshold; the threshold reflects relatively sensitive species, although not the most sensitive. Additional discussion was added to Section 5.3.1.1 of the EIS about the specific studies and species considered by the authors of the GEIS to develop the thresholds for salt-drift impacts on vegetation.*

Comment: Despite this unique location, the introduction of salt, via drift from the nuclear plant cooling towers to the environment, approximately 31 pounds of salt daily or 6.72 million pounds over the 60-year life of the plant, is only assigned a small impact. (**0002-2-2** [Foley, Beth])

Comment: Cumulative impacts on a temporal scale - The threshold referenced above also fails to address 60 years of salt drift and airborne deposition of other compound from the proposed LNP cooling towers. Likewise, the threshold also fails to account for drought conditions on the historic scale or an increase in frequency and intensity of future droughts due to climate disruption. Furthermore, that threshold also fails to account for cumulative temporal impacts of salt drift combined with hydroperiod alterations from passive and active dewatering and surface water withdrawals, combined with other consequences inherent in PEF's plans for the proposed LNP. (**0030-3-1** [Bacchus, Sydney])

Response: *Discussion regarding the salt-deposition threshold for visible leaf damage (i.e., 10–20 kg/ha/mo during the growing season) is provided in Section 5.3.1.1 of the EIS. Although the threshold wasn't developed using 60 years of vegetation exposure to salt drift, and wasn't specifically intended to detect the interaction between drought, groundwater withdrawal, and salt drift, the threshold does provide a meaningful indicator of potential adverse effects on vegetation during the growing season. The salt-drift threshold was derived from the responses of relatively sensitive plant species (both cultivated and native) to salt deposition as reported in the scientific literature (NRC 1996). Furthermore, monitoring results from operating nuclear power plants, as well as literature review and information provided by natural resource and agricultural agencies in states with nuclear power plants, have detected no measurable productivity losses to agricultural crops or any measurable degradation of the health of natural plant communities from cooling-tower operations (NRC 1996). These findings, which encompass the natural variability in rainfall and drought for areas around nuclear power plants, suggest that significant long-term effects on vegetation from salt drift are rare. Additional information was added to Section 5.3.1 to support this conclusion.*

Comment: The DEIS repeats similar [refers to Howroyd's August 17, 2010 Affidavit statements to support PEF's Motion for Summary Disposition] unsubstantiated claims on p. 5-23, as follows: Salt drift and deposition are not expected to impair freshwater ecosystems at the Levy site. These statements ignore the following findings of the U.S. Global Change Research Program (GCRP), ironically also included in the DEIS (p. 7-12, Line 19): While the GCRP has not incrementally forecasted the change in precipitation by decade to align with the licensing action, the projected change in precipitation from the recent past (1961-1979) to the period 2080 to 2099 is a decrease of between 20 to 25 percent in spring and an increase of between 15 to 20 percent in the fall (GCRP 2009). Declines in aquifer water levels may continue throughout Florida, as the aquifers are relied on in response to changes in precipitation and the growth in demand for freshwater (GCRP 2009). (**0030-3-2** [Bacchus, Sydney])

Comment: [H]is [Howroyd's CH2MHill affidavit dated August 17, 2010 to support PEF's Motion for Summary Disposition] statements in the DEIS that salt is not expected to impair freshwater ecosystems completely ignores the fact that the rain simply will transfer the salt into the soil, where it will cause root damage and death. (**0030-3-3** [Bacchus, Sydney])

Response: *Section 5.3.1.1 of the EIS discusses the potential for salt drift to noticeably impair freshwater ecosystems on the LNP site. This is unlikely because of the low contribution to surface-water salinity from cooling-tower drift and because salt is not expected to concentrate in*

surface waters. The projected changes in precipitation patterns for southwest Florida over the next 70 to 80 years, as reported by the U.S. Global Change Research Program (GCRP) (2009), are for a decline in rainfall of between 20 to 25 percent in the spring and an increase of between 15 to 20 percent in the fall. Using a similar conservative approach (i.e., assuming maximum drift rate and lowest mean monthly precipitation rate), the conclusions regarding surface-water salinization would not change (i.e., would remain low). Additional information was added to Section 5.3.1 to support this conclusion.

The potential for drift-associated soil salinization to affect vegetation is also described in Section 5.3.1.1 of the EIS. Adverse impact was determined to be unlikely because the LNP site receives sufficient rainfall (approximately 53 in./yr) to leach salts from the predominately sandy soil profile. The projected changes in precipitation patterns for southwest Florida over the next 70 to 80 years, as reported by the GCRP (2009) (spring decline of between 20 to 25 percent, fall increase of between 15 to 20 percent), would not be expected to contribute to significant soil salinization. This is further supported by the GEIS (NRC 1996) review of salt-drift effects on soils, which determined the effects to be transitory to undetectable in humid environments such as Levy County. Section 5.3.1.1 of the EIS was revised to include additional information supporting this discussion.

Comment: Failure to address cumulative environmental effects of climate disruption on rainfall patterns combined with adverse impacts of "drift" - The occurrence of less rainfall during the "wet" season than during the "dry" season in Levy County that I described above may be the result of climate disruption. Climate disruption has been well-documented by scientists world-wide and is known to be exacerbated by the loss of forest resources as well as from loss of organic soils. Neither PEF nor the DEIS evaluated the cumulative adverse impacts to the environment; such as the inland and freshwater ecosystems in the vicinity of the proposed LNP, of climate disruption on rainfall combined with salt drift. Large, rather than so-called "small" adverse impacts claimed by PEF and the DEIS would be expected from the abnormal wet season rainfall I described above as well as from rainfall abnormalities associated with increasing climate disruption. For example, salt drift during summer months with limited rainfall will result in severe acute damage to foliage of native vegetation. Periodic occurrences of high rainfall would flush accumulated salt and other airborne contaminants from the proposed cooling towers into the soil and shallow aquifer system resulting in severe chronic damage to the roots of native vegetation. Therefore, there is no scientific basis for claims by PEF and the DEIS that salt drift would not contribute to significant adverse environmental impacts in the vicinity of the proposed LNP. The question that remains to be answered is not IF the damage would occur, but rather WHERE the damage will occur. Clearly that question cannot be answered by the current model results considering the problems described above, including the failure to consider even the limited number of cumulative impacts described in my affidavit. (**0030-3-6** [Bacchus, Sydney])

Response: *The meteorological data presented in the EIS are generally from either first-order meteorological stations or data that have been collected onsite. In the EIS, the conditions at Tampa, Florida, were taken to be representative of the climate of central Florida, including the LNP site. The National Oceanic and Atmospheric Administration (NOAA 2010)-produced*

Tampa Florida Local Climatological Data Annual Summary with Comparative Data were used for this analysis. These data show that the normal rainfall is greater during the summer and early fall than during other times of the year. Similar behavior is also apparent in the SWFWMD data; however, significant year-to-year variability in the precipitation observed at any site can lead to instances in which the dry-season precipitation is actually greater than the wet season precipitation in a given year. The commenter defines a 4-month wet season and an 8-month dry season, and apparently compares the total rainfall for each season in each given water year. The pattern described (i.e., "less rainfall during the wet season than during the dry season"), is more likely a function of there being twice as many months summed for the dry season rainfall totals than for the wet season, rather than the result of climate disruption. A more meaningful metric would be average wet season monthly rainfall compared to average dry season monthly rainfall. No changes were made to the EIS in response to this portion of the comment.

Section 5.3.1.1 of the EIS discusses the potential for salt drift to affect terrestrial ecological resources, including freshwater ecosystems on the LNP site. Salt drift is not expected to significantly affect these resources because salt deposition onto vegetation is expected to be minor, an adverse impact on vegetation from drift-related soil salinization is not expected, and increases in salinity of surface water from drift would be unlikely and not expected to impair freshwater ecosystems on the LNP site. According to the NRC GEIS for license renewal of nuclear power plants (NRC 1996), monitoring results from operating nuclear power plants, as well as literature review and information provided by natural resource and agricultural agencies in states with nuclear power plants, have not documented any measurable degradation of the health of natural plant communities from cooling-tower operations. The projected changes in precipitation patterns for southwest Florida over the next 70 to 80 years, as reported by the GCRP (2009), are for a decline in rainfall of between 20 to 25 percent in the spring and an increase of between 15 to 20 percent in the fall. Climate-induced change at this level is not expected to contribute to significant salt-drift impacts on terrestrial resources. Section 5.3.1.1 of EIS was revised to include additional information supporting this discussion.

Comment: When addressing the effect of salt drift in the Levy Nuclear Plant Draft Environmental Impact Study, vegetation comparisons with Crystal River's nuclear plant, that is located on the Gulf of Mexico, are made, the results of salt drift at this plant should not be equated with two nuclear plants located ten miles inland in the middle of an aquifer recharge wetland. (**0002-2-3** [Foley, Beth])

Response: *Section 5.3.1.1 of the EIS presented the findings of a 14-year salt-drift study at the nearby CREC as support for the conclusion that potential salt-drift effects on plant communities at the LNP site would be minor. Although the CREC is located on the coast (versus 7.9 mi inland for the LNP site), the review team determined that certain aspects of the study provide useful supporting information about the potential for salt drift to affect plant species and plant communities that are common to both the CREC and LNP sites. The CREC salt-drift study was only one source of evidence used in evaluating potential salt-drift impacts in the EIS. No changes were made to the EIS in response to this comment.*

Comment: The bulk of the mitigation is going to cut off all of the flow of wildlife from the Goethe State Forest to the Robinson tract, down to the Withlacoochee River. It is situated over on the southeastern corridor and it's going to be completely blocked off by the heavy-haul road. (**0002-10-4** [Seymour, Mike])

Comment: Finally, it seems that it would be a shame that the effect of the proposed plan would necessarily create a situation which would result in the loss of a large, protected habitat, which could enable wildlife movement through the Goethe State Forest all the way to the Withlacoochee River, with the accompanying ecological advantage which would result, as well. Few areas of this size and magnitude still exist in Florida. And acceptance of this plan would necessarily result in the impossibility of this unique benefit. (**0002-6-5** [Smith, Charles])

Comment: I also want to question the wildlife corridors. If you've got preservation on the -- or wetland mitigation on the Progress Energy site and then in the Goethe State Forest, the Robinson Estate property lies in between those two. So, Progress Energy is relying on the Robinson Estate property remaining undeveloped in order to provide that wildlife corridor. The same could be said for the flow of water and similar ecological attributes. (**0002-7-6** [Avery-Smith, Ellen])

Comment: We are also concerned that the Original Wetland Mitigation Plan, which has now been abandoned, called for the additional benefit of establishing, through our property, a continuous and preserved wildlife corridor that would connect the Goethe State Forest and the Withlacoochee floodplain and would enhance wildlife habitat value and movement between the Forest and the Withlacoochee River. The Corps, NRC and Progress Energy cannot usurp our property for mitigation or other purposes by assuming that it will remain undeveloped. (**0023-4** [Avery-Smith, Ellen] [Smith, Charles])

Comment: How does the Revised Mitigation Plan connect the Goethe State Forest to the Withlacoochee River floodplain and associated public conservation lands? If the Revised Mitigation Plan provides for this connection or corridor, would this connection or corridor be as beneficial to the state and public as the planned connection and corridor outlined in the Original Wetland Mitigation Plan? If yes, how would the benefits be consistent with the Original Wetland Mitigation Plan? (**0023-6** [Avery-Smith, Ellen] [Smith, Charles])

Comment: The Revised Mitigation Plan calls for a majority of the wetland mitigation to be located within the southwestern portion of the LPN site. Will the use of this on-site location be as beneficial to supporting wildlife movement between the Goethe State Forest and the Withlacoochee River basin as that outlined in the Original Wetland Mitigation Plan? (**0023-7** [Avery-Smith, Ellen] [Smith, Charles])

Response: *The applicant's wetland mitigation plan (Entrix 2010; ESI and TEI 2011) is designed to provide mitigation for wetland impacts in accordance with Florida and USACE regulations. One possible benefit of wetland mitigation is that it can create or preserve wildlife travel corridors; however, this is just one of many factors considered in wetland mitigation plan design. The USACE will review the mitigation plan to ensure that it meets requirements established under the CWA. The State of Florida will also review the mitigation plan to ensure*

that it meets requirements established by the State ERP. While the evaluation of the applicant's wetland mitigation plan would not presuppose that adjoining private properties would remain undeveloped, the evaluation would assess neighboring land in its current condition. No changes were made to the EIS as a result of these comments.

E.1.9 Comments Concerning Ecology – Aquatic

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] adverse effects upon offshore sea grass meadows and consequent irreparable damage to the marine food web from discharge of toxic heated effluent into the Gulf of Mexico. (**0005-12** [Hopkins, Norman])

Comment: [D]ischarges of such waters from springs into protected surface waters would likely hazard ... flora and fauna, including protected species such as the manatee, as well as impair offshore sea grass meadows in which the marine food web is nurtured. Such activities would adversely impact the economic worth of protected waters suggested to exceed $20 million per annum. (**0005-27** [Hopkins, Norman])

Comment: The discharge plumes from the Crystal River Energy Complex as represented in DEIS Figures 5.6, 5.7 and 5.8 and are delineated into the southern extremity of the BBSGP boundaries and it is reasonable to conclude examination of marine water chemistry alteration due to diversion and consumptive use is likewise justified. Such alterations will impact a valuable and stable coastal estuary system for the life of the plant and such impacts will begin at the bottom of the food chain. (**0042-14** [Hilliard, Dan])

Response: *The EIS addresses impacts on offshore habitat and marine species from discharge of blowdown effluent in Section 5.3.2. The review team concluded that chemical, thermal, and physical impacts on habitat and aquatic biota of the blowdown effluent from LNP Units 1 and 2 into the CREC discharge canal and Gulf of Mexico would be SMALL, due to the small increase in discharge associated with the additional LNP blowdown. Furthermore retirement of the two once-through fossil plants once LNP begins operation will significantly reduce the discharge flow to and thermal loading of Crystal Bay, lessening the impact on aquatic life in the receiving waters. No changes were made to the EIS in response to these comments.*

Comment: The impacts of the power plant will impact... the aquatic ecosystems. (**0001-11-7** [Minno, Maria])

Response: *The comment is not specific in identifying what might have an impact on aquatic ecosystems. The EIS addresses impacts on aquatic ecosystems from preparation, construction, and operation of the proposed plant in Sections 4.3.2 and 5.3.2. The review team concluded that the impact on the aquatic ecosystem would be SMALL. No changes were made to the EIS in response to this comment.*

Comment: Increased use of the Barge Canal will harm the endangered manatees who frequent it, birthing and feeding there. (**0001-5-11** [Berger, Betty])

Response: *The EIS addresses impacts on manatees from activities in the CFBC associated with preparation, construction, and operation of the proposed plant in Sections 4.3.2 and 5.3.2. The review team concluded that impacts on manatees from preparation, construction, and operation of LNP Units 1 and 2 would be minimal. The U.S. Fish and Wildlife Service agreed with the review team's assessment of potential impact on manatees by letter dated December 1, 2011 (FWS 2011). No changes were made to the EIS in response to this comment.*

Comment: Freshwater input to the CFBC represented in the DEIS indicate substantial freshwater contribution and it is apparent that, under low-flow conditions, such as annual dry season and drought, none of the freshwater entering the CFBC may escape into the estuary. The review team appears to have only recognized increased salinity within the CFBC itself due to LNP withdrawals, and does not discuss the loss of freshwater input into the estuary. Freshwater losses could, by raising salinity levels, affect the Withlacoochee Bay, Big Bend Seagrasses Aquatic Preserve, and Class III shellfish waters. (**0008-27** [Hubbard, Michael])

Response: *The EIS addresses impacts on offshore habitat and marine species from operation of the proposed plant in Section 5.3.2. The review team considered the impact on aquatic organisms from the reduction in freshwater flow into Crystal Bay and Withlacoochee Bay due to the reduction in freshwater flows from the CFBC. The reduction in freshwater contribution might result in a detectable increase in salinity in the immediate vicinity of the mouth of the CFBC; however, this change in salinity would be limited in its areal extent and difficult to detect due to tidal action, density differences in freshwater and saltwater, weather conditions, and the bathymetry in the region, which is fairly shallow. The reduced freshwater discharge from the CFBC may affect the distribution and abundance of aquatic organisms in the CFBC and in the immediate vicinity of the mouth of the CBFC; however, organisms inhabiting the CFBC and the nearshore regions of Crystal Bay and Withlacoochee Bay are euryhaline and tolerant to changes in salinity. The review team consulted with the NMFS on the potential impact on habitat essential for managed fish stocks in the vicinity of the project. The review team's review of essential fish habitat concluded that construction and operation of the LNP would have minimal adverse impacts on essential fish habitat. The review team's conclusions were confirmed by the NMFS (NMFS 2010b). Likewise, it is unlikely that changes in site stormwater runoff would have a detectable effect on the salinity of nearshore water of the Gulf some 5 mi west of the site. No changes were made to the EIS in response to this comment.*

Comment: Section 2.4.2.1, Page 2-89, Starting at line 36: DEIS Section 2.4.2 continually references CH2M HILL 2009b which according to references in DEIS Section 2 is TMEM-079 (Estimated Salinity Changes in the Cross Florida Barge Canal and Old Withlacoachee River Channel after Levy Nuclear Plant Intake Operation). The reference CH2MHILL 2009b appears to actually come from the Essential Fish Habitat report located in Appendix F of the DEIS. This should be clarified in section 2.4.2 or it appears the wrong data source is being referenced. Once the DEIS reaches the OWR section on page 2-98, the reference is accurate. (**0010-1-13** [Kitchen, Robert])

Response: *The commenter is correct. The reference was changed to cite the correct source (CH2M Hill 2009,TMEM-087) for all sampling information in Section 2.4.2.*

Comment: Section 2.4.2.1, Page 2-97, Line 15: DEIS statement inconsistent with TMEM-087 (Aquatic sampling) which it references. (Note that CH2M Hill 2009b reference is not correct for Chapter 2, but is the same reference and number from Appendix F.) DEIS statement reads "Station 1 had the highest catches" for minnow traps from CFBC. TMEM-087 states "Station 2 had the highest overall sampling totals for all events". (**0010-1-15** [Kitchen, Robert])

Comment: Section 2.4.2.1, Page 2-97, Line 21: DEIS statement inconsistent with TMEM-087 (Aquatic sampling) which it references. (Note that CH2M Hill 2009b reference is not correct for Chapter 2, but is the same reference and number from Appendix F.) DEIS statement reads "Fall and Winter had the highest CPUE" for cast netting from CFBC. TMEM-087 reports Winter and Summer were highest respectively. (**0010-1-16** [Kitchen, Robert])

Comment: Section 2.4.2.1, Page 2-97, Line 27: DEIS statement inconsistent with TMEM-087 (Aquatic sampling) which it references. (Note that CH2M Hill 2009b reference is not correct for Chapter 2, but is the same reference and number from Appendix F.) Repeat of previous inconsistent statement, says "As with cast netting, Fall and Winter events yielded the highest CPUE". Need to remove "As with cast netting" since that statement is not consistent as mentioned above. (**0010-1-17** [Kitchen, Robert])

Comment: Section 2.4.2.1, Page 2-97, Line 36: DEIS statement about CFBC Station 1 "but still has appreciable numbers of sediment-dwelling invertebrates" is inconsistent with TMEM-087 which it references. (Note that CH2M Hill 2009b reference is not correct for Chapter 2, but is the same reference and number from Appendix F.) Data from TMEM-087 indicates very low numbers of sediment-dwelling invertebrates. (**0010-1-18** [Kitchen, Robert])

Comment: Section 2.4.2.1, Page 2-102, Line 5: DEIS statement inconsistent with previous paragraph and TMEM-087 (Aquatic Sampling). DEIS statement says Silver Perch were notably absent from CREC stations. Previous paragraph states they were a dominant species during cast netting at CREC stations. (**0010-1-19** [Kitchen, Robert])

Response: *The commenter is correct. The text and references were revised in Section 2.4.2.1.*

Comment: Section 2.4.2.3, Page 2-104, Line 35: DEIS statement should read Crevalle jacks were identified at CFBC station 2 near the US-19 overpass and at CREC stations 3 and 4. The statement omitted CREC station 3. (**0010-1-20** [Kitchen, Robert])

Comment: Section 2.4.2.3, Page 2-106, Line 6: DEIS statement should read pink shrimp were collected at CFBC stations 2, 3, and 4. The statement omitted CFBC station 4. Section 2.4.2.3, Page 2-106, Line 15: DEIS statement should read blue crabs were caught at all CFBC stations (1, 2, 3, and 4). The statement omitted CFBC stations 1 and 4. (**0010-2-1** [Kitchen, Robert])

Comment: Section 2.4.2.3, Page 2-108, Line 11: DEIS statement should read red drum were caught at CFBC stations 1 and 2. The statement omitted CFBC station 2. (**0010-2-2** [Kitchen, Robert])

Response: *The commenter is correct. Section 2.4.2.3 was revised to reflect these comments.*

Comment: EPA commends PEF for the extensive pre-applicant [aquatic] monitoring programs at the proposed LNP discharge location ... EPA understands that pre-operational surveys and monitoring are planned to be conducted for a period of time, and that statistical analysis will be used to establish seasonal and climatological baseline, biological and water quality conditions. EPA requests that PEF submit a CFBC and Withlacoochee River Survey and Monitoring Plan to EPA for review prior to initiation of formal monitoring. EPA may have specific monitoring recommendations and/or requirements after the permit application has been submitted. (**0003-5** [Mueller, Heinz J])

Response: *Section 4.3.2 of the EIS was revised to include updated information from the applicant on pre-operational monitoring to fulfill requirements for compliance with the FDEP.*

Comment: Essential Fish Habitat Assessment, Section 5.1.6, Page F-38, Line 28: DEIS statement inconsistent with TMEM-087 (Aquatic sampling) which it references, DEIS says Lane snapper were observed at all 3 CFBC stations. TMEM-087 only lists Lane snapper as being caught at CFBC station 3. (**0010-4-10** [Kitchen, Robert])

Comment: Essential Fish Habitat Assessment, Section 2.1, Page F-10, Line 8: DEIS statement implies that analytical water quality samples included TOC. TOC analyses were performed on sediment samples within the CFBC and not water samples.

Essential Fish Habitat Assessment, Section 2.2.1, Page F-17, Line 3: DEIS statement implies that analytical water quality samples included TOC. TOC analyses were performed on sediment samples within the CREC and not water samples. (**0010-4-5** [Kitchen, Robert])

Comment: Essential Fish Habitat Assessment, Section 2.2.1, Page F-17, Line 10: DEIS statement inconsistent with TMEM-087 (Aquatic Sampling). DEIS statement says Silver Perch were notably absent from CREC stations. TMEM-OB7 indicates Silver perch were caught cast netting at CREC stations. (**0010-4-6** [Kitchen, Robert])

Comment: Essential Fish Habitat Assessment, Section 3.1, Page F-21, Line 15: DEIS statement about size of inlet area needing to be larger than 106.1 ft2 references CH2MHILL 316(b) study. This information is not found in that source. Later, the same statement is referenced to PEF 2008a which is LNP 1 and 2 SCA volumes 1 through 9. References inconsistent and not accurate in regard to CH2MHILL 2009c.

Essential Fish Habitat Assessment, Section 4.2.1, Page F-28, line 1: DEIS statement about size of inlet area needing to be larger than 106.1 ft2 references CH2MHILL 316(b) study. This information is not found in that source. Later, the same statement is referenced to PEF 2008a

which is LNP 1 and 2 SCA volumes 1 through 9. References inconsistent and not accurate in regard to CH2MHILL 2009c. (**0010-4-8** [Kitchen, Robert])

Response: *The commenter is correct, the described inaccuracies in the reference occur in the Essential Fish Habitat (EFH) Assessment submitted to NMFS on August 5, 2010, and reprinted as an appendix to the EIS. The EFH assessment is part of the completed consultation between the NRC and NMFS (NRC 2010*b*). Therefore, no changes to the EFH Assessment are planned. Consultation between the USACE and NMFS is ongoing regarding EFH including conservation recommendations.*

Comment: Biological Assessment, Section 3.2.1, Page F-71, Line 30: DEIS statement about CFBC Station 1 "but still has appreciable numbers of sediment-dwelling invertebrates" is inconsistent with data from TMEM-087, which it references, that indicates very low numbers of sediment-dwelling invertebrates. (**0010-4-11** [Kitchen, Robert])

Comment: Biological Assessment, Section 3.2.3, Page F-73, Line 27: DEIS statement inconsistent with TMEM-087 (Aquatic Sampling). DEIS statement says Silver Perch were notably absent from CREC stations. TMEM-OB7 indicates Silver perch were caught cast netting at CREC stations. (**0010-4-12** [Kitchen, Robert])

Response: *The commenter is correct; the described inaccuracies occur in the review team's BA. The BA was submitted to NMFS on August 5, 2010, as part of the completed ESA consultation between NRC, USACE, and NMFS (NMFS 2010a). No changes were made to the BA, reprinted as an appendix to the EIS, in response to these comments. This comment is also applicable to Section 2.4.2.1 of the EIS. Changes to the text of Section 2.4.2.1 were made.*

Comment: Inadequate assessment of environmental impacts prevents determination of unpermitted taking -Because PEF and the DEIS have failed to identify, describe and consider all of the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP, required to determine the affected area of the proposed project, the affected public and regulatory agencies have been precluded from providing meaningful comments regarding the unpermitted taking of federally listed endangered and threatened species. In fact, because of the gross inadequacies of the DEIS, agencies such as the U.S. Fish and Wildlife Service (USFWS) and the U.S. Environmental Protection Agency (USEPA) are incapable of determining the total number of individuals of federally listed species such as manatees, sea turtles that will be taken (killed) and other environmental effects as a result of the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP. (**0020-46** [Bacchus, Sydney])

Response: *The EIS addresses cumulative impacts on Federally listed species from preconstruction, construction, and operation of the proposed plant in Section 7.3.2. The EPA has no jurisdiction for managing Federally listed species. Both the FWS and NMFS were consulted for concurrence with BAs to determine the impacts on Federally listed species due to direct, indirect, and cumulative effects consistent with the respective agency responsibilities. No changes were made to the EIS in response to this comment.*

Comment: Spring discharges along the CFBC -Federally endangered manatees are marine mammals. Like all mammals, manatees must drink fresh water to survive. Fresh groundwater discharges as springs are critical sources of fresh water for survival of manatees. Bacchus Exhibit FI includes five photographs of freshwater springs discharging along the CFBC in the immediate vicinity of where the proposed LNP has relocated it's groundwater withdrawal wells, where surfacewater withdrawals would occur and where the 100-foot deep pits and stormwater ponds would be excavated. This exhibit was submitted to NRC on September 23, 2010 as part of the public comments on the DEIS. This exhibit and the attachments referenced in this exhibit describe additional information that PEF and the DEIS failed to consider regarding adverse environmental impacts that would occur from the proposed LNP. The attachments referenced in this exhibit should be part of the official public record for the DEIS and are incorporated herein by reference.

Coastal spring discharges used as source of freshwater consumption by manatee -I have observed the CFBC springs illustrated in the photographs referenced above on numerous occasions and have verified that those discharges are fresh water. I have observed manatee drinking water from springs similar to those CFBC springs shown in the photographs referenced above, including coastal springs with less flow than the springs discharging to the CFBC. (**0020-47** [Bacchus, Sydney])

Comment: Example of unpermitted taking of federally endangered manatees by proposed LNP -In my professional opinion, the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP would terminate the flow of the springs discharging to the CFBC and other coastal springs in the vicinity of the proposed LNP. My opinion is based, in part, on my knowledge of the existing threats to the survival and recovery of manatees and other federally listed species including anthropogenic alterations of water quantity and quality such as those described in my peer-reviewed publication titled species. Part I: Marine ecological disturbances (Bacchus Exhibit F2). Furthermore, it is my opinion that the cessation of flow of those springs discharging to the CFBC and other areas in the affected area of the proposed LNP would result in the unpermitted taking of an undetermined number of manatees. The unpermitted taking of manatee may not be confined to the CFBC manatee population described in the Recommended Order for Save the Manatee Club, Inc. Case No. 96-1723 and attached hereto as Bacchus Exhibit F3. The unpermitted taking of manatee may include additional manatees in the coastal (estuarine) areas northwest and southwest of the proposed LNP. (**0020-48** [Bacchus, Sydney])

Comment: Ignored impacts of proposed CFBC cooling-tower withdrawals and excavations on manatees - A summary of the "potential operational impacts on Federally threatened and endangered species" was provided on DEIS page 5-56. Segmenting operational impacts of the proposed LNP from construction impacts of the proposed LNP ignores the combined adverse impacts of both phases. The DEIS failed to evaluate the combined adverse operational and construction impacts of the proposed LNP. In fact, the DEIS failed to even evaluate the adverse construction impacts independent of the combined construction and operational effects. For example, the 100-foot deep excavations into the aquifer would extend to approximately the same depth at the Vogtle nuclear facility under

construction in Georgia. See Bacchus Exhibit D-4. Those 100-foot deep excavations would result in both water quantity and water quality impacts to the CFBC and the federally endangered manatee that use that area. Furthermore, PEF and the DEIS also failed to consider adverse water quantity and water quality impacts on the manatee and other federally listed species of excavation of the cooling tower canal that FDEP permitted on March 11, 2009. See Bacchus Exhibit D-6. Despite the irreversible impacts of dewatering from these excavations for the proposed LNP, the DEIS considered only impacts of alterations of water temperature and manatees that may become entrapped as adverse impacts to manatees from the proposed LNP. (**0030-2-1** [Bacchus, Sydney])

Comment: Example of unpermitted "taking" of federally endangered manatees by proposed LNP - In my professional opinion, the direct, indirect and cumulative impacts associated with constructing and operating the proposed LNP would terminate the flow of the springs discharging to the CFBC and other coastal springs in the vicinity of the proposed LNP. My opinion is based, in part, on my knowledge of the existing threats to the survival and recovery of manatees and other federally listed species including anthropogenic alterations of water quantity and quality such as those described in my peer-reviewed publication titled "species. Part I: Marine ecological disturbances" (Bacchus Exhibit F-2). Furthermore, it is my opinion that the cessation of flow of those springs discharging to the CFBC and other areas in the affected area of the proposed LNP would result in the unpermitted "taking" of an undetermined number of manatees. The unpermitted "taking" of manatee may not be confined to the CFBC manatee population described in the Recommended Order for Save the Manatee Club, Inc. Case No. 961723 and attached hereto as Bacchus Exhibit F-3. The unpermitted "taking" of manatee may include additional manatees in the coastal (estuarine) areas northwest and southwest of the proposed LNP. (**0030-3-10** [Bacchus, Sydney])

Comment: Spring discharges along the CFBC - Federally endangered manatees are marine mammals. Like all mammals, manatees must drink fresh water to survive. Fresh groundwater discharges as springs are critical sources of fresh water for survival of manatees. Bacchus Exhibit F-1 includes five photographs of freshwater springs discharging along the CFBC in the immediate vicinity of where the proposed LNP has relocated its groundwater withdrawal wells, where surfacewater withdrawals would occur and where the 100-foot deep pits and stormwater ponds would be excavated. This exhibit was submitted to NRC on September 23, 2010 as part of the public comments on the DEIS. This exhibit and the attachments referenced in this exhibit describe additional information that PEF and the DEIS failed to consider regarding adverse environmental impacts that would occur from the proposed LNP. The attachments referenced in this exhibit should be part of the official public record for the DEIS and are incorporated herein by reference. ... Coastal spring discharges used as source of freshwater consumption by manatee - I have observed the CFBC springs illustrated in the photographs referenced above on numerous occasions and have verified that those discharges are fresh water. I have observed manatee drinking water from springs similar to those CFBC springs shown in the photographs referenced above, including coastal springs with less flow than the springs discharging to the CFBC. (**0030-3-9** [Bacchus, Sydney])

Comment: Like the Waccasassa Bay Preserve, it [Withlacoochee Bay] is recognized as habitat for multiple listed species. These waters are also recognized as a major shark nursery as identified by Mote Marine Laboratory (Attachment C). The study provided by Mote Marine Laboratory identifies substantial data clusters (occurrences), both north and south of the River and CFBC mouth. On 18 August 2010 various federal officials including Admiral Thad Allen (USCG, Ret.) and Dr. Jane Lubchenko (Administrator, NOAA) took part in a live release of 23 Kemp Ridley sea turtles in the vicinity of Cedar Key, Fl. The turtles had been rehabilitated from oil exposure resulting from the BP/Deep Water Horizon disaster. Dr. Lubchenko explained the site was chosen for several reasons, not the least of which being "...because this is the best type of habitat for the Kemps Ridley turtles of this age." The turtles were juveniles that weighed approximately 5 pounds. Further, she described the choice of waters around Cedar Key being due to the "pristine nature of the water and the habitat..." Meghan Koperski, an environmental specialist with the Florida Fish, Wildlife and Conservation Commission based in Tequesta, Fl. was quoted: "They were released offshore in an area known to be a Kemp's Ridley foraging habitat," she said. "Hopefully they will go out and behave like normal turtles." She said the sea turtles are very fond of crunchy items - like crabs. Why the release in Cedar Key? "It's a known hotspot for Kemp's Ridley. They're here year round. They are always offshore in the waters ... This is not a seasonal thing for them." (Citrus Chronicle, 19 August 2010, Page 1) The Kemp Ridley sea turtle is but one of 3 listed marine turtles dependent upon this habitat and a forth is listed as threatened. Additional protected marine species dependent upon such habitat include Manatees and Dolphins. (**0042-5** [Hilliard, Dan])

Response: *The review team acknowledges that groundwater pumping may result in a change in groundwater elevation in the vicinity of the wellfield. This could alter the flow rate of some of the freshwater springs that discharge into the CFBC closest to the LNP wellfield; however, as stated in Section 5.3.1.1 of the EIS, SWFWMD's review criteria would require that groundwater withdrawal would not cause unacceptable adverse impacts on wetlands or other surface waters. These requirements would minimize groundwater drawdown and alteration of freshwater spring flow. Even if some drawdown of the groundwater occurs, sufficient freshwater sources are expected to persist to ensure the survival of manatees. In addition, freshwater exists in the upper reaches of the Old Withlacoochee River to accommodate any freshwater needs of manatees transecting the CFBC. Based on the results of frequent FWS aerial manatee surveys, the CFBC does not serve as important habitat nor as a warm water refugium for manatees; therefore, the use of the canal by large numbers of manatees has not occurred in the past, nor is it expected to occur during LNP construction and operation. The discharge of heated effluent into the CREC discharge canal is not expected to adversely affect manatees inhabiting Crystal Bay. No takings of manatees due to operation of the LNP are expected. The EIS considers direct, indirect, and cumulative impacts on all Federally listed species from preconstruction, construction, and operation of the proposed plant in Sections 4.3.2 and 5.3.2. The FWS was consulted for concurrence with the review team's BA. On December 1, 2011, the FWS concurred with the review team's assessment of no jeopardy to the manatee (FWS 2011). In addition, impacts on habitat for sea turtles was assessed in a separate BA, which considered Federally protected species under the jurisdiction of the NMFS that potentially could be affected by LNP construction and operation. The review team considered direct, indirect, and cumulative impacts on the protected species, which included sea turtles, Gulf sturgeon, and smalltooth*

sawfish. On November 26, 2010, the NMFS concurred with the review team's assessment that the smalltooth sawfish, Gulf sturgeon in the Gulf of Mexico, and sea turtles, including the Kemp's Ridley turtle, are not likely to be adversely effected, as described in the August 5, 2010 BA (NMFS 2010a). No changes were made to the EIS in response to these comments.

Comment: Another benefit the basin could also provided if it is used as a manatee sanctuary area during the winter months since a lock at the dam enable passage to the cooling basin where the water is warmer during winter months. The lock could be open occasionally and be used as a staging area to allow the mammals to enter the basin. (**0028-5** [Fetrow, Robert])

Response: *The review team interprets this comment as a recommendation for the applicant to consider alternatives for a cooling basin in the CFBC. The use of the CFBC as a cooling canal or basin as the cooling system heat sink is impractical and would not dissipate sufficient heat to allow operation of the LNP Units 1 and 2. Furthermore without significant makeup and blowdown the total dissolved solids in the canal would quickly reach levels that were harmful to manatees and most other aquatic life. No changes were made to the EIS in response to this comment.*

Comment: Supplemental DEIS required to address deficiencies in current DEIS – Because of the gross inadequacies in the DEIS, a supplemental DEIS is essential to provide meaningful comments from the public and sister regulatory agencies. For example, the USFWS cannot determine the comprehensive number of federally listed species and individuals of those species that will be "taken" if the proposed LNP is constructed and operated based on the information provided in the current DEIS. Similarly, organizations and individuals dedicated to protecting federally listed species, such as "Save the Manatee" would be unable to determine that a manatee population is threatened by the proposed LNP simply by reading the current DEIS. Therefore, a supplemental DEIS is required. (**0020-54** [Bacchus, Sydney]) (**0030-3-14** [Bacchus, Sydney])

Comment: [T]he following conclusions in the DEIS lack any scientific basis and thus are arbitrary and capricious and the proposed LNP would result in unpermitted takings of undetermined numbers of individuals of federally listed sea turtles, sawfish, and manatees. Therefore, operation of LNP may affect, but is not likely to adversely affect, juvenile, subadult, and adult sea turtles, sawfish, or manatees. [sic] Based on this review, the staff concludes that the impacts on aquatic Federally listed threatened and endangered species from operation of proposed LNP Units 1 and 2 would be minimal and mitigation would not be warranted. (DEIS p. 5-56) (**0030-2-3** [Bacchus, Sydney])

Response: *The EIS addresses impacts on Federally listed species from operation of the proposed plant in Sections 4.3.2, 5.3.2, and 7.3.2. The review team prepared two separate BAs; one for the FWS and one for the NMFS. The BAs considered all Federally protected species that potentially could be affected by LNP construction and operation. The review team considered direct, indirect, and cumulative impacts on the protected species. The review team has met with both agencies during the review and has extensively documented all Section 7 consultation efforts. On November 26, 2010, the NMFS concurred with the review team's*

assessment that the smalltooth sawfish, Gulf sturgeon in the Gulf of Mexico, and sea turtles, including the Kemp's Ridley turtle, are not likely to be adversely effected, as described in the August 5, 2010 BA (NMFS 2010a). On December 1, 2011, the FWS concurred with the review team's assessment that manatees and Gulf sturgeon in freshwater are not likely to be adversely effected (FWS 2011). No changes to the EIS were made as a result of these comments.

Comment: Section 4.3.2.6 indicates that there would be a small impact to aquatic resources and habitats from pre-construction and construction activities. While the DEIS references Florida's COCs regarding Aquatic Survey and Monitoring, we recommend that the discussion be revised in the final EIS to reflect the aquatic survey and monitoring plan protocols that are being finalized, as required by the COCs, between Progress Energy and Florida. Copies of the final aquatic survey and monitoring plans can be obtained from either Progress Energy or the FWC. (**0040-1** [Poole, Mary Ann])

Response: *Section 4.3.2 of the EIS was revised in response to this comment using the final aquatic survey and monitoring plan information and protocols.*

Comment: Lastly, we would like to point out that Florida's COCs require that if aquatic monitoring shows changes from the baseline conditions, mitigation measures will be taken. (**0040-4** [Poole, Mary Ann])

Comment: [FWC recommend that the Final EIS:] reflect Florida's COCs regarding mitigation measures if aquatic impacts are determined (**0040-8** [Poole, Mary Ann])

Response: *Section 5.3.2 was revised in response to these comments using the final Florida State Conditions of Certification information regarding mitigation measures (FDEP 2011b).*

Comment: Section 5.3.2.3 (Aquatic Species and Habitats) and Appendix F (Essential Fish Habitat Assessment) discuss potential operational effects on marine organisms. While submerged aquatic vegetation (SAV) and oyster habitats are mentioned in these and previous sections of the DEIS, the only discussion of potential impacts to these SAV habitats is in Table 8-1 of Appendix F. Florida's COCs require that surveying and monitoring of SAV, oysters, and scallops be conducted and that mitigation be provided if impacts are determined. We recommend that the final EIS more fully address potential impacts of the operations to SAV and oyster habitats and that it reference Florida's COCs regarding these habitats. (**0040-5** [Poole, Mary Ann])

Comment: [FWC recommends that the Final EIS:] reflect the changes in the aquatic survey and monitoring plan protocols required by Florida's COCs (**0040-6** [Poole, Mary Ann])

Comment: [FWC recommend that the Final EIS:] address submerged aquatic vegetation and oyster habitat in the discussion of operational impacts, essential fish habitat, and in the biological assessment (**0040-9** [Poole, Mary Ann])

Response: *Sections 4.3.2, 5.3.2, and 7.3.2 of the EIS were revised in response to these comments using the final Florida Conditions of Certification aquatic survey and monitoring plan information and protocols (FDEP 2011b).*

Comment: Finally, preliminary plans for the Inglis Hydropower LLC project (Federal Energy Regulatory Commission Project Number 12783-000), proposed in the Inglis Bypass Canal Spillway approximately 0.7-mile from the LNP cooling water intake structure location, are currently being coordinated through our office by the Federal Energy Regulatory Commission for that project's effects on diadromous fish historically present in the Old Withlacoochee River. The term diadromous refers to fish species that migrate between marine and fresh water to complete their life cycles. Estuarine and coastal marine areas downstream from the Inglis Hydropower project site provide valuable habitat for a variety of fish and invertebrates of ecological, commercial, or recreational importance.

Therefore, NMFS Habitat Conservation Division further recommends that the NRC and COE coordinate with the Federal Energy Regulatory Commission to assess the potential cumulative effects of the Levy Nuclear and Inglis Hydropower plants' operations on diadromous species and their associated habitats and address preliminary measures for protection, mitigation, and enhancement of these resources. The assessment should include examination of the potential for dams and project operations to impact passage of diadromous species to and from upstream habitats via the mouth of the Withlacoochee River. The assessment should also examine the potential for project operations, altered instream flows, and changes in water quality to impact species and their habitats, including EFH downstream from these projects and the horizontal and vertical salinity gradients and water flows at the mouth of the Withlacoochee River and barge canal. (**0014-2** [Croom, Miles])

Response: *The proposed Inglis Hydropower plant will be a run-of-river facility at the existing spillway for the Withlacoochee bypass channel that connects Lake Rousseau to the Lower Withlacoochee River (Inglis 2009). The current spillway has no fish ladder structures, and therefore, any diadromous fish that may exist or use the Withlacoochee River habitat are prevented from migrating further upstream by the bypass spillway. Construction activities associated with building the new hydropower plant will likely require use of BMPs to minimize sedimentation and erosion to the bypass channel waters and the downstream portion of the Withlacoochee River. These waters are not directly associated with LNP Units 1 and 2 construction and operation, and any cumulative impacts from construction activities would be considered minor. Operation of the hydropower facility would also not likely affect any diadromous fish species because none have been identified within the Withlacoochee River, and the elevation barrier would remain, preventing fish migration through the powerhouse. By operating under a run-of-river mode, there would be no alteration of freshwater quality or flow pattern downstream of the facility; therefore, the review team concludes that no cumulative impacts on the LNP project are likely to occur from construction and operation of the Inglis Hydropower plant, and no changes were made to the EIS in response to this comment.*

Comment: The District will use as part of this review multiple oyster beds beyond the mouth of the Withlacoochee River and in several cases, located between the CFBC and navigation

channel west of the river mouth. This State determination is being made on navigable waters under Federal jurisdiction. These actions appear conflicted in context of function and form. (**0037-2** [Hilliard, Dan])

Response: *Section 4.3.2 of the EIS was revised to include updated information from the applicant about pre-operational monitoring to fulfill requirements for compliance with the FDEP (FDEP 2011b). Part of the pre-operational monitoring would include monitoring of oyster beds.*

E.1.10 Comments Concerning Socioeconomics

Comment: Devaluation of property that adjoins a nuclear facility. What kind of studies have been done on that in the last 30 years? And if there has been, what are the results? And I'd like it in writing. (**0001-7-2** [Smith, Robert])

Comment: We are not objecting to the need for the nuclear plants. We are asking for assurances from the NRC and the Corps of Engineers that the new mitigation plan, if accepted, will not have any adverse effect on the value or on the usage of our property for future development. (**0002-6-2** [Smith, Charles])

Response: *These comments express concern about the impact on the property values of homes and land in the vicinity of the proposed site. Sections 4.4.4.3 and 5.4.4.3 address impacts from construction and operations on housing, respectively. The change in property values that result from the siting of a nuclear power plant has been subject to a number of academic research papers. In general, they all conclude that for a nuclear power plant, the impacts on residential property values is different from those felt by the siting of a large industrial plant or a large coal-fired power plant. In response to this comment, the review team has examined a number of peer-reviewed studies that look at the question from several different perspectives. The general conclusions of these studies indicate there is no systematic and measurable adverse impact on property values for residents near a nuclear power plant site. The review team cannot assure residents that the LNP project would not affect the value or usage of adjacent land. The review team expanded the discussions in Section 5.4.4.3 to address this issue and present the findings of these reports in greater detail.*

The applicant's final wetland mitigation plan along with the impacts that the plan would propose to compensate, will be evaluated by the USACE in light of NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other requirements of the USACE's regulatory authorities. This evaluation and final determination of the acceptability of the final mitigation plan will be documented in the USACE's Record of Decision. Authorization of works or structures by a DA permit does not convey a property right, nor authorize any injury to property or invasion of other rights.

Comment: I know the shooting range is going to be quite close and that's going to go on once a week, I believe, pretty regularly. I'd like to know, you know, what they're going to do with that and how long is it going to be there? I'd like to have an answer on that in writing. (**0001-7-10** [Smith, Robert])

Response: *This comment addresses a concern that the security-related shooting range at the proposed site would impose undue noise impacts on nearby residents. The shooting range is an important part of the LNP security operations and would remain in operation for as long as the plant requires a high level of security. Noise attenuates rapidly with intervening vegetation, topographical changes, and distance. While the exact location of the shooting range is unclear at this time, there is a chance that the closest residents to the site may experience adverse physical and aesthetic impacts from the use of that shooting range; therefore, the design, construction and operation of the shooting range would follow guidelines to prevent rounds from straying from the range and to minimize noise offsite. Sections 5.4.1.1 and 5.8.2 discuss the impacts of noise from operations-related activities and were revised by the review team to include noise from the shooting range.*

Comment: [I]s there a diminution in value of either the 5,700 acres or this 28 acres by Progress Energy's location next door and its, what will amount to an assumption that the Robinson Estate property will not be developed, and hopefully that will not occur. (**0002-7-11** [Avery-Smith, Ellen])

Response: *This comment addresses concerns about the loss of property values of homes and land in the vicinity of the proposed site. Sections 4.4.4.3 and 5.4.4.3 address impacts from construction and operations on housing, respectively. These sections were revised to include discussions of property values.*

Comment: Has there been any studies on the effect of the noise, the lights of a power plant, with people living within a mile and a half? Now, I know I -- I'm from the Florida Keys and I lived in the Bay in Key Largo and I could see Turkey Point from 35 miles from my house. And I could see a gigantic orange glow. Now, it's going to be 6,800 feet behind my house and when I look in the corner of my house out of the porch, I see nothing but black sky and trees. And it ain't going to be that way no more. And I'd like to know if there -- if anybody has been living that close, what did the noise and all that do to them? Because it's going to affect me. (**0001-7-8** [Smith, Robert])

Response: *Sections 4.4.1.4 and 5.4.1.4 discuss the aesthetic impacts of construction and operations, respectively. Section 5.3.1.1 discusses potential impacts of light pollution. Sections 4.4.1.1, 4.8.2, 5.4.1.1, and 5.8.2 discuss the impacts of noise from construction and operations related activities. The review team revised these sections to include more detailed discussions of noise, especially from the shooting range.*

Comment: [D]ischarges of such waters from springs into protected surface waters would likely hazard recreation ... Such activities would adversely impact the economic worth of protected waters. (**0005-30** [Hopkins, Norman])

Comment: Will hunting in the Goethe State Forest property be prohibited on the lands designated for mitigation? (**0023-11** [Avery-Smith, Ellen] [Smith, Charles])

Comment: The Robinson Property consists of more than 5,700 acres and is currently being used for hunting and target practice, among other activities. Similarly, the Goethe State Forest

has hunting permits issued to a large number of people for use of that publicly owned property. Will Progress Energy or the state or federal governments attempt to put any restrictions on the use of these properties for hunting and target practice or for any other purpose once the Progress Energy plant comes to fruition? (**0023-8** [Avery-Smith, Ellen] [Smith, Charles])

Response: *These comments offer a general concern about the recreational access of nearby properties if the proposed project were to be constructed and operated; however, these comments provide no new information. Sections 4.4.4.2 and 5.4.4.2 discuss the construction- and operations-related impacts on recreation. No changes were made to the EIS in response to these comments.*

Comment: Progress Energy plans to build a heavy haul road adjacent to a 28-acre parcel also owned by my family. Currently, there is an access road extending south from Highway 40 to the barge canal. Will this road remain in place to allow the public continued access to the spillway and barge canal? How can my family be assured that Progress Energy's use of the heavy haul road will not restrict the uses or damage the value of our adjacent property? (**0023-15** [Avery-Smith, Ellen] [Smith, Charles])

Response: *Traffic-related impacts from construction and operations are discussed in Sections 3.3.1.5, 4.4.4.1, 4.8.3, 5.4.4.1, and 5.8.6. Sections 4.4.4.3 and 5.4.4.3 address impacts from construction and operations on housing. Sections on housing were revised to include discussion of property values.*

Comment: I also want to put my other hat on, and that is the Vice-Chair of the Chamber of Commerce and the Chair-Elect of the Economic Development Council. And those two organizations, approximately 1,400 members, are very in support of this project, because we are in desire for jobs in this area. Unemployment is 14 percent. People are losing their homes, their livelihood, their houses, and having to completely shut down operations here. (**0001-1-4** [Hollins, Dixie])

Comment: As we all are aware, we are in very poor times as far as jobs are concerned. Unemployment rate in the area ranges from 13.6 to 14.4 percent. Construction jobs are very badly needed in the area and it would help other small businesses associated with the project. Hopefully, by the starting this project as soon as possible, the recovery within the State can start. Let this be the starting point for this recovery in the State. (**0001-12-2** [Hollins, Dixie])

Comment: I think Crystal River is evidence that having a plant built does not necessarily lead to rampant growth or overgrowth. I think it is a supplier of good employment in an area that is in desperate need of good employment opportunities. And we would certainly look forward to benefit to Citrus County, as well as Levy County, and believe that in these times it will be a beneficial addition to the area. (**0001-2-1** [Houston, Andy])

Comment: [M]aybe some of the ears from Progress Energy will come -- you know, maybe there will be an epiphany and they'll come to one of our Commission meetings and say, hey, we're here to help you with this growth. (**0001-3-3** [Diamond, Darryl])

Comment: The Levy plant will actually play an important role in the community, as well. And you've heard some of that discussion already here this afternoon. At the peak of construction, we will create 3,000 jobs. And the plant itself, when it's in operation, will provide over 800 permanent, good paying jobs in our community. (**0001-4-3** [Elnitsky, John])

Comment: The Levy plant will play an important role for our community, as well. At the peak of construction, we will employ over 3,000 on the site at Levy County. The plant itself, when it comes into operation, will create 800 permanent, good-paying jobs in our community. (**0002-1-3** [Elnitsky, John])

Comment: [O]ne thing I hear over and over again was that the job thing just didn't work out. And there's a woman in Texas who's actually figured out why. The reason is, is because most of the long term jobs that would come with these new reactors won't be hired locally, maybe a few. But most of those workers for the long term positions, not the construction jobs, but the other ones, will be hired from out of the area. But they're not monks. They're not single individuals. They will come with a spouse. And because they're technically skilled positions, they --many of them will be mature individuals with teenage and older children. And so you get one worker, but you get two to three potentially -- at least one, two, or three work seekers. And so, incredibly, the unemployment rate goes up in new reactor communities, not down. (**0002-8-6** [Olson, Mary])

Comment: We need jobs! Issuing an LWA for the Levy plant will go a long way toward employing our citizens - not me, probably, but local construction workers who have homes and children to feed. (**0012-1** [Overa, Beverly])

Comment: As we all know, the present economic situation in Florida is quite bleak Hopefully, allowing Progress Energy to start this large construction project, new jobs will be created and the long road to economic recovery in Florida can begin. (**0026-2** [Fetrow, Robert])

Response: *These comments address a general concern about the local economy and the ability of the proposed project to provide economic solutions—primarily in the form of new jobs. Baseline socioeconomic issues are discussed in Section 2.5 of the EIS. Construction-related economic impacts are found in Section 4.4.3 and operations-related economic impacts are discussed in Section 5.4.3. These comments discuss the proposed project, but provide no additional information. No changes were made to the EIS in response to these comments.*

Comment: The new one that you all approved, I believe, in Georgia, I want to know how many people are living within a half a -- a mile and a half of that plant. I'd like to have, you know, let me know how many people are in the same area as we are, a mile and half, mile and a quarter, something like that. (**0001-7-15** [Smith, Robert])

Response: *The commenter voices a concern about proximity to the proposed nuclear power plant; however, a number of nuclear power plants in the United States have populations living as close as or closer to a nuclear power plant than the commenter. For example, in Georgia, people live within 1.2 mi of Plant Vogtle. In South Carolina, 8 people live within 1 mi of the Oconee site and at the VC Summer site, which is currently seeking a license to add two new*

units, over 100 people live within 1 mile of the plant. Arkansas Nuclear One has single-family homes within a quarter mile of the site boundary. In Texas, 119 people live within 1.2 mi of the Comanche Peak Nuclear Power Plant. Demographic information can be found in Section 2.5.1 of the EIS. This comment offered no new information. No changes were made to the EIS in response to this comment.

Comment: We're going to need more police and we'd like to have some cooperation. We barely can afford our police force, so any help that - and I know the Nuclear Regulatory Commission is not there to specifically force Progress Energy to help us monetarily. But if I could bring it up and anybody could help us, we would appreciate it. A couple more things, which is not the NRC's direct influence, is we will probably need a sewer system. We have none. We don't have the money for it. And we also have a lot of roads that need to be paved. (**0001-3-2** [Diamond, Darryl])

Response: *Construction-related impacts on infrastructure and community services are found in Section 4.4.4; and operations-related impacts are found in Section 5.4.4. This comment does not provide any new information; therefore, the EIS was not changed in response to this comment.*

Comment: Not to mention the secondary and even the tertiary effects of this nuclear plant, in the form of increased traffic, water and air pollution, nuclear waste storage and disposal, and infrastructure impacts (sanitary sewer, potable water demand, housing and energy demand, solid waste disposal) to the region. (**0031-4** [Thuemler, Ronald])

Response: *Traffic impacts are found in Sections 4.4.4.1 and 5.4.4.1 of the EIS. Water impacts are found in 4.2, 4.4.4.4, 4.10.2, 5.2, 5.4.4.4, and 5.10.2. Air pollution impacts are found in 4.4.1.1, 4.7, 5.4.1.1, and 5.7. Nuclear waste storage and disposal are found in Chapter 6 of the EIS. Infrastructure impacts are found in Sections 4.4.4.4 and 5.4.4.4. Energy demand is discussed in Section 8.2 of the EIS. The cumulative impacts on all of these categories are described in Chapter 7 of the EIS. This comment provided no new information. No changes were made to the EIS as a result of this comment.*

Comment: Section 4.3.2.3 of the DEIS identifies only the blue crab as a commercially exploited species in the estuary and posits that other commercial activity is dislocated well offshore. Commercial fisheries have always been a small component of economic activity in the immediate area of the CFBC and Withlacoochee River mouths while recreational activities in the form of sport fishing, boating and eco-tourism have been and remain enormously productive for the local economies of Inglis and Yankeetown, Fl. Since plant operational impacts are not evaluated by the Applicant or NRC in context of altered estuary water chemistry, WAR concludes there is no basis for the conclusions of DEIS Section(s) 4.3.2.6 and 5.3.2.3 due to inappropriately narrow scope of the investigation. (**0042-13** [Hilliard, Dan])

Response: *This comment addresses a concern for local blue crab fisheries. Sections 4.4.3.2 and 5.4.3.2 discuss commercial and recreational fishing impacts from the proposed project.*

Sections 4.3.2.3 and 5.3.2.3 of the EIS were amended to include more information about commercial and recreational fisheries in response to this comment.

Comment: And another question I'd like to know, maybe from the County Commissioners or from Nuclear Regulatory, how come the growth in Crystal River seems to be east and south and not around Crystal River, the plant itself? (**0001-7-12** [Smith, Robert])

Response: *This comment addresses urban development issues. North of Yankeetown/Inglis and south of Crystal River State Reserve Park, development occurs only to the east because of the numerous State parks in the area. Economic development in the area surrounding the Crystal River site is driven by geographical and institutional boundaries. North of Yankeetown/Inglis is Waccassa State Park; northeast of the LNP Site is Goethe State Forest. Land to the south of the Crystal River Reserve is bordered on the west by the Gulf of Mexico, and to the east by numerous State parks and national wildlife refuges and the Suncoast Parkway. No changes were made to the EIS in response to this comment.*

Comment: [T]he total of "Probable Nearby Losses" [from the proposed Tarmac mine] are calculated to be $88 million and 1,280 jobs and a labor income of $37 million and Levy County fees of $172,000. (**0020-12** [Bacchus, Sydney])

Response: *Cumulative effects are discussed in Section 7.4.1. Information from the referenced exhibits was assessed and incorporated in this section where relevant.*

Comment: I own about 400 acres also next to where Progress Energy is going to be built, or the proposed site. The land, when it was bought, was kept secretly. No one knew about it until the deal was closed. And then we found out that it was bought by Progress Energy to build a nuclear power plant. And then they come in and say, well, we want your feedback. Well, at that point it was a little too late, once they spend millions of dollars buying up all this property. Unfortunately, I'm afraid at this point. All the meetings I've been to and all the different programs I've attended listening to all of this, I'm afraid once that land was purchased and it was a done deal, that this will amount to nothing. And that's -- that upsets me, because we had a developer who had come in, the land that I own, and was going to build upscale homes, a beautiful neighborhood, and homes in the 250 to $500,000 price range. And once he found out Progress Energy had purchased this land for this nuclear power plant, they pulled the contract that we had signed with them off. (**0002-3-3** [Lott, Phyllis])

Response: *This comment addresses a concern about the loss of the property values of homes and land in the vicinity of the proposed site that would affect the potential development of a spec housing development. The review team cannot assure residents that approval of the permit would not affect the value or usage of adjacent land. Sections 4.4.4.3 and 5.4.4.3 address impacts from construction and operations on housing, respectively. These sections were revised to include discussions of potential changes in property values because of the construction and operation of the two proposed units at the LNP site.*

Comment: Failure to take a hard look at the comprehensive economic impacts from the myriad direct, indirect and cumulative adverse impacts -Another critical deficiency in the LNP DEIS the failure of the agencies to take a hard look at all of the economic impacts of the myriad direct, indirect and cumulative adverse impacts, which would exceed LARGE. Such a hard look at all of the economic impacts is not possible because of the grave deficiencies of the LNP DEIS, such as those described above [provided a list of deficiencies in the DEIS] and those described below [continued list of deficiencies in the DEIS]. Therefore, a supplemental DEIS is required to prepare a comprehensive economic assessment of the myriad direct, indirect and cumulative adverse impacts from the proposed project. (**0020-11** [Bacchus, Sydney])

Response: *This comment addresses a general concern for the economy. Baseline socioeconomic issues are discussed in Section 2.5 of the EIS. Construction-related economic impacts are discussed in Section 4.4.3, operations-related economic impacts in Section 5.4.3, and cumulative socioeconomic impacts in Section 7.4.1. The information in the comment did not provide any significant new information not already considered by the NRC review team in the draft EIS. No changes were made to the EIS as a result of this comment.*

E.1.11 Comments Concerning Historic and Cultural Resources

Comment: Section 4.6, Page 4-107, Line 10: "significant" needs to be added before cultural resource. It should read: "... near known significant cultural resources ..." (**0010-2-15** [Kitchen, Robert])

Comment: Section 5.6, Page 5-77, Line 8: "significant" needs to be added before cultural resource. It should read: ... concluded that no known significant cultural resources exist ... [there are known cultural resources in the APE, they just aren't significant].

Section 5.6, Page 5-77, Line 17: "Significant" needs to be added before cultural resource. It should read: ... near known significant cultural resources ... (**0010-3-8** [Kitchen, Robert])

Response: *Sections 4.6 and 5.6 of the EIS were modified to incorporate the NHPA terminology.*

Comment: DIRECT, INDIRECT AND CUMULATIVE IMPACTS -NEPA regulations provide that all effects, including direct and indirect effects, shall be considered by the Corps. 40 C.F.R. 1508.8. All cumulative impacts also shall be considered. 40 C.F.R. 1508.7. The DEIS fails to analyze all of the adverse direct, indirect and cumulative impacts that would result from this proposed project. For example the DEIS fails to confirm that comprehensive field evaluations were conducted of the proposed site and adjacent site, where the groundwater wells were relocated, to identify all potential archeological sites and discuss the direct, indirect and cumulative effects of the proposed project on those sites. (**0011-6** [Bacchus, Sydney])

Comment: Failure to preserve cultural resource sites because of critical deficiencies in methods of investigations and areas of assessment for proposed LNP project -The results of a review of the potential impact of the construction of the proposed LNP facility on the region's

cultural resources, including prehistoric and historic archaeological sites, standing structures, cemeteries, and bridges are included in Bacchus Exhibit A8, which is incorporated herein by reference. ... Construction of the LNP will have irreversible consequences for the local environment, and if there are cultural resources destroyed by either the building of or maintenance of the plant, this will result in a heritage that should be shared by all being lost by all. (**0020-13** [Bacchus, Sydney])

Comment: In association with the Combined License Application to the Nuclear Regulatory Commission by Progress Energy Florida, Inc. (PEF), cultural resource investigations were undertaken in two phases, both through contract with CH2M Hill. In 2007, Sara Orton conducted a survey for historically significant standing structures older than 50 years in an area within a 1 mile radius of the projected center of the LNP site and along a .25 mile corridor along the projected transmission corridor (Figure 2). This survey did not locate any structures greater than 50 years old (Orton 2008). There are however several previously recorded historic standing structures nearby, most importantly in the nearby community of Yankeetown, southwest of the LPN project area. Two structures, 8Lv707 and 8Lv708, are considered eligible for inclusion in the National Register of Historic Places (NRHP).

The second phase of cultural resource survey was conducted by personnel from New South Associates, subcontracted by CH2M Hill (Koski et al 2008). ... most the shovel tests were focused in areas suitable for shovel testing. Koski et al. estimate that they actually tested ca. 700 acres of the 3,300 total (2008: 41), leaving as much as 2,600 acres completely untested. A large part of this untested area is inundated land, i.e., that land most likely to have buried archaeological sites with well-preserved materials.

Accounting for the corridor, there remains more than 1,900 acres of unsurveyed land in the southern site block. Between the two blocks, as much as 4,500 acres have not been surveyed for cultural resources in any fashion whatsoever. The rates of shovel testing in areas tested is worrisome as well, with an average of a single shovel test per 4 acres being the highest intensity strategy employed.

An argument could be made that the boundaries of these site blocks only represent the property to be controlled by the LPN, not areas that are scheduled to be altered. That may be the case, that no construction will take place beyond the areas already surveyed, but once the areas have been considered cleared, there will be no further investigation if PEF, or anyone, decides to conduct land altering activity within those bounds.

Conclusion

As indicated above, although legal requirements may appear to have been met by the cultural resources investigations the methods used for the site surveys were not conducive for identifying cultural resources where they are most likely to occur-in the wetlands. Therefore, the status of permits should be re-evaluated as they relate to cultural resources. It would be prudent to survey all the acreage within the LNP properties, in addition to all of the surrounding areas that would be affected by any alterations of the water levels. Most importantly,

methodology needs to be devised to investigate the wetlands and other inundated areas, even if it is only exploratory at this time. Finally, the visual impact of the structures to be built should be reconsidered, with a much more intensive modeling of sightlines and viewshed. (**0020-14** [Bacchus, Sydney])

Comment: Inadequate methodology and extent of site assessments - Clearly the methods of the cultural resource site surveys conducted for the proposed LNP project were flawed and the area surveyed was gravely inadequate. Accepting that flawed methodology as adequate would be tantamount to a parent allowing a young child to search diligently for Easter eggs inside a house when the parent is aware that all of the Easter eggs are hidden outside. The NRC and Corps must ensure that more suitable methodology is developed, directed specifically to the extensive wetlands on and surrounding the proposed LNP site, to determine where the cultural resource Easter eggs are hidden. (**0020-15** [Bacchus, Sydney])

Comment: Recent adverse impacts of inadequate cultural resource site assessments -In addition to the inadequacies described in the report included as Bacchus Exhibit A8, recent adverse impacts of inadequate cultural resource site assessments are described in the Palm Beach Post article by Christine Stapleton titled "Tribes angry, Everglades projects halt after workers dig up major burial ground but don't tell." That article describes the agencies' failure to identify a significant native American burial site at a construction site where prior cultural resource surveys were conducted. More disturbing, the article describes the agencies' apparent intent to conceal the discovery from the tribes. A copy of that article is incorporated herein as Bacchus Exhibit A9 and also is available at the following link http://www.palmbeachpost.comlnewslstateltribes-angry-everglades-projects-halt-after-workers-dig-1073931.html (**0020-17** [Bacchus, Sydney])

Response: *Field evaluations were conducted in consultation with the Florida State Division of Historical Resources to identify potential cultural resources in the area of potential effect for the proposed licensing action and are described in Section 2.7. The impacts on cultural resources from construction and operation of the proposed project are addressed in Sections 4.6 and 5.6. The evaluation of cumulative impacts on cultural resources is part of the review team's review and is addressed in Section 7.5. The applicant has archaeological and cultural resource guidelines and procedures in place that are designed to protect cultural resources from ground-disturbing activities or inadvertent discoveries (PEF 2008b). On September 20, 2010, the Florida State Historic Preservation Office (SHPO) sent a concurrence letter to the NRC concurring with the conclusions and recommendations presented in the EIS related to historical cultural resources (Florida SHPO 2010). The EIS does consider direct, indirect, and cumulative impacts in Chapters 4, 5, and 7 and irreversible and irretrievable commitment of resources in Chapter 10. The Palm Beach Post newspaper article referenced above is in regard to a different project. The NRC and USACE are consulting with the Tribes in accordance with the National Historic Preservation Act (NHPA). No change to the EIS was made as a result of these comments.*

Comment: Our office [Florida Department of State, Division of Historical Resources] received and reviewed the above referenced project application in accordance with Section 106 of the

National Historic Preservation Act of 1966 (Public Law 89-665), as amended in 1992; 36 C.F.R., Part 800: Protection of Historic Properties for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places. Our review of the Florida Master Site File indicates that no significant historic properties are recorded within the project area. Furthermore, because of the location and/or nature of the project it is unlikely that historic properties will be affected. (**0019-1** [Kammerer, Laura])

Comment: Our office [SHPO] reviewed the referenced DEIS: for possible adverse impacts to historic properties listed, or eligible for listing, in the National Register of Historic Places. The review was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966 as amended and 36 CFR Part 800: Protection of Historic Properties; and the National Environmental Policy Act of 1969, as amended. Based on the current information and documentation this office concurs with the conclusions and recommendations presented related to historical cultural resource and have no comments to submit. (**0025-1** [Stroh, Scott])

Response: *These comments support the discussion in Sections 4.6, 5.6, and 7.5 of the EIS. No changes were made to the EIS in response to these comments.*

Comment: At this point, the Tribe's main concern is where the transmission lines will be placed and who will be responsible for overseeing the associated undertaking(s). As I understand, the APE's have not been finalized for the transmission lines. Due to the presence of documented cultural resources in the area, a Phase I archaeological survey needs to be conducted throughout the project corridor. The STOF-THPO requests to review those survey results before making a final comment on possible effects to cultural resources. (**0032-1** [Steele, Willard] [York, Elliot])

Comment: Additionally, I have attached the initial correspondence letter from the STOF-THPO to the ACOE, dated 16 August 2010, requesting a Phase I survey of the finalized transmission line corridors. The current position stated in the attached letter is still the official position of the STOF-THPO until further culture resource assessment surveys can be reviewed. Due to the potentially adverse impacts to culturally sensitive sites, the STOF-THPO reiterates the importance of a Phase I survey for the proposed transmission lines. I appreciate your willingness to hear the Tribe's concerns regarding this proposal. (**0032-2** [Steele, Willard] [York, Elliot])

Comment: The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) has received the Corps of Engineers project notification for the aforementioned project. Due to the fact that the project area is within the geographic area considered by the Seminole Tribe of Florida to be ancestral, aboriginal, or ceded (NHPA 1966, Section b1, and 36 CFR, Section 800.2), the STOF-THPO would like to request a Phase I archaeological survey of the Levy Nuclear Plant site for review. Additionally, the STOF-THPO would like to review the future cultural resource survey of the finalized transmission line corridors prior to making any further comment. (**0032-3** [Steele, Willard] [York, Elliot])

Comment: [T]he STOF-THPO's main concern is the potential adverse effects to cultural resources associated with the placement of transmission lines. As I understand, our consultation will continue once the APE's for the transmission lines have been finalized. Upon finalization, a Phase I archaeological survey should be conducted of the transmission line corridor in order to ascertain possible effects to archaeological resources. (**0033-1** [York, Elliot])

Response: *Consultation is ongoing with the Seminole Tribe of Florida (STOF). PEF has provided a work plan to identify cultural resources within the transmission line corridors. The USACE is the lead Federal agency for the NHPA Section 106 Consultation, regarding the transmission lines for this licensing action. The applicant has committed to completing comprehensive Phase I surveys of the transmission lines once they have been finalized and prior to construction activities. The State of Florida included a condition in the LNP site certification regarding the need to complete cultural resource work associated with the transmission-line corridors. Sections 4.6 and 5.6 of the EIS describe the status and path forward of the cultural resources assessment for the transmission lines. The USACE concluded consultation with STOF regarding the transmission lines for the Levy COL action. By letter dated February 8, 2012, the USACE stated to the STOF that if a Department of the Army permit is issued for this project, the permit would be specifically conditioned to require that Phase I Cultural Resource Assessment Surveys would be conducted prior to initiating ground-disturbing activities for various project components, including construction of transmission lines. According to the LWA Rule (72 FR 57416), construction of transmission lines are outside of NRC's jurisdiction. Changes were made to the EIS to update the status of consultation on the transmission lines.*

Comment: Supplemental DEIS required to address deficiencies in methods and areas of cultural resource site assessment - Based on my professional expertise, research and experience spanning more than 30 years, it is my professional opinion that a 0.5-foot drawdown of the surficial aquifer for less than a season's duration will alter the hydroperiod of and dewater the wetlands on and surrounding the proposed LNP and proposed Tarmac mine sites, resulting in LARGE and irreversible alterations in the chemical, physical and biological integrity of the nations waters and destroying cultural resource sites at unknown locations as described in Bacchus Exhibit A8. Further, it is my professional opinion that those wetlands will be dewatered and the natural hydroperiods altered by proposed construction activities described in the LNP DEIS, also resulting in "LARGE" and irreversible alterations in the chemical, physical and biological integrity of the nations waters and destroying cultural resource sites at unknown locations. The extent and magnitude of those hydroperiod alterations have not been determined or assessed by modeling or any other means apparent in the LNP DEIS. Therefore, a supplemental DEIS is required to: (a) determine a more realistic and accurate area of the surface and subsurface foot-print of water-related impacts where cultural resource site surveys should be conducted; (b) design and propose for public comment more appropriate methodology for conducting cultural resource site surveys within the newly determined area of off-site impacts in addition to on-site areas that were not assessed and (c) determine a more accurate viewshed impact zone all of which are required due to the myriad "LARGE" direct, indirect and cumulative adverse impacts from the proposed project. (**0020-16** [Bacchus, Sydney])

Response: *The cultural resource field evaluations were conducted in consultation with the Florida State Division of Historical Resources to identify potential cultural resources in the area of potential effects for the proposed licensing action and are described in Section 2.7. The impacts on cultural resources from construction and operation of the proposed project are addressed in Sections 4.6 and 5.6. The evaluation of cumulative impacts on cultural resources is part of the review team's review and is addressed in Section 7.5. The applicant has archaeological and cultural resource procedures in place that describe the company's guidelines that are designed to protect cultural resources from ground-disturbing activities or inadvertent discoveries (PEF 2008b). On September 20, 2010, the Florida SHPO sent a concurrence letter to the NRC concurring with the conclusions and recommendations presented in the EIS related to historical cultural resources (Florida SHPO 2010). This letter was referenced in the review team's analysis and is included in appendix F of the EIS. No changes to the EIS were made as a result of this comment.*

E.1.12 Comments Concerning Geology

Comment: We're concerned with sink holes. (**0001-14-7** [Price, Sally])

Comment: Neither the DEIS nor PEF appear to acknowledge the karst and other characteristics of the vicinity of the proposed LNP, as described in Chapter 2 Site Characteristics LNP Units 1 and 2, COL Application, Part 2, Final Safety Analysis Report [Final Safety Analysis Report] (FSAR). (**0030-1-2** [Bacchus, Sydney])

Response: *Section 2.3.1.2 of the EIS discusses the current conditions of the site with regard to karst terrain. No changes were made to the EIS as a result of these comments.*

Comment: At one time Progress Energy proposed to planed to build a rail line from the LNP going East and North to bring in a special mixture of soil type that was only found in North Florida and Georgia. We were informed, this soil type was necessary for the stability and foundation strength of the new plant especially because, of the high water table on the site. Since this rail line has since been abandoned, how will Progress Energy bring in this special soil mixture to the LNP site? If the soil for the foundation is not coming from North Florida and Georgia, will the soil used in its place still have the same compaction qualities and sand clay ratios of the Northern type soils? (**0027-6** [Smith, Charles])

Response: *PEF has not indicated from where the fill material would be obtained. For the purposes of evaluating possible impacts the review team assessed impacts assuming that PEF would obtain the fill needed from the proposed Tarmac King Road Limestone Mine. No changes were made to the EIS in response to this comment.*

E.1.13 Comments Concerning Meteorology and Air Quality

Comment: On which way does the wind blow on -- for the proposed --the proposed site in a year, average year? Does it blow out of the north the most? Does it blow out of the south? Does it blow northwest? Does it blow southeast or southwest? I'd like to know if they've done a

study on that in the year since they've had a weather station, so I know -- what I've been told, mostly out of the southeast, which would be blowing to the northwest, which would affect my home. I'd like to know -- have an answer on that, in writing if possible. (**0001-7-4** [Smith, Robert])

Response: *The climatology of the LNP site is discussed in Section 2.9 of the EIS. As discussed in Section 2.9.1.1 of the EIS, the prevailing winds are from the east-northeast. No changes were made to the EIS as a result of this comment.*

Comment: Section 5.7.1, Page 5-78, Line 17: ... Section 7.6.1, Page 7-41, Line 6: Note that a PSD Permit (Air Permit No. PSD-FL-403) was issued for the LNP air emissions on 02/20/09. (**0010-3-9** [Kitchen, Robert])

Response: *Sections 5.7.1 and 7.6.1 of the EIS was updated to reflect this change in permit status.*

Comment: Additional misleading statements regarding precipitation - Additional equally misleading statements regarding rainfall are included in the DEIS, such as the following statement on DEIS p. 5-21: Precipitation in the region is particularly high during the summer months (4.3 - 9.8 in., June through September), ... I reviewed the wet-season (June-September) and dry-season (October-May) records through 2008 for Levy County from the SWFWMD's data base (Rainfall Summary Data by County). In nine of the most recent 40 years of record in Levy County less rainfall occurred during the wet season than during the dry season for the same year. Of the remaining years wet season rainfall exceeded dry season rainfall by less than 3 in. for the same year. http://www.swfwmd.state.fl.us/data/wmdbweb/rainfall_data_summaries.php (**0030-3-5** [Bacchus, Sydney])

Comment: Supplemental DEIS is required based on unavailable and inappropriate data and unsubstantiated statements regarding rainfall - Clearly a supplemental DEIS is required to provide the Intervenors and remaining public an opportunity to submit meaningful comments regarding the environmental impacts of the proposed LNP, based solely on the on unavailable and inappropriate data, including model files, and unsubstantiated statements regarding rainfall. (**0030-3-7** [Bacchus, Sydney])

Response: *The meteorological data presented in the EIS are generally from either first-order stations or data that has been collected onsite. In the EIS, the conditions at Tampa, Florida, were taken to be representative of the climate of central Florida. The NOAA-produced Tampa Florida Local Climatological Data Annual Summary with Comparative Data was used for this analysis (NOAA 2010). These data show, that the normal rainfall is greater during the summer and early fall than during other times of the year. Similar behavior is also apparent in the SWFWMD data; however, significant year-to-year variability in the precipitation observed at any site can lead to instances in which the dry-season precipitation is actually greater than the wet season precipitation in a given year. No changes to the EIS were made as a result of these comments.*

Comment: No justification was provided by PEF or in the DEIS for why inappropriate data were used in the AERMOD dispersion model instead of the readily available site-specific data from

the SWFWMD. Those data are free and available at the following url: http://www.swfwmd.state.fl.us/data/wmdbweblrainfall_data_summaries.php (**0030-3-4** [Bacchus, Sydney])

Response: *The review team evaluated the applicant's atmospheric dispersion modeling system (AERMOD) simulations. In addition the review team conducted its own AERMOD simulations using onsite meteorological data collected during 2008. The results from this period fall within the range of salt-deposition rates reported by the applicant using surface data from Gainesville, Florida. Data provided in the SWFMWD only includes surface data, which is insufficient for running AERMOD. No changes were made in the EIS in response to this comment.*

Comment: And on the salt drift, if the wind is out of the south or southeast and it's going to blow towards my land, is it going to affect my metal roof? My cars? My vehicles? I mean, and if it does, is Progress Energy going to step up and be responsible to replace my new, beautiful roof that I built on my dream home? I'd like to know about that. Or my cars, if the salt air gets on it. I'd like to have that answered. (**0001-7-5** [Smith, Robert])

Comment: A search for other U.S. nuclear plants located inland using salt water for their cooling towers resulted in none. That's my other question. Are there any that use salt water that are located ten miles inland? Because of the unique circumstances of the Levy Nuclear Plants 1 and 2 location, scientific modeling must be arduously done to assure that drinking water and personal property and nearby conservation areas will not be adversely affected by the unnatural spreading of approximately 3,360 tons of salt by the cooling towers drift over a period of 60 years. The necessary modeling has not been done in the apples and oranges comparison used in the NRC Environmental Impact Study, and is completely inadequate. (**0002-2-4** [Foley, Beth])

Comment: I was a little concerned to hear about salt water drift -- or, yes, salt drift in the atmosphere coming from these plants. You don't want that near the Rainbow River. You don't want that inland. (**0002-5-5** [Jones, Art])

Comment: As part of the DEIS process, isopleth maps showing modeled salt deposition in different meteorological data years were appropriately created. The DEIS mentions that the maximum predicted offsite deposition rate would be 6.83 kg/ha/mo of total solids at the property boundary west of the cooling towers, as determined from the 2002 meteorological data year. Offsite deposition rates would decrease significantly with increasing distance from the proposed plant site, reportedly approaching one-third of the maximum offsite rate at 3280 ft from the site boundary. The FEIS should provide the predicted maximum rate at the nearest residence (which EPA understands may be less than 6000 ft from the cooling towers) and the closest public park and recreational area. (**0003-17** [Mueller, Heinz J])

Response: *The amount of salt drift associated with the operation of the cooling towers is addressed in Section 5.7.2 of the EIS, while the impact of the salt drift on the environment is discussed in Section 5.3.1. The salt drift and deposition were simulated using the AERMOD model, which is an EPA-approved regulatory model. As described in Section 5.3.1 of the EIS,*

the amount of salt deposition decreases quickly with distance from the LNP site. Only the location of maximum salt deposition is reported in the EIS, rather than the deposition at other locations that might be of interest. Because the value of maximum offsite salt deposition is smaller than the threshold of concern (10 kg/ha/mo described in NRC 2000), all other points of interest would also have deposition rates that are smaller than the threshold. The review team evaluated the estimates of salt drift presented in the ER. This evaluation included using AERMOD and 1 year of onsite meteorological data to compute salt drift. The results of this independent analysis were within the year-to-year variation of results from simulations provided by the applicant to NRC using surface data collected at Gainesville, Florida. Section 5.7.2 of the EIS has been modified to reflect the additional analysis by the review team.

Comment: Failure to identify, quantify and assess all components in drift from proposed LNP cooling towers - Neither PEF nor the DEIS identified, quantified or assessed all of the components that would occur in drift from proposed LNP cooling towers. (**0030-2-11** [Bacchus, Sydney])

Comment: [I]mplications by PEF and the DEIS that all drift is only salt also have no scientific basis. (**0030-2-12** [Bacchus, Sydney])

Response: *Drift from the cooling towers includes salts as well as a number of different chemicals associated with the water. The majority of these components are salts that naturally occur in the cooling water, and hence salt deposition has been the focus of the analysis presented in the EIS. The treatment of the components of salt drift is consistent with the GEIS (NRC 1996), which limits its discussion of cooling-tower drift to salt drift. No changes were made to the EIS as a result of this comment.*

Comment: The dispersion modeling demonstrates that the maximum predicted off-site deposition rate is **6.81 kilograms/hectare/month (kg/ha/mo)** of total solids at the nearest site boundary. The dispersion modeling also demonstrates that the off-site deposition rate would decrease significantly with increasing distance from the plant. [emphasis added] That deposition rate is not consistent with the following statements in the DEIS (p. 2-176, line 35-36) that the maximum predicted off-site deposition is **6.83 (kg/ha/mo)**. [emphasis added] Both [Howroyd's affidavit and DEIS statement on p. 2-176, line 35-36 that the maximum predicted off-site deposition is 6.83 kg/ha/mo] fail to identify the precise area/extent of the off-site deposition. Furthermore, the DEIS states that the prevailing winds at Levy are from the **east-northeast** and from the **west**. If, indeed the DEIS is correct then logically the offsite deposition from the towers would not be due west (closer to the coast) but southwest, and east (away from the coast), presumably increasing the extent and magnitude of adverse environmental impacts from drift if the proposed LNP was constructed and became operational. The problems described above, related to the dispersion model suggest that the data from the Tampa site may have been used to obfuscate the full magnitude and extant of adverse environmental impacts of drift from the proposed LNP. (**0030-2-18** [Bacchus, Sydney])

Response: *The salt-deposition estimates presented in Sections 5.3.1 and 5.7.2 of the EIS are from the AERMOD simulations provided by the applicant using surface winds from Gainesville,*

Florida. The review team evaluated the estimates of salt drift presented in the applicant's Environmental Report (PEF 2009a). This evaluation included using AERMOD and 1 year of onsite meteorological data to compute salt drift. The results of this independent analysis were within the year-to-year variation of results from the simulations provided by the applicant. The impacts of the salt drift are discussed in Section 5.3.1, which includes a description of the orientation of the area of largest salt deposition. The peak values of the salt deposition are listed in Section 5.7.2. There can be differences in the prevailing wind direction, and the direction of maximum deposition. This can occur because dispersion of any pollutant is a function of the amount of turbulence in the atmosphere, in addition to the wind speed and wind direction. Section 5.7.2 of the EIS was modified to describe the additional analysis by the review team.

Comment: Neither PEF nor the DEIS produced the model files for the AERMOD dispersion model used as the basis of conclusions regarding the environmental impacts of salt drift from the cooling towers of the proposed LNP. In addition to that deficiency, the five years of weather data referenced in Howroyd's Affidavit [CH2MHill August 17, 2010 affidavit to support PEF's Motion for Summary Disposition] ([paragraphs] 18-19) cannot be justified because the DEIS (2-176, Line 34) states there is only wind data from 2007-2009 at the actual proposed LNP site. Therefore, it appears that the data use in the dispersion model actually is from Tampa or Gainesville based on additional statements in the DEIS (2-175, Line 33). The wind data from Tampa is different than the proposed LNP site, resulting in essentially irrelevant salt drift assessment using AERMOD model. (**0030-2-16** [Bacchus, Sydney])

Comment: The proposed LNP site is approximately 100 miles north of the Tampa site. The Tampa site is surrounded by a bay, but the proposed LNP site is an inland site in proximity to the Gulf coast. A significant portion of the highly developed metropolitan area surrounding the Tampa site is paved with large structures (impermeable surfaces). Conversely the vicinity of the proposed LNP site predominantly is rural, undeveloped area where a significant portion of the surroundings is vegetation primarily composed of native species. Therefore, there is no scientific basis for presuming that climatography data such as wind and rainfall data from a highly developed metropolitan area approximately 100 miles from the proposed LNP site (or any highly developed area) could be used to evaluate the environmental impacts of any aspect involving drift from the proposed LNP cooling towers. In fact, the body of scientific literature clearly refutes such a presumption. (**0030-2-17** [Bacchus, Sydney])

Response: *The Tampa site was selected because it is the closest first-order weather station to the LNP site, and the general features of the climate at the two sites are similar. It is true that the characteristics of the Tampa site are not identical to those of the LNP, and there could be some differences in winds (due to differences in surface roughness and topography) or temperature due to urban development around Tampa site; however, the wind roses generated for both sites are similar, and both experience regular sea-breeze circulations. No changes were made in the EIS in response to these comments.*

Comment: Cumulative impacts of salt drift from proposed LNP cooling towers and airborne coastal salt not quantified or assessed - Not only did PEF and the DEIS fail to

quantify salt drift that would occur from the proposed LNP cooling towers using comparable existing cooling towers, neither PEF nor the DEIS quantified or assessed the combined and cumulative impacts of salt drift from operating cooling towers similar to the proposed LNP cooling towers combined with naturally occurring airborne salt deposition from the coast in the vicinity of the proposed LNP site. Dispersal of airborne salt is not consistent from day to day or even within the same season. (**0030-2-10** [Bacchus, Sydney])

Response: *The analysis of salt deposition presented in the EIS is focused on that associated with the operation of the cooling towers at the LNP site. Naturally occurring salt drift associated with the Gulf of Mexico is not considered. This treatment is consistent with the analysis descried in NUREG-1555, NUREG-0038, and Regulatory Guide 1.23 that describe the analysis associated with the operation of the cooling system (NRC 2000; NRC 1976; NRC 2007, respectively). It is important to note that the ecosystems around LNP have developed in the presence of natural salt drift from the Gulf of Mexico. No changes were made to the EIS as a result of this comment.*

E.1.14 Comments Concerning Health – Nonradiological

Comment: Large trucks emit diesel fumes that are cancer-causing, according to EPA. It takes 500 feet to stop one. Our one stop sign in Inglis would mean nothing. (**0001-5-6** [Berger, Betty])

Response: *Potential impacts of emissions from construction equipment, including diesel particulate are addressed in Section 4.8.1.2 of the EIS. Impacts of construction on local traffic patterns are discussed in Section 4.8.3 of the EIS and were determined to be negligible. This comment provides no new information. No change was made to the EIS as a result of this comment.*

Comment: Section 2.10.1.1, Page 2-182, Line 23: Air emissions in Levy County are permitted by FDEP, not Levy County.

Section 2.10.2, Page 2-185, Lines 34-35: Note that "... Inglis Island Trail in Goethe State Forest might also be affected by construction noise." This trail is not in Goethe but on Marjorie Harris Carr Cross Florida Greenway.

Section 2.10.3, Page 2-187, Line 23: says the CSX line runs to the City of Crystal River ... it runs to the Crystal River Energy Complex not the city. (**0010-2-5** [Kitchen, Robert])

Response: *With regard to the first issue, the commenter is correct, in that ambient air quality standards, air quality permits, and open-burning standards are enforced by the FDEP (FDEP 2011b). Section 2.10.1.1 was corrected to reflect this. With regard to the second issue, the commenter is correct in noting that the Inglis Island Trail is located in the Marjorie Harris Carr Cross Florida Greenway. Section 2.10.2 was corrected to reflect this fact. With regard to the third issue, the commenter is correct that the railroad line to Dunnellon serves the CREC and not the city of Crystal City. The route is specified correctly in Section 2.5.2.3 of the EIS, and was corrected in Section 2.10.3.*

Comment: Section 5.8.3, page 5-84: DEIS Section 5.8.3 describes the "acute effects of electromagnetic fields". The DEIS states that "Based on PEF's commitment to design new transmission lines to ensure that the present NESC criteria are met for all of the anticipated transmission-line configurations for the proposed LNP, the staff concludes that the impact on the public from acute effects of EMFs would be minimal, and additional mitigation would not be warranted." The DEIS does not note that PEF's compliance with National Electric Safety Code (NESC) criteria and standards are statutory requirements imposed by the Florida Public Service Commission on PEF. The NESC criteria are statutory and regulatory requirements, not merely "commitments by PEF." Section 366.04(6), Florida Statutes, provides the FPSC the authority to adopt safety standards for transmission facilities of all utilities in Florida, and provides that the NESC "shall constitute acceptable and adequate requirements for the protection of the safety of the public, and compliance with the minimum requirements of that code shall constitute good engineering practice by the utilities." FPSC has adopted the NESC and provided that newly constructed transmission lines must comply, at a minimum, with the NESC standards and criteria. (See Rule 25-6.0345, Fla. Admin. Code, Safety Standards for Construction of New Transmission and Distribution Facilities). (**0010-3-11** [Kitchen, Robert])

Response: *The commenter, representing PEF, points out that the National Electrical Safety Code (NESC) transmission-line design criteria are incorporated as regulatory requirements under Florida Statutes and Florida Public Service Commission (FPSC) regulations, and that PEF's commitment to comply is not voluntary, but legally mandated. Section 5.8.3 was modified to indicate that the NESC standards are legally binding.*

E.1.15 Comments Concerning Health – Radiological

Comment: My first question is, health studies on people living within a mile and a half of a nuclear facility in the last 30 years. Has there one been done, and what are the results? And I'd like it in writing, if there has been. (**0001-7-1** [Smith, Robert])

Comment: [W]hat kind of effect is it going to have on my vegetable garden? I mean, ... anything that gets from that, the water and stuff like that, is it -- is it going to, you know, affect my garden? Has there been any studies done on people living within a mile and a half that have gardens or small farms, not including tree farms? I'd like to know if there's been any effect on them or they've come up with any results so we know what's going on there. So, if I eat my vegetables, I'm not going to glow at night or I'm not going to die, or whatever might happen. (**0001-7-17** [Smith, Robert])

Comment: NRC admitted in 1990 that their own standards --and I'm taking the nicest, prettiest, little, tightest number, 100 millirem a year, results in 3.5 fatal cancers per 1,000 people exposed. What does that mean? It means, if we're talking about men, that there's there 1 in every 286 people. Not 1 in a million, not 1 in 10,000. But one in every 286 allowable deaths from the radiation standards that this industry is regulated under. I can't attack that in intervention, but I can disclose it to you. And then, finally, I can tell you that women are more vulnerable. Why? Because we have more vulnerable tissue, because our reproductive organs are larger. We get one and a half times the rate. That goes down to 1 in 191. You start talking about children and

unborn children and the numbers are like 1 in 10. And this is perfect performance with no accidents. This is what our federal regulator allows. (**0002-8-8** [Olson, Mary])

Comment: It cannot be denied that atmospheric deposits of tritium in water molecules accumulate in ground waters of a poorly confined aquifer system. Fifty or so years ago, measured amounts of tritium in ground water near Ocala had risen to exceed one hundred times normal background levels - due to nuclear events many thousands of miles away on the other side of the planet. (**0005-21** [Hopkins, Norman])

Comment: This radioactive waste has very subtle, but frightening, health consequences. There are those pesky tritium leaks. And who's really looked at what's been in the air, except for maybe the tooth fairy study, where it correlated the amount of radioactive waste leaks in children's teeth to the rate of cancer. Florida already has one of the highest rates of children's cancer in the entire nation. (**0001-11-2** [Minno, Maria])

Comment: I just wanted to mention something that these very smart scientists did when they were first blowing off the bombs. Testing the bombs with aboveground testing, they said, well, plutonium goes into bones in people, when they breathe it in or it gets in their food. But it kind of hasn't -- the body confuses it with calcium. But they said, it doesn't matter if the cows are feeding on pastures that are contaminated with plutonium from the waste because it will only get into their bones. And guess what? Those brilliant scientists forgot that it also goes into the milk. So, ever since they've done the aboveground testing, our milk has been contaminated with plutonium, and we have, too. (**0001-11-4** [Minno, Maria])

Response: *These comments concern potential human health effects such as cancer from radiation exposure. Section 5.9 of the EIS estimates the expected radiation dose impacts on members of the public living near the proposed Levy Units 1 and 2 from all exposure pathways, including ingestion of garden vegetables. The NRC staff is not aware what 1990 NRC document one of the commenters is referencing; however, using the risk coefficient presented in Section 5.9.3.2 (570 fatal cancers, nonfatal cancers, and severe hereditary effects per 1,000,000 person-rem), 100 millirem (0.1 rem) times 1000 people would produce an estimate of about 0.06 fatal cancers, nonfatal cancers, and severe hereditary effects, not 3.5 fatal cancers as suggested the commenter. As discussed in Section 5.9.3.2, the estimated doses to the public from operation of the proposed Levy Units 1 and 2 would most likely result in no excess health effects. Also, as stated in EIS Section 5.9.3.2, the National Cancer Institute's 1990 study titled, Cancer in Populations Living Near Nuclear Facilities, (NCI 1990) found "no evidence that an excess occurrence of cancer has resulted from living near nuclear facilities." No changes to the EIS were made as a result of these comments.*

Comment: The NRC maxim Protecting People and the Environment requires that we reiterate our very serious concern with the siting of any nuclear plant in a region with poorly confined aquifer systems allowing aerial effluent fallout to penetrate into and accumulate in groundwater. This was also represented to you from the podium and by e-mail attachment on October 18, 2010. It is not adequately addressed in the draft NUREG-1941 documents despite some deliberations in Chapter 7 and Appendix J. (**0015-6** [Hopkins, Norman])

Comment:

- all nuclear reactors including those proposed for Levy County and that at the CREC throughout their operating life continually release tritium (together with several dozen other radionuclides such as strontium and radioiodine) (Pages, J-3 and J-7),

- tritium abides in water molecules as hydrogen as explained in the backgrounder,

- tritium is a radioactive isotope of hydrogen and an EPA listed human cancer causing agent, emitting Beta particles until it degrades after about 120 years into helium,

- furthermore, it is believed that the dosage models used in this DEIS only consider routine radiation releases and fail to account for both accidental releases and tritiated water accumulations in groundwater. Moreover calculated dosage limits also assume venting of a routine radiation release from standard man's contaminated bodily fluids within a few days, (**0005-22** [Hopkins, Norman])

Comment: We own the 5700 plus acres of property immediately to the east of the planned nuclear plant to be built by Progress Energy Corp. in Levy County, Florida. We are, therefore, very concerned about the potential contamination of our property and the surface and subsurface waters thereon as we have already spent a great deal of time and expense to plan the future development of this property. (**0027-1** [Smith, Charles])

Comment: What is the amount of Tritium that will be in the cooling water as it leaves the nuclear reactors at the Levy site? What is the standard for tritium contamination exposure allowed for the LNP? How does this compare to the current NRE standards? (**0027-3** [Smith, Charles])

Comment: [A]s I spoke this afternoon about the accumulation of radionuclides in groundwater from a plant in Levy County, as described in the Environmental Impact Statement, will most likely influence the wells from which the domestic water supply is taken for 135,000 households in Citrus County. (**0002-12-6** [Hopkins, Norman])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] health hazards from the discharge of radionuclides have been assessed without sufficient consideration being given to accumulations of tritiated water in groundwater. (**0005-11** [Hopkins, Norman])

Comment: Also, the need to protect the region's scarce potable water resources likely to be impaired by any LNP facility should be given corresponding if not higher consideration as environmental damage would persist well beyond the life of the LNP facility and threaten a broad segment of the population [comment references tritium]. (**0005-3** [Hopkins, Norman])

Comment: We [Norman Hopkins] would still require the definition of fallout accumulations over the life of the LNP. (**0004-1** [Hopkins, Norman])

Comment: No nuclear plant should exist on a site situated upon a poorly confined aquifer system - a sole source of drinking water to thousands. For decades it has been beyond dispute that tritiated water, a cause of cancer, accumulates in groundwater of such aquifer systems. (**0006-3** [Hopkins, Norman])

Comment: [T]he public needs to be apprised of how, in what quantities, and into which areas harmful radionuclides are released and accumulated over the operating life of the plant for both gaseous and liquids effluent pathways from the plant, together with calculated dosages resulting from them, especially with regard to infants fed on mother's milk. (**0001-9-6** [Hopkins, Norman])

Comment: [B]efore licensing any LNP plant, the public needs to be apprised of how, in what quantities and into which areas harmful radionuclides are to be released and accumulated in groundwater over the operating life of the plant for both gaseous and liquid effluent pathways. Together with the calculated dosages resulting there from, especially regarding infants fed on mother's milk. (The harm is done to us when beta radiating elements get inside us). Groundwater accumulates harmful cancer causing agents over the decades of a nuclear plant's life where it remains radioactive for decades more. We drink it. We eat animal and vegetable products after they too assimilate the contamination. Also, the marine food web is poisoned by the toxic waste belched daily into offshore sea grass meadows which nurture our maine food web supplying food that we also eat. (**0015-7** [Hopkins, Norman])

Comment: I'm concerned about tritium for several reasons. Fifty years or so ago, measured amounts of tritium in groundwater near Ocala elevated to more than 100 hundred times background levels. They went from six tritium units in the groundwater to more than 620 units. Now, the reason for that was because on the other side of the planet there was nuclear activity and all nuclear activities release tritium. All nuclear reactors, including those proposed for the Levy plant and also Crystal River, emit tritium. Tritium is the third isotope of hydrogen and it's unstable. It emits beta particles, which are damaging to human physiology, and is a listed cancer causing agent by the EPA. (**0001-9-1** [Hopkins, Norman])

Comment: Those plants emit tritium throughout their life of operation. And they remain active, although they've got a half life of 12.3 years to something like 120 years. The problem with tritium is that it abides within a water molecule, replacing non-radioactive hydrogen atoms. So, it's imbedded within the water molecule and it can't easily be removed. (**0001-9-2** [Hopkins, Norman])

Comment: Neither do, I believe, that they deal with accumulations of radionuclides in groundwaters. So, over the life of the plant, within the fallout area of the aerial emissions, we have an accumulation of tritium. ...What we're talking about as a danger is the accumulation within the groundwater supplies that are the basis of the drinking water taken from the Floridian --from the Floridan aquifer. (**0001-9-4** [Hopkins, Norman])

Comment: Before licensing any LNP plant, the public needs to be apprised of how, in what quantities and into which areas harmful radionuclides are to be released and accumulated in groundwater over the operating life of the plant for both gaseous and liquid effluent pathways.

Together with the calculated dosages resulting therefrom, especially regarding infants fed on mother's milk. (**0005-20** [Hopkins, Norman])

Comment: The radioactive effluent comprising the largest routine gaseous and liquid releases from nuclear power plants, tritium or tritiated water, is not discussed in the DEIS adequately and monitoring requirements for determining and reporting tritium effluent amounts should be included.

According to NRC's website, radioactive materials (most notably tritium) have been identified in ground moisture or groundwater at "several" commercial nuclear power plants. NRC lists the following four causes for tritium contamination:

1. system leaks (e.g., pipes, valves, tanks)
2. evaporation of liquids
3. condensation of vapors
4. as the result of routine, approved releases [NRC 2010a]

NRC asserts that none of the groundwater contamination cases that have been evaluated exceeded any of NRC's radiation dose limits. NRC's reference to radioactive releases identified at "several" nuclear reactor plants includes over half (37 of 65) of the currently operating nuclear reactor sites on its list of "Leaks and Spills of Tritium at U.S. Commercial Nuclear Power Plants" [NRC 2010b]. The list includes only unintended releases resulting in contamination greater than 20,000 picocuries per liter (pCi/L). The list does not include known radioactive spills of cobalt-60, cobalt-58, cesium-134, cesium-137, strontium-90, or nickel-63. As of 14 September 2010, 15 nuclear reactor sites, nearly a quarter of all operating nuclear plants, are currently reporting tritium leaks or spills in excess of 20,000 pCi/L.

It is important to note that, of the 37 sites reporting tritium leak or spill events, 65 percent of these events have occurred within the last 5 years, indicating that tritium releases have only recently been detected and/or reported and may have been occurring for decades. NRC admits that it has received many questions from the public, news media, and politicians regarding spills and leaks of radioactive materials at nuclear reactors [NRC 2010b] and should, therefore, discuss at least tritium releases in the DEIS.

Despite all the interest in tritium releases, and the fact that the DEIS describes the evolution of some of the radioactive effluents (the noble gases and iodine at Page 3-32), no discussion of tritium is included. A discussion of tritium evolution is pertinent given the fact that normal and accidental releases of tritium from nuclear plants have caused widespread, lowlevel contamination of water bodies in the United States. [Makhijani and Makhijani 2009]
There is also the potential for rain during a gaseous discharge to become infused with tritium and reach locally high contamination levels under certain weather and release conditions. (**0008-35** [Hubbard, Michael])

Comment: Because tritium contamination from nuclear power plants affects many water bodies, and sometimes many plants affect a single water body, large numbers of people are

exposed to low radiation doses. The DEIS should discuss ALARA in terms of reducing or completely avoiding tritium discharges to public waters. The DEIS should also discuss environmental and health risks to humans and local biota related to gaseous tritium discharges during rainfall events. (**0008-36** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together within complete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. … Tritium generation, minimization, impacts, monitoring, and reporting not adequately addressed in DEIS and should be, given variation in reporting, groundwater contamination history, and sample representativeness issues. (**0008-67** [Hubbard, Michael])

Response: *These comments concern the potential for radioactive material from proposed Levy Units 1 and 2 to contaminate the groundwater. Section 5.9 of the EIS estimates the expected radiation dose impacts on members of the public from exposure pathways from the proposed Levy Units 1 and 2. These estimates include the most significant pathways for exposure to tritium in gaseous effluents such as inhalation and ingestion of meat and vegetables grown near the site. Deposition of tritium (and all other radionuclides) from the gaseous effluents onto the ground in the vicinity a nuclear power plant and subsequent transport into the groundwater is not a significant dose pathway compared to the pathways evaluated in Section 5.9. The tritium released in gaseous effluents (estimated 350 curies per year from each proposed unit as shown in Table J-3 of the EIS) would be dispersed by the meteorological conditions; most of it would be deposited miles away from the site. Second, the tritium deposited on the ground would have to percolate through the soil down to the groundwater. Finally, the tritium that did reach the groundwater would be greatly diluted in the groundwater before reaching an offsite well where it could be used by the public. Tritium in the liquid effluents (estimated to be 1000 curies per year from each proposed unit shown in Table J-3 of the EIS) would flow through a discharge pipe to the release point into the Gulf of Mexico at the CREC discharge canal and would not enter the groundwater. No changes to the EIS were made as a result of the comments regarding the potential for tritium released in gaseous effluents to enter the groundwater.*

Section 5.9 of the EIS estimates the doses to infants from inhalation and consumption of goat milk; the estimates in Table 5-10 show that the goat milk pathway is the bounding exposure pathway for infants for proposed LNP Units 1 and 2. The EIS does not estimate potential radiation doses to infants from drinking mother's milk. ICRP Publication 95 (ICRP 2004) indicates roughly 30 percent of the tritium ingested or inhaled by the mother would be transferred into her breast milk and the resulting dose to the infant would be only slightly greater than the dose to the mother; however, the ICRP publication also indicates roughly 30 percent of the radioiodine ingested or inhaled by the mother would be transferred into her breast milk and in the unlikely event that the mother received the maximum doses from all the exposure pathways, the dose to the infant would still be well within the NRC's dose criteria and a small impact. No changes to the EIS were made as a result of the comments regarding mother's

milk. Section 5.9.1 of the EIS has been revised to address the potential impacts of leakage of radioactive material such as tritium.

Comment: What are the total levels of Tritium currently being produced from the existing Crystal River Plant? What will be the total levels of Tritium produced from the new LNP site? What is the amount of Tritium currently being discharged from the Crystal River Plant into the Gulf of Mexico? What is the amount of Tritium that will be dispersed into the atmosphere at the Levy site? What is the amount of Tritium currently being dispersed into the atmosphere from the Crystal River site? Has there been any testing of the levels of Tritium in the surface soils of the open pasture surrounding the Crystal River Plant? If the answer is no, why have they not monitored the Tritium levels in the surface soils? If the answer is yes, what are the current readings? What is the estimated amount of Tritium that will be produced at the new Levy County nuclear plant? What type of monitoring devices will be used to determine the amount of Tritium produced at the Levy site? Has there been any testing of the current levels of Tritium in the soils at the Levy site or testing of Tritium levels that might currently exist on the 5700 acre site known as the Robinson Tract, the neighbor to the East of the Levy site? What is the amount of Tritium that will be discharged into the Gulf of Mexico from the new Levy nuclear reactors? Since Tritium will be dispersed from both the Crystal River plant and the Levy plant, What is the amount of Tritium that might be brought back into the cooling waters to the new Levy plant? Will there be monitoring wells on-site and on the 5700 acre Robinson property to monitor contamination and the amount and type of radiation that has been allowed to escape into the aquifer and surrounding water table? Will there be any monitoring devices set up on the 5700 acre Robinson Tract to monitor possible new Tritium levels in the soils and wetlands on the property? How far apart from each other will the monitoring wells to be located? (**0027-2** [Smith, Charles])

Comment: Radiological Monitoring is not adequately described in the DEIS. The monitoring of tritium appears to be loosely regulated, reporting not uniform, and sampling methodologies not proven adequately representative of actual discharges. (**0008-37** [Hubbard, Michael])

Comment: More inconsistencies in tritium monitoring include varying collection time intervals and samples that are composited prior to analysis. There is little NRC oversight to guarantee that samples are collected in association with a tritium release event, hence no verification that tritium sampling is representative of actual releases.

Tritium discharges to the atmosphere and in liquid effluents are highly variable, even among reactors of the same design. Discharges appear to be especially variable in the Pressurized Water Reactors (PWR), as are proposed for the LNP. NRC has not offered any explanation for such high variability in reported tritium discharges.

Differences in instrumentation also create inconsistencies. NRC guidelines require a lower detection limit for tritium of 2000 or 3000 picocuries, although most plants employ instruments with lower detection limits and measure in the hundreds of picocuries range. This creates inaccuracies when plant operators report tritium levels as being below the lower detection limit and then do not report what that lower detection limit is. It appears that the monitoring and

reporting of tritium effluents suffers from not having specified methodologies to assure results that are comparable and representative.

Are tritium emissions reported for each unit, or as a total from the plant? Are tritium effluents measured and reported in the unit of the standard? Will LNP operators be required to report rainfall during gaseous tritium discharge events? Will sample collection for tritium discharges be associated with release events? and how will this be verified? Is radiological measurement equipment routinely calibrated? and how will this be verified? (**0008-38** [Hubbard, Michael])

Comment: Given the high variation in liquid and gas effluent amounts of tritium currently being reported to NRC and the number of unintended tritium releases reported, a discussion of how tritium radiological discharges are measured and reported should be included in a Supplemental DEIS in order to provide assurance of adequate representation. (**0008-39** [Hubbard, Michael])

Response: *The comments concern tritium monitoring. As discussed in Section 3.4.3 of the EIS, radiological effluents would be treated and monitored before they are released. As discussed in Section 5.9.6 of the EIS, PEF currently conducts a radiological environmental monitoring program (REMP) around the CREC site and would conduct a similar REMP around the LNP site. The details of the REMP around the LNP site, including the specific sample sites, have not been developed yet. The NRC concludes that it is not necessary to discuss the specific details of the effluent and environmental monitoring methods for individual radionuclides, such as tritium, in the EIS to estimate the radiological environmental impact of the effluents. Moreover, these monitoring programs are reviewed and inspected by NRC health physics experts to ensure they are properly conducted. Tritium is typically monitored in surface water and groundwater; it is not typically monitored in soil. Also, as discussed in Section 5.9.6, the results of these monitoring programs are submitted to the NRC annually in publicly available reports. Estimates of the amount of tritium that would be released from the proposed LNP Units 1 and 2 are shown in Tables J-1 and J-3 of the EIS. No changes to the EIS were made as a result of these comments.*

Comment: Is there any current testing of construction workers or employees at the Crystal River plant to determine if there is any increase of Tritium levels in their system? Is there any plans to monitor the levels of Tritium or other possible contamination levels of workers and employees of the proposed LNP? (**0027-5** [Smith, Charles])

Response: *The comment concerns monitoring of workers for tritium contamination. All nuclear power plants in the United States, including Crystal River, have the capability to monitor workers for tritium contamination using urine analysis. At Crystal River, as at many U.S. nuclear power plants, urine analysis of workers for tritium contamination is not routinely conducted and only instituted when workers conduct activities that have the potential for tritium contamination. Workers at LNP would be monitored for tritium contamination when the potential for such contamination exists. No changes to the EIS were made as a result of this comment.*

Comment: The risks of radiation exposure were not considered as cumulative impacts in the DEIS and, therefore, should be considered by USACE in the Public Interest Review. NRC has

proven itself a master of compartmentalization in the proposed LNP DEIS. Radiation exposure is presented for various actions and activities, but is never expressed as an additive, cumulative dose. Even dosage amounts from the reactors themselves are provided for a single unit, seldom as an additive amount from both proposed units. NRC never provides a cumulative dose amount for reactor operation, transportation of new and spent fuels, onsite longterm storage, and decommissioning activities. Past spills and releases are not included in any cumulative analysis provided by NRC. Background radiation now includes radiation from past aboveground nuclear detonations and the widespread radioactive releases from the Chernobyl accident. NRC's requirements for both routine and accidental radiation releases are very loosely regulated regarding methodologies and reporting requirements. It appears that NRC is very casual about incremental increases in radiological exposures to humans and biota. The fact is, every increment of radiation exposure, no matter how small, produces a corresponding and proportional increment of cancer risk. NRC has, incredibly, promulgated regulations which expressly forbid a true cumulative impacts analysis of radiation exposure. Releases from geologic repositories are considered outside of NRC's purview, Table S3 is required by regulation to be used in lieu of sitespecific conditions, no consideration of radioactive exposures by the military are included in ANY cumulative impacts analysis, and radioactive exposure due to sources outside the United States are never considered. In the DEIS, NRC consistently compares radiation exposure from various activities to background radiation levels, typically presenting exposures from an activity as a fraction of "natural" background levels. This represents flawed logic because radiation exposure risk is additive. The exposure risk should be presented as the background level plus the exposure amount from the activity. There is no threshold below which radiation exposure has zero risk. (**0009-13** [Hubbard, Michael])

Comment: The Public Interest Review should consider risks in terms of voluntary and involuntary radiologic exposure. Manmade radiation exposure has been imposed on the public without the full and informed consent of that public. USACE is not bound to the strictures NRC has placed on itself and should consider public interest in terms of cumulative exposure risk, public safety in light of known terrorist intents, and Intergenerational Equity. (**0009-14** [Hubbard, Michael])

Response: *The comment concerns cumulative radiological impacts. Section 5.9.3.1 of the EIS estimates the potential radiation doses from operation of the reactor unit at CREC and the proposed units at LNP and compares them to EPA's dose standards (40 CFR 190). Section 7.8 of the EIS addresses the cumulative radiological impacts of the operation of proposed LNP Units 1 and 2, including CREC and other sources in the region. Safety is one of the review factors evaluated in the USACE's Public Interest Review; however, the NRC is the Federal agency responsible for oversight of reactor safety, radiation safety, and safeguards. Thus, in accordance with 33 CFR 320.4(j)(4), the USACE in its ROD will give substantial consideration to the NRC in its evaluation and determination of radiological safety issues, including concerns in regard to cumulative radiological impacts, for this proposed project as addressed in Sections 5.9.3.1 and 7.8. No changes to the EIS were made as a result of this comment.*

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending

December 2008:] risk of unintended releases of toxicity into groundwater, arising from the relative fragility of the proposed single wall PVC piping to the CREC exposed to mining seismic disturbance. (**0005-14** [Hopkins, Norman])

Comment: I'm also concerned with regard to releasing tritium, the fact that the 13 miles of pipeline conveying water effluent from the blowdown water to the Crystal River plant, I believe, is a single PVC pipe, as opposed to a PVC pipe enclosed within a second PVC pipe, with leak detectors to detect leakages from the main pipe. Now, that pipe passes by mining operations and is subject to seismic disturbances throughout its life, and I don't know what assurance can be given that that is safe. (**0001-9-5** [Hopkins, Norman])

Comment: [T]he integrity of blowdown water piping to the CR site through a single wall PVC pipe without leak detection causes concern, especially as it will be subject to regular daily seismic disturbances from mining activities. (**0005-23** [Hopkins, Norman])

Comment: Regarding the discharge pipe that will, be used to remove the treated cooling water to the Gulf of Mexico: will it be a double wall or single wall pipe? The piping for the cooling water, will it be below ground or above ground in a vaulted system making inspection, maintenance and repair easier should leaks occur? Has there been any upgrades preformed on the cooling water piping at the Crystal River plant? (**0027-3** [Smith, Charles])

Response: *The comments concern potential leakage from the proposed pipe from LNP Units 1 and 2 to the CREC. The LNP Units 1 and 2 COL application (FSAR Section 11.2) addresses the design features of the pipeline that would transfer the cooling-tower blowdown and liquid radiological effluents from LNP Units 1 and 2 to the discharge canal from CREC to the Gulf of Mexico, and how they would be monitored (PEF 2011a). The pipe would have thick single walls made of high-density polyethylene. The pipe would be buried, and the pipe sections would be fused together. The accessible features of the pipe, including vacuum breakers, vent lines, and manways, would be inspected periodically, and there would be groundwater monitoring for leak detection. Based on operating experience with this kind of pipe, the NRC staff expects the pipe would be durable and unlikely to leak; however, if the pipe did leak, the concentration of radioactive material in the leakage would be within the allowable limits of 10 CFR Part 20. Section 5.9.1 of this EIS has been revised to address the potential for leakage at the LNP site and from the blowdown line.*

Comment: The following additional oversights/shortcomings, taken together within complete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Failure to consider radiation dose to manatees as required at 10 CFR 50, Appendix I. (**0008-59** [Hubbard, Michael])

Comment: The DEIS does not adequately address radioactive doses to the Florida manatee because: no category for marine mammals was included in the evaluation; surrogate species do not apply and/or appropriateness of surrogate species for manatees was not discussed;

radioactive doses to biota included only the two proposed LNP units; CREC Unit 3 radioactive discharges were not considered in the cumulative impacts assessment for biota; and the radiation exposure evaluation did not take into account specific factors related to the estimation of radiation exposure for the Florida manatee.

The Florida manatee is listed as Endangered by the state and federal governments, as is properly addressed in the DEIS. However, NRC's analysis of radioactive dose to manatees does not appear to take into account the following: the fact that manatees may live up to 60 or more years, increasing exposure time and bioaccumulation potentials; the fact that manatees typically return to the same winter refuge year after year; and the fact that 60-90 manatees utilize the warm waters of the CREC discharge canal as a refuge in winter months [J. Kleen, USFWS, pers. comm., 14 September 2010]. According to the Biological Assessment provided by the U.S. Fish and Wildlife Service (FWS), there are an estimated 280 individuals comprising the northwest manatee population. This means that up to a third of the population may be utilizing the CREC discharge canal.

At Section 5.9.5 – Impacts on Non-Human Biota, the DEIS states that surrogate species were used to calculate radiation dose for aquatic species such as fish, invertebrates, and algae, but not manatees or marine mammals. Doses were also calculated for "important" aquatic species and manatees are not listed (Page 5-98). No manatee nor marine mammal is included in the doses calculated for aquatic species listed on Table 5-13 (Page 5-99) nor is the manatee or a marine mammal category included in a comparison of biota doses to exposure limit guidelines listed in Table 5-14 (Page 5-100). It is not apparent from the DEIS that radiological exposure dose was calculated for the Florida manatee at all.

10 CFR 50, App. I, Sect. III, A.1 states that NRC shall demonstrate by calculation procedures that actual exposure of individuals is unlikely to be underestimated. The exposure analysis is further defined at A2 of the same section: "The characteristics attributed to a hypothetical receptor for the purpose of estimating internal dose commitment shall take into account reasonable deviations of individual habits from the average." The regulation continues with a list of factors or phenomena affecting the estimate of radiation exposure. One of these factors most pertinent to the manatee is "physical processes tending to attenuate the quantity of radioactive material to which an individual would be exposed." (**0008-8** [Hubbard, Michael])

Comment: The DEIS should include a discussion of the methods and results of radiation dose computation for the Florida manatee, and include important factors such as 40 to 60 years of exposure, exposure to unborn, newborn, and sub-adult manatees at the discharge location, and bioaccumulation over 40-60 years. Additionally, radioactive tritium, which constitutes the largest normal operations releases from nuclear power plants, can cross the placenta, increasing the risk of birth defects as well as cancer. From information provided in the DEIS, it appears that NRC failed to fully evaluate radiological impacts to <u>all</u> biota, including manatees, by not performing a cumulative impacts analysis that included addition of radioactive effluents from CREC Unit 3 (see p. 5-98, lines 23-24 and p. 5-99, Table 5-13).

In accordance with 10 CFR 50, Appendix I, NRC must perform radioactive exposure assessment utilizing real phenomena and, in accordance with 10 CFR 51.75(c), perform a cumulative impacts analysis for radioactive exposure to biota, including manatees. This commenter requests that radiation dose impacts, including cumulative impacts, to Florida manatees be explicitly considered and calculation methodology and impacts be provided to the public for review in a Supplemental DEIS. (**0008-9** [Hubbard, Michael])

Response: *The comments concern the potential radiological impacts on the manatee. In the ER (PEF 2009d), PEF calculated doses to a list of surrogate biota species and other important species including the manatee. The estimated dose to the manatee was less than the dose to the saltwater invertebrate surrogate species. Section 5.9.5 of the EIS addresses potential radiological impacts on biota other than humans. The NRC staff limited the tables presenting estimated biota doses to the surrogate species and the northern bobwhite. The text of Section 5.9.5 listed all of the other important species and indicated that the important biota specie with the highest calculated dose was the northern bobwhite. The manatee was inadvertently left out of the list. Section 5.9.5 has been revised to include the manatee in the list of other important biota species.*

Comment: [T]he statistics put forward by Mary Olson at the 23 September 2010 review meeting indicating levels of human harm from radionuclide emissions and in high level wastes within the regulated standards were simply staggering and quite unacceptable to civilized society. (**0005-24** [Hopkins, Norman])

Response: *The NRC has set regulatory limits related to the doses to workers and members of the public from radioactive materials released from nuclear power plants. The NRC ensures that effluents from operating plants under its oversight are within the established limits. The NRC regulations also incorporate, by reference, EPA's generally applicable environmental radiation standards set forth in 40 CFR Part 190. The regulations are set to protect workers and the public from the harmful health effects of radiation on humans, with the understanding that if levels are kept this low, they would be appropriate for animals as well. The nuclear power plant licensee verifies that the doses to the public from radioactive materials released to the environment are within the regulatory limits and documents this information in its annual Radioactive Effluent Release Report, which is available through the NRC's web site. No changes were made to the EIS as a result of this comment.*

Comment: Section 5.9.3.1, Page 5-95, Line 6: There is an apparent discrepancy between what is reported in the DEIS and the ER regarding the calculated Beta Air Dose from the gaseous pathway from one new AP1000 unit. Table 5-11 of the DEIS states 9.9 mrad and Table 5.4-9 of the ER states 9.4 mrad. (**0010-3-12** [Kitchen, Robert])

Response: *This comment concerns an error in the EIS. PEF correctly reported in ER Table 5.4-9 Rev 2 the results of its calculations. Table 5-11 of the EIS was revised to reflect the beta air dose value of 9.4 mrad.*

E.1.16 Comments Concerning Nonradiological Waste

Comment: Page 3-37 of the DEIS discusses decreased volatile organic compound (VOC) content in products such as paints, solvents, and adhesives and states that use of these lower-VOC-content and/or water-based products can minimize VOC emissions to the atmosphere. However, no regulatory requirement for PEF to use such products is cited, nor is a statement that PEF has committed to utilizing such products provided. (**0008-1** [Hubbard, Michael])

Response: *The comment concerns a statement in Section 3.4.4.3 that lower volatile organic compound (VOC) products are increasingly available, without stating that PEF commits to using such low-VOC formulation products. The statement was removed from the EIS.*

Comment: **...**what are we going to do with all that toxic chemicals that are there...? (**0002-3-5** [Lott, Phyllis])

Response: *The comment concerns management of toxic wastes. Section 4.10 of the EIS discusses the management of nonradioactive construction wastes. Section 5.10 discusses the management of nonradioactive operational wastes. Section 6.1 discusses wastes from the uranium fuel cycle. No changes were made to the EIS as a result of this comment.*

E.1.17 Comments Concerning Accidents

Comment: [O]ne other thing that appears to me is that the dosage models used in the EIS reports only consider routine releases from the plant. They fail to account for accidental releases, and there's a warning in there that they should not be used for accidental releases. (**0001-9-3** [Hopkins, Norman])

Response: *This comment concerns the potential impacts of accidents. The potential consequences of design basis accidents are addressed in Section 5.11.1 of the EIS. The consequences presented include the dose at the exclusion area boundary for the worst two hours of the accident, and the dose for the course of the accident for a period of up to 30 days at the outer boundary of the low population zone. Risks associated with postulated severe accidents are addressed in Section 5.11.2 of the EIS. These risks include population dose risk, health risks, economic risks, and land decontamination risks. No changes were made to the EIS in response to this comment.*

E.1.18 Comments Concerning the Uranium Fuel Cycle

Comment: [T]he environmental consequences of this nuclear power plant will not go away within a human time scale, because the radioactive wastes have a half life of thousands of years. In addition, there is no safe way to dispose of nuclear waste at this time. (**0001-11-3** [Minno, Maria])

Comment: [T]here actually is no plan in place to store this nuclear waste. Places -- you're right. It is a business to set up facilities to store this. (**0002-3-1** [Lott, Phyllis])

Comment: We do know that Yucca Mountain is closing, and that was the main place that you had mentioned that you were going to store this. So, I don't understand why we're going to spend billions of dollars building a facility and we don't have any permanent place to store the nuclear waste. You cannot leave it in those containers for any length of time. So, I'm very much concerned, because I don't believe, when we were talking about building this plant, that we thought this was going to be a problem. Now I think it is a major problem, and before we spend all this money building something, we must have some place to store this nuclear waste. It would be ridiculous to build this, and what are we going to do with all [...the] rods and other things? (**0002-3-2** [Lott, Phyllis])

Comment: [T]he storage of the spent fuel will occur close to the Robinson Estate property. We hope that you will take those kinds of issues into consideration. (**0002-7-9** [Avery-Smith, Ellen])

Comment: I do want to say a couple of things about waste, because I think that the earlier comments were spot on. There is no place to send any of the waste that would be generated at this proposed site at this time. (**0002-8-2** [Olson, Mary])

Comment: [I]n the last month the Nuclear Regulatory Commission has issued a new ruling saying that their basis of confidence for approving a new reactor, whether it be in Levy County or anywhere else, is that the high level nuclear waste, the irradiated fuel rods that were described to us this evening -- and just so you know, technical analysis says that on average they're 6 million times more radioactive than the uranium that's put in, and it does give a lethal exposure if unshielded and in less than 30 seconds. So, this is a very tricky material. I'm not saying that Progress Energy or anyone else is handling it in an unsafe manner, but the fact is that the regulator has determined that the basis for issuing a license to make more of this stuff is that it can be stored where it is generated for up to 120 years. (**0002-8-3** [Olson, Mary])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] the absence of safe storage for highly toxic used fuel rods removed from the reactors. (**0005-13** [Hopkins, Norman])

Comment: Alternatives analysis in the DEIS is incomplete because the DEIS itself was substantially incomplete. Unavoidable impacts from the proposed LNP were not determined because service water supply issues had not been resolved prior to issuing the DEIS, as well as other design issues such as "low-level" radioactive waste onsite storage and incomplete or missing studies such as impacts due to loss of freshwater input into the estuary system, among others. Because the DEIS is significantly incomplete regarding the range and extent of environmental impacts, a Supplemental DEIS meeting the regulations and guidance is required in accordance with 40 CFR 1502.9(a). (**0008-42** [Hubbard, Michael])

Comment: There is no justification provided in the alternatives analysis for producing long-lasting, intensely radioactive wastes for which no disposal exists. (**0008-53** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Final disposition of LLW unknown, site-specific impacts not addressed. (**0008-66** [Hubbard, Michael])

Comment: The bane of nuclear power is the radioactive exposure and toxic waste produced in every step of the uranium fuel cycle, and especially the high-level wastes that can remain radioactive for one million years. We do not have the technology to build containment that is guaranteed to endure anywhere near that long.

NRC has not proven in its Waste Confidence Rule (10 CFR 51.23) that safe disposal of spent fuel in a geologic repository is technically feasible [Makhijani 2009]. Therefore, NRC's reliance on the assumption of zero radioactive releases in Table S3, Table of Uranium Fuel Cycle Environmental Data [10 CFR 51.51] is unrealistic. Since long-term storage of radioactive wastes has resisted solution, increasing the amount of such wastes would only compound the problem and, thus, would not be in the public's best interest.

The general public will, to a large extent, pay for the disposal of 63,000 metric tons (69,460 U.S. tons) estimated by DOE to exist by 2010, and is estimated by DOE to be 105,000 metric tons (115,760 U.S. tons) by 2046.

Creating highly toxic wastes for which no means of safe disposal exists also violates the ethical construct of Intergenerational Equity - that is, the foisting of problems we cannot resolve today onto future generations instead of opting not to create the problem in the first place. This ethical principle is a key element of long-term public interest that has not received the attention it should with regard to nuclear power, mainly because the public has not been well informed as to the technical infeasibility of safely storing high-level radioactive wastes. I urge USACE to utilize the concept of Intergenerational Equity when balancing benefits and detriments of the proposed LNP for public interest. (**0009-11** [Hubbard, Michael])

Comment: USACE is required to consider the extent and permanence of benefits and detriments of any proposed project. The benefit of electric power for 60 years should not outweigh the generation of thousands of tons of radioactive waste for which no option for safe disposal has gained public or political/financial support. Creating such potent and longlasting radioactive wastes without a valid plan for disposal violates the ethics and morals of Intergenerational Equity. I encourage USACE to have the courage to say so publicly. (**0009-16** [Hubbard, Michael])

Response: *These comments concern the environmental impacts of onsite storage and eventual disposal of low-level radioactive waste, spent fuel, and high-level radioactive waste produced by proposed LNP Units 1 and 2. Section 5.9 of the EIS evaluates the radiological impacts of operation of proposed LNP Units 1 and 2, including the onsite storage of radioactive wastes until they can be shipped to a licensed waste disposal facility. Section 6.1 of the EIS*

addresses the environmental impacts of the fuel cycle, and Section 6.1.6 specifically addresses the environmental impacts of radioactive waste disposal after the waste is shipped from the LNP site. Section 6.1.6 also addresses options such as the addition of temporary onsite storage capacity if licensed disposal facilities are temporarily not available.

In an update of the Waste Confidence Rule on December 23, 2010 (72 FR 81032), the NRC Commissioners determined that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed operational life (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent-fuel storage basin and at either onsite or offsite independent spent-fuel storage installations. Furthermore, the Commission believes there is reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial high-level radioactive waste and spent fuel generated in any reactor when necessary. Section 6.1.6 of the EIS was revised to reflect these changes to the Waste Confidence Rule.

Safety is one of the review factors evaluated in the USACE's Public Interest Review; however, the NRC is the Federal agency responsible for oversight of reactor safety, radiation safety, and safeguards. Thus, in accordance with 33 CFR 320.4(j)(4), the USACE in its ROD will give substantial consideration to the NRC in its evaluation and determination of radiological safety issues for this proposed project. No change was made to the EIS as a result of the comments regarding USACE review.

Comment: I'd also like to know where they're going to store the waste on the property. I haven't been able to find it in none of the things --actually where they're going to store it. Where it's -- how -- is it going to be underground? Above ground? Is there going to be a chance of water leakage? Is it going to be close to my house? What's going to go on? (**0001-7-9** [Smith, Robert])

Response: *This comment concerns the location of radiological waste on the LNP site. Radiological waste would be stored in the radwaste buildings until processed for shipping. At each of the Units LNP 1 and 2, the radwaste building would be located approximately 70 ft south of the shield building and would be attached to the auxiliary building. Section 3.2.3.1 of the EIS was revised to include information about the radwaste buildings. Section 6.1.6 discusses the location of additional onsite low-level waste storage facilities if such facilities were to be built. No changes were made to Section 6.1.6 in response to this comment.*

Comment: I'm here to tell you that page 17 of the handout is entirely misleading. This little pie chart about radiation. Just imagine for a moment that there's 104 operating nuclear reactors, and then there's about a dozen nuclear weapon sites, and then there's all their support industries, the laundries, and the waste processors, and there's some incinerators. But probably there's on the order of, you know, a few hundred nuclear facilities. And yet, they're showing up at a tenth of a percent. That is one one-thousandth of all the radiation. That means

that the averaging is pretty amazing when they give these numbers, because people who live in these areas are getting a lot of radiation, okay? Because the radiation standards are so permissive. (**0002-8-7** [Olson, Mary])

Comment: Used Fuel Rods. The so-called "spent" fuel rods are more radioactive after use in a nuclear reactor than when first inserted by an average six million times. Although fuel rods removed from a LNP reactor will have U235 at reduced levels, other radioactive elements (eg Boron used to control the reactor process) would raise radioactivity intensity in the used rods far above their levels before use in the reactor. (**0005-25** [Hopkins, Norman])

Comment: Use of uranium fuel results in low-level exposure from every step in the process: mining the ore, transporting ore, processing and packaging, shipment to reactors, use as fuel resulting in routine and accidental releases, onsite spent fuel storage, transporting spent fuels to repository, and we are learning that repositories will also introduce radioactivity into the environment. Additionally, accidents can result in low-level exposures and have potential for high-level exposures covering broad areas. No other generation option comes with such a cost to human health. (**0009-8** [Hubbard, Michael])

Response: *These comments concern the environmental impacts of the uranium fuel cycle. Sections 6.1 and 6.2 of the EIS evaluate the environmental impacts of the uranium fuel cycle based on the generic impacts codified in 10 CFR 51.51(b), Table S-3, Table of Uranium Fuel Cycle Environmental Data, including the impacts of uranium mining and milling, fuel manufacturing, transportation, onsite storage and offsite disposal of low-level radioactive waste, and the onsite storage and eventual disposal of spent fuel. No change was made to the EIS as a result of these comments.*

Comment: The communities in this country are standing up and saying no, we don't want to be dumps. The dumps that are there have been closed, except for there very few exceptions. Utah is an exception. There are dumps that are taking waste from specific states, like South Carolina's still taking from Connecticut, New Jersey, and South Carolina only. But that's what's forcing every reactor in the United States to either store or ship to a temporary location their so-called low level waste. And the same would be true of Levy after two years of storage that's in the AP-1000 design, if it's the average level of production of waste, which it may or may not be in the first year -- second year. (**0002-8-4** [Olson, Mary])

Comment: PEF's inability to state the disposition of low-level radioactive wastes (LLW) at this time is another example of how this DEIS is incomplete. NRC assures the public in the DEIS that, no matter which option PEF chooses to handle low-level radioactive wastes at the proposed LNP, radiological impacts would be insignificant.

Three options are presented for handling LLW at the proposed LNP (Page 6-13). The first option, implementing "measures to reduce or eliminate" the generation of certain low-level wastes, is temporary at best and merely extends the time span of temporary storage past the design storage time of two years. The DEIS does not say how much past two years the low-

level radioactive waste could be stored. This commenter would like to know why NRC is not requiring PEF to implement "measures to reduce or eliminate" the generation of radioactive wastes in the first place.

The next option presented is finding a NRC licensed facility to accept low-level radioactive wastes, as was the original design plan. But it is not apparent that this will occur in time to prevent need for the third option, which entails the construction of onsite facilities for the storage of these radioactive wastes. The DEIS states that PEF has "indicated" that onsite low level radioactive waste storage facilities would be constructed in accordance with a NRC Standard Review Plan (Page 6-13). The DEIS also states that 10 CFR 50.59 allows licensed nuclear power plants "to construct and operate additional onsite LLW storage facilities without seeking approval from the NRC." This is astounding because portions of so-called "low-level" radioactive wastes contain the same radionuclides that are found in high-level wastes and may remain highly radioactive for up to a million years. (**0008-33** [Hubbard, Michael])

Comment: Disposition of LLW are a valid concern, else the Atomic Safety Licensing Board (ASLB) would not have granted two contentions regarding PEF's plans to handle low-level radioactive wastes at the proposed LNP due to a Petition to Intervene in the COL application. The ASLB apparently agreed that onsite long-term storage of low-level radioactive wastes could significantly increase the environmental, safety, and security risks of the proposed LNP.

The DEIS states that increases in radiation dose both onsite and offsite from long-term storage of "low-level" radioactive wastes onsite would be insignificant because all the NRC (10 CFR 20) and EPA (40 CFR 190) dose limitations would apply. NRC supported this conclusion based on a study of interim LLW storage at other nuclear facilities. Based on the study, NUREG-1437, NRC has determined:

> The types and amounts of LLW generated by the proposed reactors at LNP would be similar to those generated by currently operating nuclear power plants and the construction and operation of any interim LLW storage facilities would be similar to the construction and operation of the currently operating facilities. Therefore, the impacts of constructing and operating additional onsite LLW storage facilities would be small. (Page 6-14)

Proposing that similar facilities have constructed and stored LLW onsite without significant radiological impacts is not sufficient support for determining that the proposed LNP would also have insignificant impact. NRC claims little regulatory oversight over construction of the onsite "low-level" radioactive waste storage facilities. Site-specific data and design specifications should be evaluated in order to support the "small" impact conclusion. This commenter would like to know if it was considered, in NUREG-1437, that the LLW storage facilities would be located on a karst floodplain over a surfical aquifer directly connected to a lower aquifer?

The fate of "low-level" radioactive wastes should be determined in order to demonstrate minimization of environmental impacts (i.e., "measures to reduce or eliminate" the generation of

such wastes in the first place), quantify adverse impacts, and then allow public review and comment in a Supplemental DEIS. Use of previous generic studies, such as NUREG-1437, should only be addressed if a discussion of applicability to sitespecific conditions is also provided. (**0008-34** [Hubbard, Michael])

Response: *These comments concern the management of low-level wastes (LLWs). Section 6.1.6 of the EIS discusses the three options available to PEF for the storage and disposal of LLW. PEF expects to enter into an agreement with an NRC-licensed facility that would accept LLW from LNP. The EnergySolutions, LLC site near Clive, Utah can accept LLW Class A from any U.S. LLW-generator site. The Waste Control Specialists, LLC, site in Andrews County, Texas, is licensed to accept Class A, B, and C LLW from the Texas Compact (Texas and Vermont). As of May 2011, Waste Control Specialists, LLC, may accept Class A, B, and C LLW from outside the Texas Compact for disposal subject to established criteria, conditions, and approval processes. If PEF has not entered into an agreement with an NRC-licensed facility that would accept Class B and Class C LLW from LNP, PEF would implement measures to reduce or eliminate the generation of Class B and C wastes, extending the capacity of the onsite waste storage within the facilities identified in the DCD (PEF 2009e). Section 6.1.6 of the EIS explains that the potential measures to reduce the generation of Class B and C wastes described by PEF could increase the volume of LLW but would not increase the total curies of radioactive material in the waste. The environmental impacts would still be bounded by or very similar to the estimates in Table S–3, and the environmental impacts would not be significantly different. If needed, PEF would also construct additional onsite LLW storage facilities designed and operated to meet the guidance standards in Appendix 11.4-A of the Standard Review Plan (NUREG-0800 [NRC 2007b]). Section 6.1.6 of the EIS also explains that in most circumstances the NRC's regulations (10 CFR 50.59) allow licensees operating nuclear power plants to construct and operate additional onsite LLW storage facilities without seeking approval from the NRC. Licensees are required to evaluate the safety and environmental impacts before constructing the facility and make those evaluations available to NRC inspectors. Finally, PEF could enter into an agreement with a third-party contractor to process, store, own, and ultimately dispose of LLW from LNP. In Section 6.1.6 of the EIS, the NRC staff evaluated the environmental impacts of each option. This section was revised to reflect the possibility of PEF in using the Clive, Utah or the Andrew, Texas LLW disposal sites or both for the LLW generated at the Levy County site as a result of this comment. No other changes were made to the EIS as a result of this comment.*

Comment: Since the publication of the DEIS, the NRC has determined (on 9/15/2010) that radioactive wastes from nuclear power plants can be safely stored for at least 60 years beyond the licensed life of any reactor. The final revisions to its Waste Confidence regulation revised the number of storage years upward by 30 years, and asserted that sufficient repository capacity will be available when necessary. The FEIS should clarify the impact of this revision on the proposed LNP project, as this new determination finds that spent nuclear fuel can be stored safely and securely without significant environmental impacts for at least 60 years after operation at any nuclear power plant. EPA recommends that the FEIS cite any new analyses for longer-term storage regarding scientific knowledge relating to spent fuel storage and disposal. The FEIS should also mention any developments with the Presidential Blue Ribbon

Commission on alternatives for dealing with high-level radioactive waste if there are such developments before FEIS publication. (**0003-19** [Mueller, Heinz J])

Comment: EPA is requesting additional information on a number of issues including ... the potential for long-term storage of spent fuel at LNP in light of the new Waste Confidence regulation. (**0003-3** [Mueller, Heinz J])

Response: *These comments by the EPA concern the basis of the Waste Confidence Rule. In a revision of the Waste Confidence Rule on December 23, 2010 (75 FR 81032), the NRC Commissioners determined that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed operational life (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent-fuel storage basin and at either onsite or offsite independent spent-fuel storage installations. Furthermore, the Commission believes there is reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial high-level radioactive waste and spent fuel generated in any reactor when necessary. 75 FR 81037 provides additional information on the technical basis for the update of the Waste Confidence Decision. On January 26, 2012, the Blue Ribbon Commission on America's Nuclear Future (BCR) sent the Secretary of Energy its final report. Section 6.1.6 of the EIS was revised to reflect these changes to the Waste Confidence Rule and for the BCR issuing their final report.*

E.1.19 Comments Concerning Transportation

Comment: If another repository in the contiguous United States (other than Yucca Mountain) is ever selected, the environmental impact estimates from the transportation of spent reactor fuel should be re- calculated as required under 42 USC 4321 Fuel Cycle, Transportation, and Decommissioning. (**0003-21** [Mueller, Heinz J])

Response: *The comment concerns the possible future choice of another location for a high-level waste (HLW) repository. If another repository besides Yucca Mountain is ever selected, it is likely that an EIS would be required for the repository. A full description and detailed analysis of the transportation of spent nuclear fuel from nuclear power plants to the new repository location would probably be included in that EIS; however, as noted in Section 6.2.4 of the EIS, the distance from the LNP site or any of the alternative sites to any new planned repository in the contiguous United States would be no more than double the distance from the LNP site or alternative sites to Yucca Mountain. Doubling the environmental impact estimates from the transportation of spent reactor fuel would provide a reasonable bounding estimate of the impacts to meet the needs of NEPA. In Section 6.2.4 of the EIS, the NRC staff concluded that the environmental impacts of these doubled estimates would still be SMALL. No changes were made to the EIS as a result of this comment.*

Comment: Shipping casks have reportedly not been designed for the spent fuel from advanced reactor designs such as the Westinghouse AP1000. Information in the Early Site Permit Environmental Report Sections and Supporting Documentation (INEEL 2003) indicated that

advanced LWR fuel designs would not be significantly different from existing LWR designs; therefore, current shipping cask designs were used for the analysis of Westinghouse AP1000 reactor spent fuel shipments. EPA recommends that when shipping casks are designed for the spent fuel for the Westinghouse AP1000, the analysis should be repeated. We understand that the NRC staff assumed that the capacity of a truck shipment of Westinghouse AP1000 reactor spent fuel was 0.5 MTU/shipment. (**0003-20** [Mueller, Heinz J])

Response: *The comment concerns the non-availability of an approved transportation cask for the Westinghouse Electric Company, LLC AP1000 pressurized water reactor (AP1000) spent fuel. The commenter is correct in that shipping casks designed specifically to transport AP1000 spent fuel have not been developed and the NRC staff's analysis of transportation impacts was based on current light water reactor (LWR) shipping cask designs. The key shipping cask design-related parameters used in the analysis are the cargo capacities and external radiation dose rates. The shipping cask capacities used in the NRC staff's analysis are conservative; i.e., they are substantially smaller than the cargo capacities anticipated for shipping casks designed for Westinghouse AP1000 spent fuel. The small cargo capacity assumed by the NRC staff results in a substantially larger number of spent-fuel shipments and radiological impacts than are actually expected when this plant begins to ship spent fuel offsite. Radiation dose rates emitted from spent-fuel shipments were set to the regulatory dose rate limit in the NRC staff's analysis. Actual radiation dose rates cannot be higher and are likely to be lower than the regulatory limits. Consequently, the NRC staff concludes that the transportation impact analysis presented in the LNP EIS is bounding. Further analysis to incorporate future shipping cask designs would result in lower impacts and would not affect the NRC staff's conclusion that transportation impacts are SMALL. No changes were made to the EIS as a result of this comment.*

Comment: And I was also curious about how they will be transporting the uranium and how many houses it will go by to get there. (**0002-9-2** [Seiling, Barbara])

Response: *The comment concerns how many houses would be along transportation routes. As noted in Sections 6.2.1 and 6.2.2 of the EIS, unirradiated uranium fuel would be shipped by truck and irradiated uranium fuel (spent nuclear fuel) could be shipped by truck or rail. The NRC staff has not determined how many houses these shipments might pass by; however, as presented in Sections 6.2.1 and 6.2.4 of the EIS, the incident-free radiological doses, radiological accident risks, and nonradiological accident risks of transporting unirradiated and irradiated unranium fuel would be minimal; therefore, as noted in Section 6.2.4 of the EIS, the impacts of these shipments would be SMALL. No changes were made to the EIS as a result of this comment.*

Comment: Cumulative impacts regarding transportation of new and spent (irradiated) fuels do not appear to be addressed in the DEIS. Discussion of the topic is difficult to comprehend in the DEIS. However, the COL application is more straightforward and should be similar to, but perhaps less conservative than, NRC's conclusions in the DEIS. In Part 3, Environmental Report of the COL application, Page 3-103 states:

The total number of truck shipments of fuel and radioactive waste to and from the reactor is estimated at 65 per year for the AP 1000.

It is unclear what NRC did, but a cumulative impacts analysis it was not. In order to provide a true cumulative impacts assessment performed in accordance with CEQ guidelines (Cumulative Effects Report), 65 trucks/year/unit needs to be multiplied by the number of currently operating nuclear reactors plus proposed LNP Units 1 and 2. That would be 106 reactors multiplied by 65 trucks per reactor, or 6890 trucks carrying radioactive loads on our highways every year. (**0008-40** [Hubbard, Michael])

Comment: The point being that someone should be looking at a true cumulative impacts analysis for shipping radioactive materials across the nation and no indication that the NRC has done so was found. Certainly the larger scale is not considered in this DEIS as appears to be required by guidance on cumulative impacts analysis. Since the LNP reactors exceeded the acceptance criteria of Table S-4 (10 CFR 51.52), a "full description and detailed analysis" of impacts for transportation of new and spent fuels is required at 10 CFR 51.52(b). A "detailed analysis" of impacts implies cumulative impacts as well. This commenter would like to see a true cumulative impacts analysis for radiation dose from all shipping of radioactive loads across the nation, and the regulations and guidelines appear to support that the Environmental Impact Statement should include just such an evaluation. (**0008-41** [Hubbard, Michael])

Comment: Transportation The DEIS in no way accounts for the cumulative effects of transporting radioactive new and spent fuels on our highways. A crude assessment by Hubbard 2010, estimates that there could be, on average, up to 7000 trucks per year carrying new and spent fuels on public highways, exposing individuals living near these highways to radiation, as well as those unfortunate enough to be traveling those same highways at the time, or visiting vehicle rest and refueling facilities. The assessment did not account for radioactive waste other than spent fuels that are also generated at nuclear power plants, shipment of radioactive wastes from decommissioned facilities, or the shipment of any new or waste radioactive material for military purposes. Therefore, 7000 trucks per year hauling nuclear materials on our highways could be a significant underestimation of the actual shipping volume.

It should be noted that none of the other generation methods considered in the DEIS pose the threat of radioactive exposure to public due to transportation of fuels and wastes. A natural gas supply line already exists near the proposed LNP site, meaning that natural gas-fired power generation would not include impacts from transportation of fuel, such as coal or nuclear. Since the DEIS does not include a cumulative impact analysis for the shipment of fuels and wastes, USACE should consider both the cost of shipping fuels and wastes with the economic evaluation and the radiation exposure due to shipping new and spent nuclear fuels for the proposed LNP in the Public Interest Review. (**0009-4** [Hubbard, Michael])

Response: *The comments concern the potential cumulative impacts of transportation of unirradiated fuel, spent nuclear fuel, and radiological waste. Section 6.2 of this EIS addresses the impacts of transportation of unirradiated fuel, spent nuclear fuel, and radiological waste for operation of the proposed LNP Units 1 and 2. Section 7.11.2 of this EIS addresses*

the cumulative regional impacts of transportation of unirradiated fuel, spent nuclear fuel, and radiological waste. The impacts addressed in Section 6.2 and 7.11.2 are small, and the incremental increase in the national cumulative impacts would be insignificant. Further information is available in Section 8.4.1 of the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DOE 2002) that evaluated the cumulative impacts of radioactive material transportation for the time periods 1943 through 2033 and 1943 through 2047. This included the impacts from transporting spent nuclear fuel from nuclear power plants to the Yucca Mountain repository, the impacts from other transportation activities associated with nuclear power reactors, and the impacts from shipping radioactive waste. For workers, the collective radiation dose was estimated to be about 4000 person-rem/yr and for the public, the collective radiation dose was estimated to be about 3500 person-rem/yr. About one traffic fatality/yr was estimated. No changes were made to the EIS as a result of the comments regarding cumulative impacts.

Safety is one of the review factors evaluated in the USACE's Public Interest Review; however, the NRC is the Federal agency responsible for oversight of reactor safety, radiation safety, and safeguards. Thus, in accordance with 33 CFR 320.4(j)(4), the USACE in its ROD will give substantial consideration to the NRC in its evaluation and determination of radiological safety issues for this proposed project. No change was made to the EIS as a result of the comment regarding USACE review.

Comment: The Robinson family also owns 28 acres near the heavy-haul route. We would like you to take into consideration what revisions Progress Energy is making to ensure adequate legal access to Highway 40 from that property. What safety concerns are going to be impacted or how is that property going to be impacted by the use of that heavy-haul route? (**0002-7-10** [Avery-Smith, Ellen])

Response: *The comment concerns traffic on the proposed heavy-haul road. As identified in Section 4.4.4.1 of the EIS, the intersection of County Road (CR) 40 and the heavy-haul road could be adversely affected by construction-related traffic. The EIS also identified two mitigation measures for the intersection of CR-40 and the heavy-haul road, constructing a turn lane and an approach lane at the intersection of CR-40 with the heavy-haul road, and using flagmen when a heavy-haul crawler is crossing CR-40. Based on implementation of these mitigation measures, the review team anticipates minor impacts from construction and preconstruction of the LNP on the existing road network. No changes were made to the EIS as a result of this comment.*

E.1.20 Comments Concerning Cumulative Impacts

Comment: It appears that the review team needs to review the CEQ's January 1977 report, Considering Cumulative Effects Under The National Environmental Policy Act (Cumulative Effects Report). The review team should pay special attention to Table 1-2 of the report where the principles of cumulative impacts are addressed, Table 1-3 where eight scenarios of accumulating effects are described, Table 1-4 illustrating combinations that may result in

additive or interactive impacts, and Table 2-2 where an aquifer system is shown to be the proper geographic area for evaluating cumulative impacts. (**0008-23** [Hubbard, Michael])

Response: *The NRC is familiar with CEQ's guidance regarding the assessment of cumulative impacts. As discussed in Section 7.2.1, the NRC considered the area within 20 mi of the LNP site to be the geographical area of interest for cumulative impacts on groundwater. NRC considers this area sufficiently large to capture any cumulative impacts on the surficial and Upper Floridan aquifers from the construction and operation of LNP and other past, present, and reasonably foreseeable projects. The two aquifers in question extend over the entire geographical area within 20 mi of the proposed site, and the surficial aquifer overlies the Upper Floridan Aquifer. This geographical area is the same as that adopted by the FDEP and the SWFWMD in their evaluation of water-use impacts during the groundwater usage permitting process. The review team also considered this geographical area large enough to encompass the boundaries of the model used to evaluate drawdown impacts. This comment provides no new information. No change was made to the EIS as a result of this comment.*

Comment: Failure to take a hard look at direct, indirect and cumulative impacts of mined raw materials to construct the proposed project – According to page 3-3 of the LNP DEIS, "Each reactor containment structure for the AP1000 is approximately 225 ft high and 130 ft in diameter. Each reactor unit is supported by a multicell mechanical draft cooling tower that is approximately 1000 ft long and 56 ft high (PEF 2009a)." Because the LNP DEIS failed to identify with certainty the location where the extensive aggregate/raw materials required to construct the proposed project would be mined, the authoring agencies could not take a hard look at the direct, indirect and cumulative adverse impacts of mining the extensive aggregate/raw materials required to fill the two 100-foot deep holes proposed to be excavated to create a foundation for the cooling towers and to construct the two huge cooling towers, other facilities and roads associated with the proposed project. Those impacts would exceed "LARGE". (**0020-7** [Bacchus, Sydney])

Comment: Neither the DEIS nor PEF addressed the adverse direct, indirect and cumulative impacts of refilling the giant 100-foot deep hole that would be excavated for the proposed LNP "nuclear islands." The DEIS (p. 4-10) includes the following statement: PEF has not made a final determination regarding the source of the fill material for the LNP site. To provide additional context for the potential impacts of fill mining, the review team considered the impacts if the proposed Tarmac King Road Limestone Mine provided the source of fill. (**0030-1-14** [Bacchus, Sydney])

Response: *The NRC is not aware of any plans to excavate, and then fill, a 100-ft-deep hole as part of the construction of the LNP nuclear islands. The planned excavations for the nuclear powerblocks would be 75 ft deep. Concrete foundations would be placed in these excavations, creating a cavity below grade for the powerblock; however, in Section 3.3.1, NRC acknowledges the need for extensive fill placement. Fill material could be provided from several different locations in the region surrounding LNP and it is not possible at this time to identify with certainty which specific quarries would be chosen. For the purpose of assessing potential cumulative impacts, and to provide context for possible impacts from mining, the NRC*

considered the proposed Tarmac King Road Limestone Mine. The anticipated direct, indirect, and cumulative impacts associated with operation of this mine are described in Chapters 4 and 7. This mine would be one of the closest and largest mines in the area and could easily provide LNP's needed fill at a low transportation cost. Because it is currently undeveloped, the potential impacts would be greater there than at an operating quarry. For these reasons, the NRC considered the cumulative impacts of construction of LNP in combination with the anticipated impact of the Tarmac King Road mine as being a reasonable estimate of actual cumulative impacts regardless of which quarry or combination of quarries are used. The NRC considers the level of assessment in Chapters 4 and 7 to be commensurate with the potential cumulative impacts associated with the mine. These comments provide no new information. No changes were made to the EIS as a result of these comments.

Comment: Insufficient information to determine full area of impact - Obviously the area of impact or affected area from the proposed LNP must encompass at least the subregion where the proposed transmission lines and substations would be constructed and operated. The full area of impact of construction and operation of the proposed LNP cannot be determined at this time based on the information provided by PEF or the DEIS because those documents failed to include a scientifically based analysis of all of the adverse direct, indirect and cumulative impacts. (**0030-1-5** [Bacchus, Sydney])

Response: *Environmental impacts associated with any planned new transmission lines, substations, and rights-of-way are addressed in Chapters 4, 5, and 7 of the EIS. This comment provides no new information. No change was made to the EIS as a result of this comment.*

Comment: No comprehensive cumulative effects analysis conducted - Neither the DEIS nor PEF conducted a bona fide comprehensive cumulative effects analysis that would occur, including the adverse environmental impacts described in my affidavits and exhibits, if the proposed LNP was constructed and operated compared to the cumulative impacts of readily available alternatives. In 1997, the Council on Environmental Quality released its findings regarding "Considering Cumulative Effects Under the National Environmental Policy Act. Executive Office of the President; What are Cumulative Impacts?" identifying how such an analysis is conducted. A synopsis of that extensive report is incorporated herein as Bacchus Exhibit H-1. The cumulative effects analysis also would need to include all of the adverse impacts referenced in this affidavit and related exhibits, my original affidavit dated February 6, 2009, regarding adverse environmental impacts and attached hereto as Bacchus Exhibit H-2 and my preliminary DEIS comment letter dated 10/26/10 on the proposed LNP and attached hereto as Bacchus Exhibit H-3.

Comprehensive cumulative effects analysis requires establishment of the "area of impact" - No scientifically based "area of impact" for the proposed LNP can be established until the cumulative effects analysis has been completed. The "area of impact" is dependant on the detailed cumulative effects analysis which would include, at the least, all of the areas of direct, indirect and cumulative impacts, identified in the various maps referenced above and incorporated herein as **Bacchus Exhibit ??.** (**0020-52** [Bacchus, Sydney]) (**0030-3-12** [Bacchus, Sydney])

Response: *The NRC is aware of the 1997 guidance from the CEQ regarding cumulative impacts. The NRC's process for assessing cumulative impacts is described in the introduction to Chapter 7. In performing its cumulative impacts analysis, the NRC follows the requirements of NEPA, the NRC's regulations, and the guidance provided in NUREG-1555, the ESRP (NRC 2000). This analysis considers the impacts associated with construction and operation of LNP described in Chapters 4 and 5 to be those that are also important to consider in a cumulative impact context. Chapter 7 provides a list of other important projects within the general 50-mi region surrounding LNP that could contribute to cumulative impacts. For each resource area considered, the EIS further describes the geographical area of interest and provides a technical justification for its extent. These geographical areas of interest encompass the areas in which direct, indirect, and cumulative impacts would be expected to occur for each resource area. This comment provides no new information. No change was made to the EIS as a result of these comments.*

Comment: Comprehensive cumulative impact analysis required prior to formulating mitigation plan - A comprehensive cumulative impact analysis, including all of the impacts from the proposed Tarmac mine, is required prior to formulating mitigation plan for the proposed LNP project. (**0030-3-17** [Bacchus, Sydney])

Response: *The cumulative impacts associated with construction and operation of LNP are discussed in Chapter 7. In performing its cumulative impacts analysis, the NRC follows the requirements of NEPA, the NRC's regulations, and the guidance provided in the ESRP. For the purpose of assessing potential cumulative impacts, the NRC considered that the fill needed during construction of LNP would be provided by the proposed Tarmac King Road Limestone Mine. The anticipated direct, indirect, and cumulative impacts associated with operation of this mine are described in Chapters 4 and 7. This comment provides no new information. No change was made to the EIS as a result of this comment.*

Comment: Please revise the cumulative impacts evaluation as suggested ... to meet regulatory criteria and guidance and issue a Supplemental DEIS so that the public has opportunity to review properly evaluated cumulative impacts. (**0008-25** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together with incomplete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. Cumulative impacts evaluations incomplete or missing, not inclusive of proper impact areas, and generally do not meet regulatory requirements and guidance (groundwater withdrawal impacts, radiation dose to aquatic biota did not include CREC Unit 3 effluents, reduced freshwater input to estuary, and radiation dose from new and spent fuel transportation). (**0008-63** [Hubbard, Michael])

Response: *The NRC's process for assessing cumulative impacts is described in the introduction to Chapter 7. In performing its cumulative impacts analysis, the NRC follows the requirements of NEPA, the NRC's regulations, and the guidance provided in NUREG-1555, the*

ESRP (NRC 2000). This analysis considers the impacts associated with construction and operation of LNP described in Chapters 4 and 5 to be those that are also important to consider in a cumulative impact context for surface water, groundwater withdrawal, and radiological impacts as described in Sections 7.2 and 7.8. No changes to the EIS were made as a result of these comments.

Comment: Supplemental DEIS combining proposed LNP project and proposed mine supplying aggregate/raw materials - No DEIS has been produced evaluating the direct, indirect and cumulative adverse impacts that would occur from the proposed Tarmac mine, which would exceed LARGE. Therefore, the segmentation of these co-mingled direct, indirect and cumulative adverse impacts should be remedied by conducting a comprehensive evaluation of the proposed LNP project and proposed Tarmac mine in a single supplemental DEIS. (**0020-10** [Bacchus, Sydney])

Comment: Consequently, the public was deprived the opportunity of providing comments on the direct, indirect and cumulative adverse impacts that should have been identified in the LNP DEIS. Thus, **a supplemental DEIS is required to identify with certainty the source of those mined aggregate/raw materials and to determine the direct, indirect and cumulative adverse impacts of that mining** in conjunction with the other construction and operation impacts of the proposed LNP project. (**0020-8** [Bacchus, Sydney])

Comment: Failure to identify the location of mined aggregate/raw materials to construct the proposed project – As indicated above, another of the grave deficiencies of the LNP DEIS was the failure of the authoring agencies to confirm with certainty the location where the extensive aggregate/raw materials would be mined to fill the two 100-foot deep, multiple-acre holes proposed to be excavated for the two huge cooling towers and to construct those 56-foot tall cooling towers, roads and other facilities associated with the proposed project. The LNP DEIS only suggested that those required raw materials might be mined from the Tarmac King Road limestone mine (Tarmac mine).

Segmenting the impacts of the proposed project – The Tarmac mine is proposed to be located immediately west of the proposed LNP project. If, as the DEIS suggests but fails to confirm, the proposed Tarmac mine would be the source of the extensive aggregate/raw materials as fill for the 100 foot deep foundations and for constructing structures and roads associated with the proposed LNP project, then the DEIS has illegally segmented that part of the project. Not only did the DEIS fail to confirm the precise source of the extensive aggregate/raw materials required for the proposed LNP project, the DEIS also failed to provide a full account of the volume of aggregate/raw materials that would be required to construct the proposed project. Therefore, the affected public and other agencies could not provide meaningful comments regarding the direct, indirect and cumulative adverse impacts that would occur from the mining of the aggregate/raw materials, which would exceed "LARGE". Thus, **a supplemental DEIS is required to identify the volume of mined aggregate/raw materials required for the proposed LNP project to determine the direct, indirect and cumulative adverse impacts of that mining** in conjunction with the other construction and operation impacts of the proposed LNP project. (**0020-9** [Bacchus, Sydney])

Comment: Based on the DEIS statement above, the DEIS currently in progress for the Tarmac mine should have incorporated, in full, into this DEIS for the proposed LNP. Instead, the EIS process for the proposed Tarmac mine has been segmented as an independent activity. Therefore, a Supplemental DEIS is required to combine the entire pending DEIS/EIS for the proposed Tarmac mine with this DEIS for the proposed LNP. (**0030-1-15** [Bacchus, Sydney])

Response: *In Chapter 7, the NRC considered the cumulative effects of proposed LNP Units 1 and 2 with other past, present, and reasonably foreseeable future actions, including the Tarmac King Road Limestone Mine. The NRC is not aware of any plans to excavate and then fill a 100-ft-deep hole as part of the construction of the LNP nuclear islands. The anticipated direct, indirect, and cumulative impacts associated with operation of the mine are described in Chapters 4 and 7. This mine would be one of the closest and largest mines in the area and could easily provide LNP's needed fill at a low transportation cost. Because it is currently undeveloped, the potential impacts would be greater there than at an operating quarry. For these reasons, the NRC considered the cumulative impacts of construction of LNP in combination with the anticipated impact of the Tarmac King Road mine as being a reasonable estimate of actual cumulative impacts regardless of which quarry or combination of quarries are used, and are separate actions that have independent utility. No changes to the EIS were made as a result of these comments.*

E.1.21 Comments Concerning the Need for Power

Comment: Florida is the nation's fourth most populous state and it's the third nationally in overall energy consumption. To properly address the long term energy needs of Florida, we must have long term planning and long term solutions. Progress Energy is able to meet today's energy needs in our region, because of the careful planning conducted years ago. You just heard Hollins talk about a little of that. Just as we need to make more infrastructure investments and plans to build things like new roads and new schools, Progress Energy needs to stay in front of the curve and plan the electric system of the future that will provide reliable and safe power for our customers. (**0001-4-5** [Elnitsky, John])

Comment: You can't constantly -- forgive me for the term, pump people into this State -- I hope the Governor is listening. We already don't got enough resources, but no, what do we do? We need to have more people come in to the State to settle here. I think I don't hear right. And so, naturally, they need more resources, including electricity. The gentleman told us, Florida is the fourth populated State in the nation and third in energy consumption. Any more questions? I don't. (**0001-6-5** [Cannon, Renate])

Comment: Finally, let me address the importance of the Levy nuclear project to the long term economic and energy security of Florida. Florida is the nation's fourth most populous State, but we rank third nationally in overall energy consumption. To properly address the long term energy needs of our State, we must have long term planning and long range solutions. Progress Energy is able to meet the energy needs today because of the careful planning that went on in this State decades ago. Just as we need to make investment in other infrastructure

projects in our State, whether it's roads or schools, we need to plan ahead for what we will need for energy supply in the future that is reliable as it is today. (**0002-1-5** [Elnitsky, John])

Response: *These comments concern the need for additional electrical power in Florida. The review team reviewed FPSC's need for power analysis and determined it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Because these comments did not provide any specific new information related to these criteria, no changes were made to the EIS as a result of these comments.*

Comment: [I]f you read the U.S. Today a couple of days ago, there was an article, and it was about the economy coming out of the recession. And it said, the energy States, these couple few energy States are leading the way out of the recession. No, no, it's not that at all. That's what's causing the recession. The U.S.A., less than 5 percent of the world's population, and it's using 25 percent of the world's energy. (**0002-4-5** [Klutho, Mark])

Response: *This comment provides no new information relevant to the environmental review of the COL application. No change was made to the EIS as a result of this comment.*

Comment: The discussion in Section 9 of the DEIS resolves upon the applicant's assertion of need for an additional 2,200 MW(e) of base load power. This necessarily reflects increases in regional consumptive demand as well as the need to replace the capacity contributed by the two oldest 550MW coal-fired plants of the CREC as soon as the LNP comes on stream. That is to say that base load demand with respect to the CREC is expected to increase by fifty percent. The advent of the economic recession and its extended recovery period must call into question the assent given by the FPSC to that assertion. However, the consequent impact of the recession upon the regional economy requires other criteria to be evaluated, particularly the most pressing need to create employment opportunities for regional residents while keeping electricity costs within reasonable bounds. The first sentence of Section 9.2 ignores the fact that PEF's current markets have changed significantly since the scoping period. The analysis is consequently flawed at least to that extent. Not only is the assumed bounding target of 2,200 MW(e) by PEF questionable, there is no logic demanding that the NRC and USACE should be so bound. (**0005-2** [Hopkins, Norman])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] the uncertain extent of base load demand for electricity in view of the economic recession. (**0005-8** [Hopkins, Norman])

Comment: The severe recession we are suffering, since the docket date in August 2008, calls into question the applicant's assessment of growth in customer demand for electricity for which the plant was deemed to be necessary (**0006-6** [Hopkins, Norman])

Comment: Not only has the determination of need been placed in jeopardy by the extended recession we suffer, but the demand increase postulated by PEF to occur within the 2016 time

period to be met by nuclear power (2200 MW (e)) at the Levy plant site is rendered utterly impracticable and false. (**0013-2** [Hopkins, Norman])

Comment: Significantly, the Florida Public Services Commission in their Order No. PSC-08-0518-FOF-EI, issued on August 12, 2008, approving PEF's petition of need for 2,200 MW base load power by year 2016, also ordered an annual review of long term feasibility and costs. Albeit, the extended recession we suffer and the rising costs and delays have since negated the substance of the petition for determination of need by 2016, which had been adopted by both the NRC and USACE as a bounding target for assessing environmentally preferable alternatives (Section 9.2). The basic premise upon which PEF based their petition has been rendered unsafe and should be re-examined. Figures recited in Section 10, are out of date. (**0015-1** [Hopkins, Norman])

Comment: There is no demand for this plant; especially now, with the economic downturn, since our population is not growing as was once anticipated. (**0031-2** [Thuemler, Ronald])

Response: *Chapter 8 of the EIS provides the review team's analysis of the findings of the FPSC in support of granting PEF's Determination of Need. The determination of the need for power within a given area is not under the NRC's regulatory purview. When another agency has regulatory authority over an issue, NRC defers to that agency's decision. The review team reviewed the FPSC need for power analysis to determine whether it was (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Chapter 8 of the EIS has been updated to reflect any relevant new information provided by PEF or the FPSC regarding the need for the LNP project. In addition, it discusses FPSC's condition in its granting of PEF's Determination of Need that PEF regularly update its long-term forecasting to regularly reassess the need for the project.*

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... A detailed discussion describing the public need for this project is not provided. (**0011-15** [Bacchus, Sydney])

Response: *Full discussion of the need for the project is provided in Chapter 8 of the EIS. No changes were made to the EIS as a result of this comment.*

E.1.22 Comments Concerning Alternatives - Energy

Comment: When growth is down and the cost is up, and alternate energy is on the rise, there's just a lot of questions about why, with the natural gas line coming in, Williston converting over to solar power on their airport roofs, and Progress Energy sucking water from the Barge Canal, causing greater salt water intrusion. (**0001-14-8** [Price, Sally])

Comment: It's enormously cheaper, probably eight times cheaper on average, to save electricity than to make it. And nuclear power, as he states in the Rocky Mountain Institute Newsletter here, is the most expensive way to make electricity. (**0002-4-2** [Klutho, Mark])

Comment: I talked to a gentleman from Progressive Energy earlier and I -- and a woman, and instead of spending --they talk about alternative energy and instead of spending all their money on building a nuclear power plant, why don't they build it in their backyard? Number one. But if they spent that money towards helping everybody get alternative energy like solar or wind power that they are now supplying energy to, maybe there wouldn't be a need for a second nuclear site. (**0002-9-6** [Seiling, Barbara])

Comment: On page D-71, draft NUREG-1941, 0015-110 Nuclear power electricity generation was portrayed as prohibitively expensive. (Capital costs of the LNP exceeding three times the value of gold reserves held by the International Monetary Fund (IMF), or 5% of IMF total reserves. An enormous sum to apply to a single risky venture, taking money away from competitive power generation options which would be expected to mature years before the Levy County system were completed and degrading the environment far less). The point of the comment was to highlight the diversion of funds from environmentally preferable scenarios which would fall within the remit of the NRC. (See Response on same page). Applying even a small proportion of the LNP capital expense to improving electricity consumptive and production efficiencies would yield significant savings. It has been estimated that between a tenth and one eighth of all national electrical power generating costs could be saved by improving consumptive efficiencies. (**0005-18** [Hopkins, Norman])

Comment: A decision [PEF decision to opt for a nuclear facility at the chosen location] that diverts scarce financial resource away from competing alternative environmentally preferable solutions, and directs attention away from seeking significant energy savings available from increased consumptive and production efficiencies. (**0005-29** [Hopkins, Norman])

Comment: A more prudent course of action should be sought, for example:

- Use the sunk cost in land so far acquired to diversify technology into hydrogen storage and PV arrays as outlined in my previous e-mail, switching to less risky shorter lead time technologies.

- Each component of such an approach has great potential for nearer term cost reductions as opposed to rising nuclear construction costs. (Replacing glass in PV modules with transparent micro sheeting (e.g. Graphene), using factory produced PV modules with integrated power coupling and inversion electronics capable of mechanized roll out installation reducing labor costs, and modular design of hydrogen plant providing for high ratios of off-peak electricity storage to demand cycles).

- Anticipating the future complementary needs of distributed power and mobile power facilitated by hydrogen technology.

- siting PV arrays near to center of consumption; e.g., Orlando and The Villages, to save on new power line costs and environmental degradation

- choosing options and systems with fewer business risks than monolithic ventures.

- affording scope to emphasize demand side power economies. (**0006-9** [Hopkins, Norman])

Comment: We note that systemic inefficiencies exist when there is no way to store electricity generated in times of off peak or lower seasonal demand. Such losses of the Crystal River plants in 2008, for example, amounted to more than 800MW(e) (equivalence of a spare plant) - calculated from EIA maintained database information and data submitted by PEF as Final True-up data to the FPSC. Necessary energy storage as compressed hydrogen gas could be provided by an approach called Renewable Electrolysis (RE). In RE, as previously indicated to you, electrical energy is captured and stored as compressed hydrogen gas (released by electrolysis) which can be re-converted into electricity using fuel cells, to meet up-turns in demand. Thereby allowing the operation of existing facilities at more efficient levels than those needed during periods of lower demand, supplemented by electricity from renewable wind or solar photo voltaic sources to enable real pollution free economies to be made. Costs of RE systems are measured in millions not billions of dollars. Modular RE systems can be sited near concentrations of electricity users saving both $ and environmental costs of additional transmission lines. (**0015-4** [Hopkins, Norman])

Comment: We find the consideration of alternatives to the proposed action demanded by NEPA Section 1023(2)(C) in the draft NUREG-1941 to be utterly inadequate (RE is completely ignored and omitted from the documents). (**0015-5** [Hopkins, Norman])

Comment: We are known for the "sunshine state". Why not solar power....safe for environment, people and cheaper? (**0018-2** [Foreman, Patricia Parker])

Comment: Progress Energy has now determined they do not have a need for the neighboring East 5700 acre Robinson Tract property for wetland mitigation and future expansion. At the same time the current President of the United States has shown a great deal of interest in the use of alternative energy such as Solar Energy. If a viable plan for a Solar Power generated electrical facility could be shown to work on the 5700 acre Robinson Tract, would the NRC support the possibility of supplementing the anticipated needs of future electrical power from power generated from the use of Solar Technology? (**0027-7** [Smith, Charles])

Comment: We must aggressively implement green energy technologies, solar and wind energy wherever possible and conservation initiatives into our states future, not nuclear power. (**0031-6** [Thuemler, Ronald])

Comment: Invest in and use sustainable energy. (**0035-2** [Lester, Cecilia])

Comment: **...**I forgot, I think, to emphasize the total costs in context - See page D-71. And that applying those monies to increasing efficiencies in energy uses during the time it takes to approve and build the plant would largely obviate need for the LNP to meet demands from expected growth. (**0038-1** [Hopkins, Norman])

Response: *The energy alternatives must be technically viable, feasible, and competitive. Alternative actions such as the no-action alternative, energy efficiency and demand-side*

management (DSM), new generation alternatives, purchased electrical power, alternative technologies (including renewable energy sources such as wind and solar), and the combination of alternatives were considered in Chapter 9 of the EIS. Cost is not considered by the review team unless a feasible alternative is found to be environmentally preferable. Ultimately, decisions regarding which generation sources and alternatives to deploy are made by the applicant and regulatory bodies such as State energy planning agencies. No changes were made to the EIS in response to these comments.

Comment: Section 9.2.1. of the DEIS omits the planned up-rates of the CREC - unit 3, to about 1,000MW(e). Alternative power provided by the CREC in combination with PV arrays and hydrogen technology, for which land adjacent to the LNP site was known by PEF to be available, has not been considered (Charles Smith statement to the 23 September, 2010, review meeting). Section 9.2.3.3 of the DEIS unnecessarily limits consideration to solar thermal electricity. (**0005-4** [Hopkins, Norman])

Response: *Decisions regarding which generation sources and alternatives to deploy are made by the applicant and regulatory bodies such as State energy planning agencies. The alternatives must be technically viable, feasible, and competitive. Alternative actions such as the no-action alternative, energy efficiency and DSM, new generation alternatives, purchased electrical power, alternative technologies (including renewable energy sources such as wind and solar), and the combination of alternatives were considered in Chapter 9 of the EIS. Section 9.2.1 of the EIS does include a discussion of PEF's planned uprates of CREC Unit 3. Section 9.2.3 of the EIS already addresses the feasibility of solar power generation. No changes were made to the EIS in response to this comment.*

Comment: It [Section 9.2.1 of the DEIS] also omits consideration of placing PV array sites closer to major demand locations (e.g.,The Villages) which would eliminate need for a significant proportion of the 180 miles of additional transmission lines postulated by the applicant. (**0005-5** [Hopkins, Norman])

Response: *Section 9.2.1 of the EIS covers alternatives to the proposed action that do not require PEF to construct new generation capacity (e.g., purchasing power from other suppliers, extending the operating life of existing power plants), so deployment of photovoltaic arrays is outside the scope of the section. Solar power is discussed in Section 9.2.3, which states that solar thermal technologies are less costly than photovoltaics for bulk power production. Thus solar thermal plants were considered as part of the alternative energy analysis rather than solar photovoltaic technologies. The review team found that solar thermal by itself was not a* reasonable alternative to the proposed nuclear plant, but it was included in the combination of energy alternatives that was analyzed. No changes were made to the EIS in response to this comment.

Comment: An alternative scenario avoiding much of the negative consequence above [capital costs, cost of power, uncertain need for power, uncertainty in AP1000 design, exclusion of Crystal River/Kings Bay as affected environment, health hazards of tritiated groundwater, potential effects on sea grass meadows, absence of safe storage for fuel rods, risk to

groundwater from seismic disturbance and need to contain national debt], and be meritorious to PEF, does not appear to have been addressed in the DEIS. Time and wealth consumed inherent to the LNP proposition could be applied to bring on stream increased power capacity in a radically shorter time scale, for significantly less cost, creating local employment opportunities so urgently needed and avoiding degradation of highly valued natural resources. Earlier elimination of GHG and methyl mercury emissions from earlier ceasing operations and decommissioning the dirty coal-fired units at the CREC would be a landmark achievement for PEF. PV arrays could be brought on stream as described below (as similar installations have already been provided elsewhere in Florida), together with hydrogen plant providing for base load supply, both of which could be progressively expanded over time, taking advantage of cost reductions as technologies mature. (**0005-17** [Hopkins, Norman])

Comment: On the page D-61, 0014-59 [DEIS], is record of a suggested alternative environmentally preferable strategy which does not appear to be addressed by the response on page D-66 or D-68, (See alternative scenario above [list including information about PV arrays, Hydrogen electrolysis and storage plant, use of a land bank for expansion of PV system, and Hydrogen plant options]) Such a strategy would create jobs for local residents in the shorter term coincident with developing the expertise and production capacities having lasting benefit to our local economy for years to come.

The attention (page D-61) was directed to the land resource under existing power lines connecting with the CREC for positioning PV arrays (See alternative scenario above [suggestions for development of PV arrays]).

By way of example consider the West to East run of power lines extending from the CREC for, say, 17 miles. The width of that pathway would appear from Google Earth to be 400 feet wide with towers about 1,000 feet apart. Subtracting crossing obstructions, it would seem that a significant area could accommodate photo voltaic solar panels.

Environmentally, such an approach would avoid contamination of offshore sea grass meadows, avoid depletion of groundwater supplies and contamination from venting radionuclide contaminated water vapor into the local atmosphere with consequential harm to public health. The 5015 acre LNP site could be used to generate 500/600 MW of power for relatively risk-free transfer to the CREC. The production of dangerous used fuel rods and associated security risks are avoided. Added advantage could accrue from siting solar generation closer to substations near user conurbations avoiding environmental destruction to accommodate unnecessary power-line corridors. (**0005-19** [Hopkins, Norman])

Response: *Solar thermal technologies are less costly than photovoltaics for bulk power production. Thus, solar thermal plants were considered as part of the alternative energy analysis rather than solar photovoltaic technologies. No changes were made to the EIS in response to these comments.*

Comment: Avoidance alternatives not considered or inadequately assessed -The DEIS addressed Alternatives in the Abstract; Section 1.4 "Alternatives to the Proposed Actions;"

Section 9.0 Environmental Impacts of Alternatives; Section 9.1 "No Action Alternative;" Section 9.2 "Energy Alternatives" but fails to address alternatives that would avoid all of the adverse environmental impacts described in my affidavits and exhibits, while still providing energy to customers at an affordable price. At least some of the alternatives that PEF and the DEIS failed to consider could provide energy at a far lower cost than the environmentally devastating proposed LNP and would eliminate the need for environmentally destructive and costly transmission corridors and substations linked to the proposed LNP and shown in Bacchus Exhibit GI. Examples of the "avoidance" alternatives that the DEIS and PEF failed to consider include the following.

Roof-top solar funded by PEF -Neither the DEIS nor PEF took a hard look at roof-top solar funded by PEF would allow power to be produced in the metropolitan areas where it would be used, rather than in remote rural areas such as the proposed LNP site and then transferred, via transmission corridors and substations to other counties. This type of roof-top solar network is promoted by the Florida Solar Energy Center and the California Solar Energy Center. See Bacchus Exhibits G2 and G3 respectively for additional information regarding those alternatives for avoiding all of the adverse environmental impacts described in my affidavits and comments provided by others.

Decoupling no-build alternative -Additionally, the DEIS and PEF failed to take a hard look at the decoupling alternative voluntarily implemented by PEF as a substitute for constructing and operating the environmentally destructive proposed LNP. This alternative is described in Bacchus Exhibit G4.

Indirect future energy use reductions via increased efficiency and off-grid renewable options - no-build alternative -Many alternatives for significant reductions of residential and commercial energy use have been developed, including off-grid options. Neither the DEIS nor PEF took a hard look at, or even considered an alternative where PEF would fund those options as a "no-build" alternative that would avoid all of the adverse environmental impacts described in my affidavits and comments provided by others. (**0020-51** [Bacchus, Sydney])

Comment: Avoidance alternatives not considered or inadequately assessed - The DEIS addressed Alternatives in the Abstract; Section 1.4 "Alternatives to the Proposed Actions;" Section 9.0 "Environmental Impacts of Alternatives;" Section 9.1 "No Action Alternative;" Section 9.2 "Energy Alternatives" but fails to address alternatives that would avoid all of the adverse environmental impacts described in my affidavits and exhibits, while still providing energy to customers at an affordable price. ... At least some of the alternatives that PEF and the DEIS failed to consider could provide energy at a far lower cost than the environmentally devastating proposed LNP and would eliminate the need for environmentally destructive and costly transmission corridors and substations linked to the proposed LNP and shown in Bacchus Exhibit G. Examples of the "avoidance" alternatives that the DEIS and PEF failed to consider include the following. Roof-top solar funded by PEF -Neither the DEIS nor PEF took a hard look at roof-top solar funded by PEF would allow power to be produced in the metropolitan areas where it would be used, rather than in remote rural areas such as the proposed LNP site and then transferred, via transmission corridors and substations to other counties. This type of roof-

top solar network is promoted by the Florida Solar Energy Center and the California Solar Energy Center. ... Decoupling no-build alternative -Additionally, the DEIS and PEF failed to take a hard look at the decoupling alternative voluntarily implemented by PEF as a substitute for constructing and operating the environmentally destructive proposed LNP. ... Indirect future energy use reductions via increased efficiency and off-grid renewable options -no-build alternative -Many alternatives for significant reductions of residential and commercial energy use have been developed, including off-grid options. Neither the DEIS nor PEF took a hard look at, or even considered an alternative where PEF would fund those options as a no-build alternative that would avoid all of the adverse environmental impacts described in my affidavits and comments provided by others. (**0030-3-11** [Bacchus, Sydney])

Response: *The "avoidance" alternatives mentioned by the reviewer are commercial building rooftop solar photovoltaics, rate decoupling, and increased efficiency and off-grid renewable options. Each of these is discussed below.*

- *The photovoltaic alternative was analyzed in detail by the FPSC on its docket supporting the granting of the Certificate of Public Convenience and Necessity (CPCN) for the LNP project, and it was rejected as a reasonable alternative (FPSC 2008). The review team agrees with the State and did not find that the alternative meets the purpose and need of the action (i.e., production of 2200 MW(e) of baseload power to supply the future needs of PEF's service territory).*

- *Rate decoupling means essentially divorcing capital recovery for new generation facilities from customer electric rates as an incentive to utilities to invest more substantially in energy efficiency. This "alternative" is outside the purview of the NRC because it would require institutional changes in order to be implemented. The review team considers rate decoupling to be outside the scope of reasonable alternatives, because Florida does not appear to be on the verge of implementing such institutional changes.*

- *The EIS covers increased efficiency and off-grid renewable options in Section 9.2.1. The review team concluded that DSM programs are very successful in reducing peak load, but they cannot supply 2200 MW(e) of baseload power. The FPSC stated that DSM available today or in the foreseeable future cannot provide enough baseload capacity to avoid the need for the addition of the proposed LNP Units 1 and 2. Thus, implementation of conservation and DSM programs is not a reasonable alternative for providing baseload power-generating capacity.*

No changes were made to the EIS in response to these comments.

Comment: Solar power was not adequately considered in the context of decentralized generation. Small-scale thermal heating and distributed solar generation should be included in the energy alternatives analysis. (**0008-45** [Hubbard, Michael])

Comment: Solar domestic water heaters have proven to displace the need for additional electrical power over a 24-hour period due to the thermal storage capacity of the technology.

Domestic water heating averages 20 percent of a home's power usage and could significantly reduce electrical demand. The energy alternatives analysis did not include distributed solar generation (widespread placement of solar panels at individual homes and most types of buildings). Solar generation has the advantage of supplying the most input during the day, when electrical demand is at the highest. A widespread array of solar panels could reduce the need for additional power, or would more likely substantially reduce the amount needed. Taken together with actions to conserve energy in existing and new homes and buildings and an increase in wind power generation, the use of solar domestic water heating and distributed solar generation can significantly curb the need for so large a centralized generating station. The use of these methodologies do not consume public water supply nor generate wastes requiring transportation and disposal impacts and costs. Renewable energy options do not rely on a foreign supplier. (**0008-46** [Hubbard, Michael])

Comment: It is entirely possible, if not probable, that the proposed LNP's nuclear reactors would become liabilities before completing their expected operational life due to rapid development of renewable energy technology. There is no argument that a need for additional power generation exists, but other methods of generation are more flexible and the amount of power needed from a centralized source is in question. The need for two large nuclear reactors is questionable because, taken together, actions to conserve energy in existing and new homes and buildings, increased centralized and distributed wind power generation, and distributed solar generation can substantially reduce the future need for a large centralized generation project such as the proposed LNP.

Since the DEIS did not consider decentralized power generation at all, USACE should consider, at the very least, that two new large nuclear reactors is at least one too many based on future needs and expected development of renewable, distributed power generation. (**0009-1** [Hubbard, Michael])

Response: *Any alternative energy source must be able to meet the purpose and need of the action (i.e., production of 2200 MW(e) of baseload power to supply the future needs of PEF's service territory). As discussed in Section 9.2.1 of the EIS, the review team concluded that conservation and DSM programs are very successful in reducing peak load, but they cannot supply 2200 MW(e) of baseload power. DSM programs include residential solar water heating and rooftop solar photovoltaic (PV) panels. The FPSC stated that DSM available today or in the foreseeable future cannot provide enough base-load capacity to avoid the need for the addition of the proposed LNP Units 1 and 2 (FPSC 2008). Thus, implementation of conservation and DSM programs, including domestic solar water heating and rooftop solar PV panels, is not a reasonable alternative for providing baseload power-generating capacity. No changes were made to the EIS in response to these comments.*

Comment: The energy alternatives analysis is unnecessarily restrictive. On Page 9-6, the DEIS states that Florida's currently used baseload power sources were utilized as the basis for considering "feasible choices for power-generation technology within the state." This backward-looking, historical basis does not even list renewable energy options, merely lumping renewable energy options into a group referred to as "not specified in the reference." This commenter

suggests that better references are abundantly available and should be used. (**0008-43** [Hubbard, Michael])

Comment: The U.S. Department of Energy's (DOE) Energy Information System has predicted that, within 20 years, renewable energy sources will be the second largest provider of generated electrical power in the United States (Page 9-6). It appears that, before the energy alternatives analysis was even begun, renewable energy sources were virtually excluded merely because this burgeoning technology is not a major part of Florida's current baseload power sources. Due to the limitations imposed on the options chosen for consideration and the scant reasoning provided for imposing these limitations, the energy alternatives analysis appears to be incomplete and possibly biased toward PEF's preferred option. (**0008-44** [Hubbard, Michael])

Response: *The alternative energy resources considered in the EIS must be able to meet the purpose and need of the action (i.e., production of 2200 MW(e) of baseload power to supply the future needs of PEF's service territory), and they must be able to do so at a competitive cost in order to be considered feasible. While the use of renewable energy resources for distributed power generation is growing rapidly in some parts of the United States, there are no central power-generation facilities of the size required by PEF. As discussed in Section 9.2.3.3 of the EIS, the largest operational solar thermal power plant (which is located in the Mojave Desert in California), generating only 310 MW(e). As discussed in Section 9.2.3.2, the world's largest operating wind farm (which is located in Texas) is 735 MW(e). Also, as noted in the 2010 publication, Electricity from Renewable Resources – Status, Prospects, and Impediments, by the National Academy of Sciences, the National Academy of Engineering, and the National Research Council, "In the absence of a price on carbon, generating electricity from non-hydropower renewable resources generally is more expensive than generating electricity from coal, natural gas, or nuclear power at current costs." No changes were made to the EIS in response to these comments.*

Comment: Progress Energy has developed a balanced solution. We plan to use that solution to help meet our load growth needs. That solution includes alternative sources of energy, such as wind and solar; expanding our efficiency programs. In fact, we have some of the most effective efficiency programs in the nation. But it also includes building new state-of-the-art plants that meet Florida's growing energy needs. Energy efficiency and renewable energy sources are vital parts of our strategy, but they cannot supply all of the expected energy demand. That's why Progress Energy is planning to construct state-of-the-art plants in Levy County. (**0001-4-6** [Elnitsky, John])

Comment: Now, energy efficiency and renewable energy sources are a vital part of our [Progress Energy] overall strategy. But they alone cannot supply all of the expected energy demand. That is why Progress Energy Florida is planning on additional power plants and transmission infrastructure to provide sufficient and reliable electrical service to our customers. (**0002-1-6** [Elnitsky, John])

Response: *Alternative energy resources and their ability to supply baseload power were evaluated in Section 9.2 of the EIS. No changes were made to the EIS in response to these comments.*

Comment: Please expand the energy alternatives analysis to include a discussion of current non-centralized power generation options alone, or in combination with a smaller centralized generating station. This constitutes a "reasonable alternative" and should be included in a Supplemental DEIS as required at 10 CFR 51, Appendix A, #5. (**0008-47** [Hubbard, Michael])

Comment: In choosing to construct two nuclear reactors, PEF has ignored more flexible options and bet long-term on a single technology that, due to safety and cost considerations, can only be used to provide baseload power. Natural gas-fired plants, however, can serve as backup generation or peak-loading generation should future technological development render baseload thermoelectric power less efficient or too environmentally damaging over the next 60 years. A natural gas-fired plant could also close down one, two, or three units and still be utilized. The alternatives analysis does not consider flexibility of future use and, given the rapidity of renewable energy development, this should be an important consideration of the energy alternatives analysis. (**0008-48** [Hubbard, Michael])

Response: *According to NUREG-1555, a competitive alternative is one that is feasible and compares favorably with the proposed project in terms of environmental and health impacts (NRC 2000). If the proposed project is intended to supply baseload power, then a competitive alternative must also be capable of supplying baseload power. Because LNP Units 1 and 2 would provide 2200 MW(e) of baseload power, a reasonable alternative must be capable of doing the same. Section 9.2.4 of the EIS considers a possible combination of alternatives that includes three 550-MW(e) natural-gas-fired combined-cycle units at the LNP site, along with 200 MW(e) from conservation and DSM programs beyond what is currently planned, 150 MW(e) from solar, 100 MW(e) from wind, and 100 MW(e) from biomass sources, including municipal solid waste, all located within PEF's region of interest. The solar and wind components would need to be combined with energy-storage technologies in order to be operated as baseload resources. The review team concluded that the combination of alternatives is not environmentally preferable to a new nuclear plant at the LNP site. No changes to the EIS were made as a result of these comments.*

Comment: Nuclear power plants are reported to consume the most water compared to all other common generation methods [Jones 2008]. The director of DOE's National Energy Technology Laboratory, Carl O. Bauer, testified before the Senate Committee on Energy and Natural Resources last year regarding reducing power plant water usage. Mr. Bauer said:

By comparison, nuclear power plants consume approximately 40 percent more water, and natural gas combined cycle plants consume approximately 60 percent less water than equivalent contemporary subcritical Pulverized Coal (PC) technology. [Bauer 2009]

The alternatives analysis section in the DEIS states on Page 9-11 that coal-fired plants use similar amounts of water compared to nuclear power plants and states the same on Page 9-17

for natural gas combined cycle plants. I am confused by NRC's claim of equitable water consumption when other sources directly refute this conclusion, and would appreciate more justification to support NRC's specific claim that nuclear power plants and natural gas combined cycle plants consume comparable amounts of water. (**0008-49** [Hubbard, Michael])

Response: *To guide its assessment of the environmental impacts of a proposed action or alternative actions, the NRC established a standard for quantifying environmental impacts based on guidance from the CEQ (40 CFR 1508.27). Using this approach, the NRC established three significance levels to characterize environmental impacts in EISs: SMALL, MODERATE, and LARGE. The definitions of these significance levels are as follows:*

(1) SMALL = environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource;

(2) MODERATE = environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource; and

(3) LARGE = environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

These significance levels cover fairly wide ranges and do not attempt to convey point estimates of any particular impact category; rather, they represent order-of-magnitude differences. Cooling-water usage of nuclear, coal-fired, and natural-gas-fired power plants is all within the same order of magnitude, thus the impacts on water use and quality are all categorized as SMALL for this EIS. No changes were made to the EIS in response to this comment.

Comment: The energy alternatives analysis lists land use impacts for the nuclear power option and the natural gas combined cycle option as both being MODERATE. However, the natural gas combined cycle option has an onsite footprint a fifth the size of the proposed LNP (120 ac vs. 627 ac)(Pages 9-17 and 9-27). This is a distortion of the analysis. NRC/USACE should provide categories of impacts for onsite land use and offsite land use, following the pattern of how impacts for the proposed LNP are listed throughout the DEIS. Landuse impacts are not equal between natural gas combined cycle and the proposed LNP. As presented, the analysis of land-use impacts does not represent unbiased analysis. (**0008-50** [Hubbard, Michael])

Response: *To guide its assessment of the environmental impacts of a proposed action or alternative actions, the NRC established a standard for quantifying environmental impacts based on guidance from the CEQ (40 CFR 1508.27). Using this approach, the NRC established three significance levels to characterize environmental impacts in EISs: SMALL, MODERATE, and LARGE. The definitions of these significance levels were stated in the previous response.*

These significance levels cover fairly wide ranges and do not attempt to convey point estimates of any particular impact category; rather, they represent order-of-magnitude differences. Land-use impacts of nuclear, coal-fired, and natural-gas-fired power plants are all within the same order of magnitude, especially because the required transmission-line corridors are also

included in the land-use category; thus the land-use impacts are all categorized as MODERATE for this EIS. No changes were made to the EIS in response to this comment.

Comment: The energy alternatives analysis of waste impacts is misrepresentative. Waste impacts from natural gas-fired generation are listed as being SMALL in Table 9-4 (Page 9-27), to which this commenter agrees. However, Table 9-4 lists waste impacts from the proposed LNP as being SMALL as well. Nuclear power generation results in highly radioactive wastes for which disposal has, to date, not been proven safe or even technologically feasible. At the very least, waste from nuclear generation results in radioactive exposure to the public and to workers at the facility, whereas natural gas combined cycle plants generate no such wastes. Concluding that waste impacts from natural gas-fired generation and nuclear power are equal is patently false and should be corrected in a Supplemental DEIS. The proposed LNP will create 3924 cubic feet per year of radioactive waste other than spent fuels and more than 52,000 pounds per year of highly radioactive spent fuels (based on annual reload rate in Environmental Report, p. 3-102, rev. 1). (**0008-51** [Hubbard, Michael])

Response: *In September 2010, the NRC issued final revisions to its Waste Confidence Rule. This rule expresses confidence that used nuclear fuel can be safely stored at a nuclear reactor site for at least 60 years beyond the licensed life of any reactor, without significant environmental impacts, and that sufficient repository capacity will be available when necessary. The Federal government is obligated to take title to the nation's stock of spent fuel and high-level radioactive waste from commercial operations and defense programs. As noted in Section 6.1.6 of the EIS, the Waste Confidence Rule provides that no discussion of any environmental impact of onsite spent-fuel storage for the period following the term of the COL is required in any EIS prepared in conjunction with issuance of that COL. The environmental impacts of the eventual disposal of the spent fuel are discussed in Chapter 6 of the EIS and the staff concludes that those impacts are SMALL. The Blue Ribbon Commission on America's Nuclear Future is expected to make recommendations for a revised national used-fuel management program in 2012, but the staff's analysis already covers the two basic options – reprocessing or a geologic repository. Section 6.1.6 of the EIS also states that NRC's regulations allow nuclear power plant operators to construct and operate onsite LLW storage facilities. Because these facilities are typically situated near the powerblock on land that has already been disturbed, land-use impacts would be very small. No changes were made to the EIS as a result of this comment.*

Comment: The energy alternatives analysis does not fairly compare the alternatives. The DEIS concludes, after lengthy discussion (Pages 9-28 and 9-29), that the proposed LNP will generate the least amount of carbon dioxide. Agreed. However, the DEIS fails to point out the many advantages natural gas-fired generation has over the proposed LNP. That is, less landuse impacts, less water consumption, greater flexibility of future uses, less prone to broad environmental disaster, generates very little waste, has greater thermal efficiency, no impacts from transportation of radioactive new and spent fuels, no waste disposal costs, less cost to construct, and less cost to decommission. (**0008-52** [Hubbard, Michael])

Response: *As discussed in Chapter 9 of the EIS and summarized in Table 9-4, the land-use impacts of both nuclear and natural-gas-fired power generation at the LNP site would be*

moderate, due mainly to the identical transmission-line corridor impacts for both alternatives. Water consumption for both nuclear and natural-gas-fired plants would be of the same order of magnitude and categorized as small, because the environmental effects would be so minor that they would not destabilize or noticeably alter any important attribute of the water resource. Thermal efficiency is not considered to be an environmental impact, but it is captured within the related impacts of plant emissions and water use. Air emissions from a natural-gas-fired plant are shown in Table 9-2 of the EIS, including sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter, and 6.3 million T/yr of carbon dioxide. The air quality impact is categorized as SMALL to MODERATE for a natural-gas-fired plant, whereas the air quality impact from a nuclear plant is categorized as SMALL.

The waste impacts from operation of a natural-gas-fired plant (spent selective catalytic reduction catalyst used for controlling NO_x emissions) and a nuclear plant (nonradioactive wastes from Sections 4.10 and 5.10 of the EIS; radioactive waste, including spent nuclear fuel, from Sections 6.1 and 6.2) are both categorized as SMALL. As described in Section 5.11 of the EIS, the NRC staff considered the radiological consequences on the environment of potential design basis accidents (DBAs) and severe accidents for an AP1000 reactor at the LNP site. The NRC staff's analysis indicates that the environmental consequences of DBAs at the LNP site would be small. For postulated severe accidents, air, surface-water, and groundwater release pathways were considered. The staff evaluated the results of PEF's probabilistic risk assessment model and considered them to be an accurate basis for evaluating severe accidents and mitigation strategies. The environmental risks associated with severe accidents for an AP1000 reactor at the LNP site would be small and below the NRC safety criteria. Because the impacts of both DBAs and severe accidents would be small, they would not change the comparison between a natural-gas-fired plant and a nuclear plant.

Based on the guidance in NUREG-1555, the NRC only considers the cost of energy alternatives if the alternatives are found to be environmentally preferable to the proposed nuclear plant (NRC 2000). The review team concluded in Section 9.2.5 of the EIS that, from an environmental perspective, none of the viable energy alternatives is clearly preferable to construction of a new baseload nuclear plant at the LNP site. Thus, no cost comparisons were performed. This comment does not provide any significant new information. Accordingly, no change was made to the EIS in response to this comment.

Comment: It is also notable when considering alternative energy sources that only the nuclear power option includes concerns about a severe accident and resulting radiation exposure from a passing plume, radioactive materials deposited on the ground and skin, inhalation from passing plume or resuspended from the ground, and ingestion of contaminated food and water. Only the nuclear power option considers offsite costs such as relocating people, radioactive decontamination of property and equipment, and interdiction of food supplies in the case of a severe accident. Nuclear power is also the only option where transportation results in radiation exposure to persons living along roadways where trucks carrying new and spent fuels travel, persons in vehicles traveling those roads, and persons at vehicle stops for refueling and rest. Also, due to NRC's use of outdated Table S-3, the transportation of radioactive materials across our oceans and the risk of an oceanic accident is never considered in the DEIS. These are

important considerations for selecting a power generation plant option and should be considered in the alternatives analysis. (**0008-54** [Hubbard, Michael])

Response: *As described in Section 5.11 of the EIS, the NRC staff considered the radiological consequences on the environment of potential DBAs and severe accidents for an AP1000 reactor at the LNP site. The staff's analysis indicates that the environmental consequences of DBAs at the LNP site would be small. For postulated severe accidents, three pathways were considered: (1) an air release, (2) a surface-water release, and (3) a groundwater release. The staff evaluated the results of PEF's probabilistic risk assessment (PRA) model and considered them to be an acceptable basis for evaluating severe accidents and mitigation strategies. The environmental risks associated with severe accidents for an AP1000 reactor at the LNP site would be small and below the NRC safety criteria. Because the impacts of both design basis and severe accidents would be small, they would not change the comparison between the alternative energies. No changes were made to the EIS in response to this comment.*

Comment: Generation Efficiency The DEIS does not address efficiency of nuclear power generation compared to other power generation alternatives that generate waste heat. According to Makhijani 2007 (p.101):

The efficiency of thermal power plants is highly variable in practice. It ranges from a low of 15 or 20 percent for geothermal energy to about 33 percent for nuclear power plants, about 40 percent for new coal-fired power plants, and 55 percent for natural gas-fired combined cycle plants.

While little is yet being said about the contribution of waste heat to oceans, lakes, rivers, and the atmosphere as contributors to global warming, waste heat contribution is globally significant and will be recognized as a global warming issue. Given that natural gas-fired combined cycle generation is at this time the most efficient type of thermoelectric power generation, and that a major natural gas supply line is so close to the proposed LNP facility location, justification of two large nuclear reactors over a natural gas-fired combined cycle facility is not provided in the DEIS. (**0009-3** [Hubbard, Michael])

Response: *The thermal efficiency of the various power-generation alternatives is captured in the environmental impacts on water use and quality. The purpose of the EIS is not to justify any particular alternative, but to determine whether any of the feasible alternatives is environmentally preferable to the proposed nuclear power plant. In the case of the LNP, the review team determined that none of the alternatives was environmentally preferable to a nuclear plant. No changes were made to the EIS in response to this comment.*

Comment: Nuclear power uses more water than all other alternative energy sources thus far proposed for the LNP. USACE is required at 33 CFR 320.4(m) to consider water conservation, actions which significantly affect water availability for alternative uses, and opportunities to reduce demand. Authorizing a nuclear power plant that will likely operate for 60 years does not comply with any of the requirements of §320.4(m). (**0009-9** [Hubbard, Michael])

Response: *To guide its assessment of environmental impacts of a proposed action or alternative actions, the NRC established a standard for quantifying environmental impacts based on guidance from the CEQ (40 CFR 1508.27). Using this approach, the NRC established three significance levels to characterize environmental impacts in EISs: SMALL, MODERATE, and LARGE. The definitions of these significance levels were stated in a previous response.*

These significance levels cover fairly wide ranges and do not attempt to convey point estimates of any particular impact category; rather, they represent order-of-magnitude differences. Cooling-water usage of nuclear, coal-fired, and natural-gas-fired power plants is all within the same order of magnitude, thus the impacts on water use and quality are all categorized as SMALL for this EIS. No changes were made to the EIS in response to this comment.

The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements. Specific to this comment, 33 CFR 320.4(m) states "Water is an essential resource, basic to human survival, economic growth, and the natural environment. Water conservation requires the efficient use of water resources in all actions which involve the significant use of water or that significantly affect the availability of water for alternative uses including opportunities to reduce demand and improve efficiency in order to minimize new supply requirements. Actions affecting water quantities are subject to Congressional policy as stated in Section 101(g) of the CWA which provides that the authority of states to allocate water quantities shall not be superseded, abrogated, or otherwise impaired." The evaluation under 33 CFR 320.4(m) will be based on information provided in the EIS for this project, and any additional information required by the USACE for final evaluation in the USACE's ROD.

Comment: PUBLIC INTEREST REVIEW - regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... Does the production of energy from the proposed nuclear power plant units, instead of by less environmentally destructive, water-intensive alternatives serve the public interest? (**0011-10** [Bacchus, Sydney])

Comment: AVOIDANCE AND MINIMIZATION -Considering practicable alternatives that are NOT water dependent also should have been addressed in the DEIS as an initial step for avoidance and minimization of adverse impacts. (**0011-3** [Bacchus, Sydney])

Comment: PUBLIC INTEREST REVIEW - regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... How does this project serve the public interest considering that other practicable alternatives are available that are not water-dependent and would result in negligible wetland and other environmental impacts? (**0011-9** [Bacchus, Sydney])

Comment: Misconception of mitigation -Consideration of mitigation is not appropriate if a reasonable alternative is available that would avoid discharge of fill in wetlands. Reasonable alternatives for providing power exist, as described below, but were not considered in the LNP DEIS. (**0020-49** [Bacchus, Sydney])

Response: *The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements; and will be based on information provided in the EIS for this project, and any additional information required by the USACE for final evaluation in the USACE's ROD.*

E.1.23 Comments Concerning Alternatives – System Design

Comment: The DEIS states "Diesel generators would be used on the site to provide a backup source of power to selected nonsafety electrical loads." The FEIS should provide a comparison of other feasible alternative sources of electrical power (ie.,other alternative fuel sources) that may have less impact on the environment. (**0003-10** [Mueller, Heinz J])

Response: *The EIS considers alternatives to system design components in Section 9.4, but alternatives are only considered for system components that are likely to dominate the environmental consequences of operating the plant. As such, the EIS focuses on alternative components for the cooling-water system. Because emissions from the diesel generator systems would be required to comply with all regulations involving emissions and the systems would be used on an infrequent basis, the review team concluded that the environmental impacts would be minimal. Furthermore, diesel generators serve an important safety function at the site and demand a high degree of reliability; therefore, no alternatives were considered for them in the EIS. No changes were made to the EIS as a result of this comment.*

Comment: As you may be aware, the main problem caused by the construction of the barge canal has been the intrusion of saltwater into the underlying aquifer system. When construction first started in 1964 and was finally halted in 1971 due to a court injunction because of this saltwater intrusion the damage has already been done. Since that time the Florida Barge Canal has been a black eye to both the federal government, engineers and the surrounding area. While reviewing the submitted NRC application as submitted by Progress Energy for the Levy County Nuclear Power Plant, I noticed the discharge point for the new nuclear plant facility would occur at the existing Crystal River Nuclear Power Plant discharge outlet. I can understand the engineering reasoning behind this decision. As shown on the proposed site plan, the planned discharge pipe would run parallel along the North bank of the barge canal and eventually cross the canal near the canal's entrance at the Gulf of Mexico. The pipe would continue to the existing nuclear power plant facility. This brings me to the purpose of this letter. This letter is a engineering proposal that is being submitted that should be consider for discharging the nuclear power plant cooling water at a point where the proposed discharge pipe was going to cross the canal. Additionally, next to discharge location, a earth or concrete dam

with a lock system would need to be provided on the west side of this discharge outlet. This would create a close system for recycling the cooling water for the new nuclear power facility instead of discharging into the Gulf of Mexico. This changes the existing canal into a cooling basin instead. (**0028-1** [Fetrow, Robert])

Comment: The advantage of this [engineering proposal] approach is numerous. First, after installing the dam, the canal becomes a closed recycling water system. By recirculating the water, the concentrating of salt within the canal would eventually be reduced with time since the salt would either be removed mechanically or dissipated by the cooling towers. Since the discharge water will have less salt content than presently exists, it is this engineer's opinion that the existing aquifer will slowly cleanse the underground water system of long accumulating salt which has been depositing continually since the construction of the barge canal. (**0028-2** [Fetrow, Robert])

Comment: I have run some preliminary calculations, to determine the estimated cycle time of the water contained in the new formed cooling basin. See Attachment #1 to this letter for a proposed layout of the infrastructure needed as outlined in this letter. The numbers are as follows to determine the estimated recycle time: With a bottom width of the existing canal at 150 feet and an estimated depth of 12 feet, the average cross section of the existing barge canal is determined to be approximately 2,000 square feet. The separation point between the intake structure and discharge outlet and dam structure would be approximately 4.5 miles long. This creates a volume of stored water of approximately 47.5 billion cubic feet contained within this basin. It is my understanding that the daily flow for use in cooling this nuclear facility is to be 1.85 million gallons per day (247,300 cubic feet). If this is the case, the cycle time for recycling water within this basin would be a total of 192 days. Hopefully, a time period long enough to sufficiently cool the 95 degree discharge water? (**0028-3** [Fetrow, Robert])

Comment: By installing this type of cooling water control system [engineering proposal], other environmental benefits will also be realized. Since the water level in the basin would be maintained at a constant level rather than fluctuate with the existing tides, the groundwater table elevation inland would be maintained at a constant raised elevation. Another problem which the barge canal created when it was constructed was the reduction of the water depth and quality of water upstream in the Withlachoochee River. By maintaining a constant higher level in the cooling basin, it is this engineer's opinion, a positive effect will occur to the quality and water level in the Withlachoochee River west of the spillway. (**0028-4** [Fetrow, Robert])

Comment: The lock could also be used for any barge traffic which needed to enter the basin for the nuclear power plant or other purposes. It also would allow water to be added to the basin if the level became low. (**0028-6** [Fetrow, Robert])

Comment: Another benefit [engineering proposal] would be the reduction of 2.5 miles of discharge piping along side the Gulf of Mexico. With less piping, the pumping system for the discharge system would need less horsepower therefore providing additional construction cost savings. (**0028-7** [Fetrow, Robert])

Comment: I believe wetlands presently exist between the existing barge canal and the Crystal River Nuclear Power Plant. By discharging at the end of the canal, these areas would not in danger of being disturbed. [Comment related to engineering proposal by commentor] (**0028-8** [Fetrow, Robert])

Response: *These comments propose modifying the CFBC to serve as a cooling pond for the condenser cooling system blowdown for the proposed units. The use of the CFBC as a cooling pond for the blowdown is not a viable option as the cooling system heat sink because it would not dissipate sufficient heat to allow operation of the LNP Units 1 and 2. Furthermore, without significant makeup and blowdown the total dissolved solids in the canal would quickly reach levels that were harmful to manatees and most other aquatic life. Limitations associated with the use of the CFBC include increasing TDS in the canal due to evaporative losses and the need for a source of water to maintain water levels in the canal causing TDS in the canal to quickly reach levels that are harmful to manatees and most other aquatic life. No changes were made to the EIS as a result of these comments.*

Comment: Relocate the CWIS westward in the CFBC to such location that the State is not obstructed in restoration of the Lower River and will be able to capture fresh water resources and restore the river system as deemed necessary. WAR recommends siting sufficiently west in the CFBC to allow for maximum utilization of fresh water supplies for restoration and a level of beneficial use that after well considered evaluation will limit impacts to the coastal estuaries and related natural systems. Doing so will limit fresh water consumption by diversion due to the plant consumptive use and at such time as the State takes such action, the primary water supply for plant cooling will be sea water rather than freshwater. Upon such time as the State acts to capture and manage the fresh water component of the CFBC the Applicant will have access to alternative plant water supply and the region will have a surface water supply that may support several hundreds of thousands of residents' which will provide the need projected by Progress Energy Florida, and do so without interfering with rational water management practices. (**0042-24** [Hilliard, Dan])

Response: *This comment is related to the evaluation of alternative locations for the intake structure for LNP Units 1 and 2. Alternative intake locations are addressed in Section 9.4 of the EIS. Section 9.4 was updated to include an evaluation of alternative intake locations, including an offshore intake in the Gulf of Mexico, an intake on the CFBC west of the location where the Old Withlacoochee River crosses the barge canal, and an intake collocated with the intake for the CREC.*

E.1.24 Comments Concerning Alternatives – Sites

Comment: Why are you not already putting it on the Crystal River Nuclear Power Project property, where you have water, you have transmission lines? (**0001-14-2** [Price, Sally])

Comment: Under 51.45 Environmental Report. Alternatives. PEF owns enough land at Crystal River which on the Gulf would not require 15 miles of piping. To use that site, rather than Levy, piping could go out into the Gulf far enough so Gulf water heating would not be a problem. (**0001-5-4** [Berger, Betty])

Comment: [W]hy not build the nuclear plant at Crystal River, where the ground's already polluted? The water's there. All the facility's there. Turkey Point's already building one with theirs. It's right there. And there's no homes within three or four miles of Turkey Point, because I know that area quite well. It's all swampland. I'd like to you know why they're not, you know, why not go there? I mean, I don't understand the money that we're going to spend to bring the water in. And we're going to dump the water back out at the power plant in Crystal River from Levy County. So, I just -- I can't understand that. That's got me confused. (**0001-7-13** [Smith, Robert])

Comment: [I]f you really want to look at what I think Danny would have been proud of, or the community would have been proud of, is to look at the alternative sites that they had. (**0002-10-6** [Seymour, Mike])

Comment: I don't think you can chop down a forest and not kill all the trees. And you're going to kill everything else that used to live there. So, it just makes more sense to put it out at Crystal River. Sure, you're going to lose some more of the salt water wetlands, but, you know, I'd rather -- you know, the salt water is a little bit more abundant than our fresh water. So, I think that really, if it has to be built, if they have to build another power plant, it really needs to go out there at the Crystal River site. (**0002-5-7** [Jones, Art])

Comment: After all these questions I asked about this, not understanding and they give me this book. And the only difference between the Levy County and the Crystal River -- and I did have questions about that I'll ask later -- is that transportation to Levy County would be small to moderate, whereas it would be small to Crystal River. So, I still don't think I've gotten my answer. (**0002-9-1** [Seiling, Barbara])

Comment: [A]ll of the above [capital costs, cost of power, uncertain need for power, uncertainty in AP1000 design, exclusion of Crystal River/Kings Bay as affected environment, health hazards of tritiated groundwater, potential effects on sea grass meadows, absence of safe storage for fuel rods, risk to groundwater from seismic disturbance and need to contain national debt] in combination cast serious doubt upon the PEF decision to opt for a nuclear facility at the chosen locality. Especially a site within a region having poorly confined aquifers which supply water for domestic and other health needs. (**0005-16** [Hopkins, Norman])

Comment: I just wish that something could be done about the location of LNP 1 & 2. It will rob future generations environmentally in many ways. Although the site can be legally located where it will adversely affect multiple generations, I don't believe our generation ethically has that right. (**0039-1** [Foley, Beth])

Comment: It would be preferable environmentally to put them [nuclear plants in Levy County] at the Crystal River Site and Citrus County would love that. (**0041-1** [Berger, Betty])

Comment: To plan the nuclear plants at the Crystal River site would save PEF untold amounts of money, not to mention the rate payers who will complain about increased charges. (**0041-5** [Berger, Betty])

Comment: [To plan the nuclear plants at the Crystal River site] PEF would not obliterate Inglis with the transmission lines, truck traffic would be minimal and our drinking water would be safe (**0041-6** [Berger, Betty])

Comment: Exercise the alternative option to locate the plant at the Crystal River Energy Complex. (**0042-25** [Hilliard, Dan])

Response: *As part of its environmental review, the review team reviewed PEF's site-selection process to determine whether any of the alternative sites was environmentally preferable to the proposed site. Crystal River was one of the alternative sites that PEF considered in its application, but PEF determined that the LNP site was preferred over the Crystal River or any of the other alternative sites. The decision by PEF to select the LNP site over the Crystal River site includes factors other than those delineated by NEPA, such as site reliability. The review team compared the alternative sites with the proposed site and determined that none of the alternative sites was environmentally preferable to the proposed site. Environmental impacts on land, water, air, terrestrial ecology, aquatic ecology, socioeconomics, and many other factors were considered in the evaluation of alternative sites. Based on NRC licensing board decisions, a proposed site may not be rejected in favor of an alternative site when the alternative site is marginally better than the proposed site, but only when it is obviously superior (Public Service Company of New Hampshire 1977). The review team did not find the Crystal River site environmentally preferable or obviously superior. No changes were made to the EIS in response to these comments.*

Comment: I believe that the Levy site is a bad location to build a power plant for many reasons. And some of them have already been spoken here tonight, because it is right in the middle of fresh water wetlands. It's right in the middle of the recharge zone for our beautiful springs here in Florida. (**0002-5-1** [Jones, Art])

Response: *Wetland impacts would be unavoidable for any of the alternative sites due to the large amount and broad distribution of wetlands in the State of Florida. PEF submitted a wetland mitigation plan to the FDEP in September 2011 (ESI and TEI 2011), as described in Section 4.3.1.7 of the EIS. PEF is required to avoid or minimize wetland impacts to the extent* practicable, and to mitigate for unavoidable impacts by fully offsetting the functional wetland losses predicted to occur as a result of the LNP project. No changes were made to the EIS in response to this comment.

Comment: The review of alternative sites examined by NRC offers no clear basis for not locating the proposed LNP at PEF's existing CREC location. The alternative site analysis also appears to ignore 33 CFR 320.4(l)(3) which states: In accordance with Executive Order 11988, the district engineer should avoid authorizing floodplain development whenever practicable alternatives exist outside the floodplain. Please include more discussion in a Supplemental DEIS supporting why the proposed LNP cannot be constructed at the existing CREC site and

why no other site is practicable in order for USACE to be able to authorize construction within a floodplain. (**0008-55** [Hubbard, Michael])

Comment: Both USACE regulations [33 CFR 320.4(l)(2) and (3)] and Executive Order 11988 discourage USACE from authorizing development of projects on floodplains. The DEIS discusses replacement of altered floodplain retention, but does not justify that construction on the floodplain is necessary because no other location for the project is suitable. Specifically, the DEIS does not adequately support that construction of the LNP at the Crystal River Energy Complex (CREC) would not satisfy the needs of the proposed project. PEF, Florida's Department of Environmental Protection (FDEP), and NRC appear to have all but ignored USACE strictures regarding development on a floodplain, as well as an Executive Order prohibiting such development in most cases.

While NRC must prove "obviously superior" environmental affects to supplant PEF's preferred site location, USACE is not authorized to grant a permit unless the preferred site is determined to represent the Least Environmentally Damaging Practicable Alternative (LDEPA). Despite dozens of pages supporting PEF's preferred site location over the alternatives, it is difficult to imagine how construction on a previously existing industrial site (i.e., CREC) would not represent a less damaging alternative compared to constructing a new facility at a greenfield site located on a floodplain. (**0009-2** [Hubbard, Michael])

Response: *The NRC review team's alternative sites analysis does not state that the proposed plant cannot be constructed at the Crystal River site. It merely states that none of the alternative sites, including Crystal River, is environmentally preferable to the LNP site. The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the EIS. The final evaluation and determination in the ROD, including the determination of the Least Environmentally Damaging Practicable Alternative, will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements. No changes were made to the EIS as a result of these comments.*

Comment: The following additional oversights/shortcomings, taken together within complete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Incomplete and clearly biased alternatives analysis (no reason not to construct at CREC; impacts and cumulative impacts not complete in DEIS; floodplain development not adequately justified; equity of water consumption comparison requires support; future flexibility not considered; land use impacts not fairly compared; waste impacts presented as equal when this is patently false; and abundant advantages of natural gas-fired generation not included). (**0008-68** [Hubbard, Michael])

Response: *NEPA requires that the environmental impacts of building the proposed plant at each of the alternative sites be carefully considered and factored into the decision. For this*

application, the NRC determined that there were no environmentally preferable sites among the alternatives to the LNP site. If one or more of the alternative sites had been determined to be environmentally preferable, then the NRC would have considered economics, technology, and institutional factors to determine whether any of the environmentally preferable sites was obviously superior to the proposed site. If an obviously superior site was identified by the NRC, then the deficiencies of the proposed site would be noted in the EIS and the NRC staff would recommend that the Commission not issue the COL; however, the NRC cannot force an applicant to build a plant at any of the alternative sites, regardless of whether they are found to be obviously superior or not. The applicant decides what site it wants to propose in its application and the NRC reviews and either approves or denies the application.

The concerns raised by the commenter do not represent substantial changes to the proposed action or provide significantly new circumstances or information relative to environmental concerns; therefore, a supplemental EIS is not warranted. No changes were made to the EIS in response to this comment.

Comment: I want to know how many nuclear plants are within nine and a half miles of each other and how many are built inland with no water around them, which a gentleman here told me there's one. And that they pump water to it. (**0001-7-11** [Smith, Robert])

Response: *There are three nuclear plant sites along Route 6 in Illinois that are only about 10 mi apart – Braidwood, Dresden, and LaSalle. In Wisconsin, the Kewaunee and Point Beach plants are less than 5 mi apart. Palo Verde in Arizona is the only nuclear plant in the United States that does not sit on or near a large source of water. Instead, it uses treated effluent from several nearby cities to meet its cooling-water needs. No changes were made to the EIS in response to this comment.*

Comment: The DEIS states "Strategic considerations indicated the LNP site would be preferable to collocating at the Crystal River site because it is located farther from the Gulf Coast and at a higher elevation." The FEIS should provide a stronger narrative (with more details) regarding the strategic considerations for why the LNP site is preferable to collocating at the Crystal River Energy Complex location. This should include expanding the narrative in the DEIS about the need for system reliability (e.g., not including all power generation at one site in the event of a hurricane or natural disaster), potential security issues derived from having all power generation at one site, the importance of selecting a site that would address the projected effects of future: sea-level rise, increased hurricane intensity, increased storm surge heights, increased wave action, etc. Per the DEIS in Section 2.3.1.1 sea-level rise is projected to exceed 3 ft by the end of the century due to climate change, according to the U.S. Global Change Research Program's report Global Climate Change Impacts in the United States, published in 2009. (**0003-22** [Mueller, Heinz J])

Response: *Section 9.3.1.6 of the EIS was modified to expand the discussion about PEF's strategic considerations for why the LNP site was preferred to the CREC site.*

Comment: The DEIS states "Based on the results and comparison of the resource areas and associate impact characterizations, the review team concludes that the Crystal River site would not be environmentally preferable to the LNP site for the construction of the two nuclear generating units." ... the FEIS should provide additional technical rationale to support this determination. (**0003-24** [Mueller, Heinz J])

Response: *Section 9.3.6.2 of the EIS was revised to more clearly explain the review team's determination that the Crystal River site would not be environmentally preferable to the LNP site for the construction of the two nuclear generating units.*

Comment: Although water would not be withdrawn directly from the restoration area [at the Highlands site], artificial lowering of Pool E (i.e., any condition that does not mimic the climatic cycle at the time) could negatively impact hydrological conditions of the restoration area that is immediately upstream. A section of restored river channel will pass the S-650 structure to the west and link to the C-38 Canal in Pool E. The premise of the restoration project is to re-create historic hydrological conditions on a restored physical habitat template that will allow functional, 'physical, chemical, and biological attributes of the ecosystem to respond naturally. The SFWMD must conduct ecological response monitoring under a 1994 Project Cooperative Agreement with the United States Army Corps of Engineers (USACE) to document restoration progress. The artificial lowering of Pool E, if it was to occur, could change the slope of the water surface profile, causing the restored river reach to drain portions of the associated floodplain more quickly, thus shortening floodplain hydroperiods and increasing recession rates. Re-establishing historic floodplain hydroperiods is critical to the reestablishment of wetland plant communities that will provide habitat for over 300 species of responding fish and wildlife. In addition, this section of the river must be managed carefully, following restoration construction, to minimize scouring due to naturally occurring gradient issues. (**0024-1** [Golden, James])

Comment: The Northern Everglades and Estuaries Protection Program (NEEPP) promotes a comprehensive, inter-connected watershed approach to protecting Lake Okeechobee and the Caloosahatchee and St. Lucie Rivers and estuaries and recognizes the importance and connectivity of the entire Everglades ecosystem from the Kissimmee Chain of Lakes south to Florida Bay. The primary goal of the legislation is to restore and protect surface water resources by addressing water quality, quantity, and the timing and distribution of water to the natural system. Prior to construction of a power plant and associated facilities at this location, it must be demonstrated that construction, operation, and maintenance activities can be performed in a manner consistent with the NEEP legislation. The power plant should not adversely impact water quality and storage targets for the Lake Okeechobee watershed. The project will need to be consistent with the necessary nutrient load reductions identified in Section 373.4595, Florida Statutes, including the Lake Okeechobee Watershed Construction Project Phase Technical Plan and the established Total Maximum Daily Load (TMDL) for Lake Okeechobee and NEEPP. Existing water quality in the Lake Okeechobee watershed is significantly influenced by the various land use and land management practices within the individual sub-watersheds and drainage basins of the watershed. The Lake Okeechobee watershed is subject to NEEPP, the Lake Okeechobee Watershed Comprehensive Everglades

Restoration Plan, the Lake Okeechobee Watershed Construction project Phase Technical Plan, and the established phosphorus TMDL for Lake Okeechobee. (**0024-2** [Golden, James])

Comment: The SFWMD is currently in rule development to reserve water in the Kissimmee River, floodplain, and chain of lakes. The reservation water bodies subject to rule development extend south to the S-65E structure. The intent of the rule is to ensure that existing surface water necessary for fish and wildlife will not be allocated for consumptive use. (**0024-3** [Golden, James])

Comment: Based on review of diagrams provided by the U.S. Army Corps of Engineers, the plant intake pipe would be located downstream of the restoration area in Pool E, near the confluence of the C-41A and C-38 Canals. The plant withdrawals would be 45 MGD. The proposed withdrawals may negatively impact navigation in a canal used by the River Acres community during dry or drought conditions. The River Acres community is located at the southern end of Pool 0 adjacent to the S-650 water control structure. As part of the flood protection and mitigation engineering, in lieu of land acquisition, the navigation canal for this community will be linked hydrologically to Pool E after completion of construction. The navigation canal for the community is being dredged to a depth to allow for continued navigation at the lower surface water elevation associated with Pool E. (**0024-4** [Golden, James])

Comment: The Kissimmee River discharges into Lake Okeechobee. Any plant withdrawals from the Kissimmee River south of the S-65E structure could also impact water availability in Lake Okeechobee, which is a source of limited availability. (**0024-5** [Golden, James])

Comment: Although withdrawals are proposed from the Kissimmee River, the project site is located within the Indian Prairie Basin, which is a Restricted Allocation Area, pursuant to Section 3.2.1 of the SFWMD's Water Use Basis of Review. Within this Basin, no additional surface water will be allocated from SFWMD controlled surface water bodies over and above existing allocations. In addition, there is a Water Rights Compact between the SFWMD and the Seminole Tribe of Florida for the Brighton Indian Reservation, located two miles south of the project site, whereby the Seminole Tribe of Florida is entitled to fifteen percent of the surface water within the Indian Prairie Basin. Therefore, the availability of water from this basin is limited. (**0024-6** [Golden, James])

Comment: Any proposed construction of withdrawal or other facilities within SFWMD right-of-way including, but not limited to, the C-38, the C-41A [canals in Kissimmee River Basin], or any other designated Work of the District, will require prior SFWMD review and approval to ensure that there will be no interference with SFWMD operation and maintenance activities. (**0024-8** [Golden, James])

Response: *Section 9.3.4.2 of the EIS presents thd hydrologic conditions at the Highlands alternative site. The comments address the difficulty of securing sufficient surface water for station cooling due to competing usage of the available water. This section was revised to indicate it is unlikely that surface water would be available for condenser cooling at this site and alternative sources of water and/or alternative cooling technology options must be considered.*

E.1.25 Comments Concerning Benefit-Cost Balance

Comment: The most important factor is the sheer overwhelming cost of the capital expenditure and the burden that it places on the capital resources, even of this nation. Plus, the cost of kilowatt hour from nuclear energy under any circumstances is a significant multiple of any other form and a very significant multiple of the cost that we pay for kilowatt hour today. (**0002-12-2** [Hopkins, Norman])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] the inordinately high capital costs. The overwhelming magnitude of these capital costs can only be funded by massive federal government subsidies, without which no economic case for the LNP facility could be made. Moreover, these and an up-front customer levy to defray capital costs in advance causes taxpayers and customers to assume capital risk with no prospect of commensurate benefit - when that risk rightly should accrue to corporation shareholders or bond holders instead of consumers and taxpayers. (**0005-6** [Hopkins, Norman])

Comment: [Statement to the DEIS review meetings have questioned the viability of proceeding with the PEF proposal on the Levy site, ...which arose after the end of the scoping period ending December 2008:] high expected costs per kWh of electricity from the proposed LNP facility. Electricity from the nuclear plants would be several times the cost per kWh that consumers pay today and that they would pay from competitive power generating options (Craig A. Severance, Business Risks and Costs of Nuclear Power, January 2009, page 32). (**0005-7** [Hopkins, Norman])

Comment: The longer the construction lead time, with its changing component and commodity costs, the greater is the business risk that any estimated cost will be exceeded. The U.S. energy Information Agency (EIA) cites clear patterns how the Nuclear power industry regularly and catastrophically underestimated plant construction costs. That PEF first used a capital cost guess of $4 billion rising steadily over time to $17 billion does not engender confidence. Impact of the magnitude of servicing debt capital on kWh rates to make nuclear plants pay becomes self destructive. The lure of corporate return guaranteed as a given percentage margin is hard to resist - until too late. (**0006-5** [Hopkins, Norman])

Comment: Not only do construction cost escalate so too do costs of capital. Both equity and debt finance require returns. Delays to Construction schedules, for example by litigation, serve to downgrade the Utility's and or Customers' credit ratings, increasing Costs of Capital used during construction.

Ability to recover capital costs from customers is limited. For a similar project, Craig A. Severence, (2009), Appendices A through C estimates "All In" capital costs conservatively amount to $10,553per kW(e). Using a capital recovery period of 40 years and a weighted cost of capital of 14.5% and a recovery factor of 0.1457 which equals $1537.40 per kWyear; using a capacity factor of 80% and the number of hours per year at 8780 (giving 7008 kWh per year), yields a capital component cost of $ 0.22 per kWh.

Taking account of delays, using a most likely scenario in nominal dollars projected to a 2018 First year of Full Operation, including cost elements per kWh for Capital cost $0.22, O and M w/o fuel $0.01, Property taxes $0.02, Decommissioning (Section 468A(d)(2)(A)) and waste costs reserve, $0.02, and Fuel Cycle costs of $0.03, Total costs per kWh rise to $0.30. This suggests that PEF would not be able to provide its customers with adequate electricity at a reasonable cost from Levy Units 1 and 2 contrary to its testimony to the FPSC in Docket No 080148-EI, Page 9 ff.

To quote Craig A. Severance: The availability of Federally guaranteed loans, and/or a guarantee of the ability to charge ratepayers (often during construction) for the costs of a new facility, are no substitute for prudent business judgment. Simply shifting the burden of risks from the utility's shareholders and executives, to the taxpayers and ratepayers does not make any risks go away. It simply sets up yet another situation where profits are privatized while risks are socialized, allowing those who make bad decisions to walk away from the effects of their own imprudence. After hundreds of billions of such outcomes this year alone, the public has no stomach for more of this. (**0006-8** [Hopkins, Norman])

Comment: Allowing the LNP to be constructed as proposed adversely affects public interest because nuclear power is more costly to construct, more costly to dispose of radioactive wastes, and far more costly to decommission. The nuclear power option results in transportation costs much higher than other power generation options and creates wastes that will result in human exposure for thousands or tens of thousands of years. (**0009-6** [Hubbard, Michael])

Comment: [T]he FPSC failed to sufficiently assess the business risk taken on by PEF in so far as it unfairly impacts the customers of PEF with cost increases instead of economies as advanced to the FPSC by PEF. Thus rendering unsafe the the reliance placed upon the FPSC order in the last paragraph of item 9.2 of the Draft NUREG - 1941 document. (**0013-1** [Hopkins, Norman])

Comment: [W]e point to a systemic fallacy which encourages the taking of excessive business risks at the expense of consumers. Industry lobbying, providing for profit as a given percentage, has ensured that the bigger the cost burden of assumed fiscal risk the bigger the profit guaranteed by legislation - come what may. Utilities may pursue investments in the tens of billions of dollars immune to the consequences of any bad business decisions affecting the bottom line. This creates an unacceptable undisclosed conflict of interest: where shareholders, bondholders and executives benefit at the expense of their customers, running contrary to a reason quoted for the FPSC Order that, "...(PEF) will provide adequate electricity at a reasonable cost". (**0015-2** [Hopkins, Norman])

Comment: Our state is not economically situated to deal with the very high costs of building and maintaining this plant, despite the fact that Progress Energy customers are already "pre-paying" on this thing, sight unseen. (**0031-3** [Thuemler, Ronald])

Response: *The costs and benefits of construction and operation of the proposed LNP were addressed in Chapter 10 of the EIS using the best information available to the review team. Neither the NRC nor the USACE has the authority or responsibility by law or regulation to ensure that the proposed plant is the least costly alternative for providing energy services under any particular set of assumptions concerning future circumstances. In Chapter 8, the EIS provides the review team's analysis of the findings of the FPSC suggesting the State believed (and the review team agreed) that the project would be a justified use of capital. Chapter 8 has been updated to discuss the conditions of the FPSC Final Order, under which PEF must continue to update the FPSC on the long-term feasibility of the project as a condition of cost recovery being granted by the State (FPSC 2008). Any other new information changing any of the FPSC or review team conclusions in this area was incorporated into Chapters 8 and 10 of the final EIS.*

Comment: NRC's statement on Page 10-20 that nuclear fuel is less dependent on foreign suppliers appears to be untrue. PEF has stated in the COL application that it intends to purchase uranium mined outside the United States and NRC only offers hope that uranium mining will revive within U.S. borders. Please revise the statement on Page 10-20 to reflect current market reality. (**0008-56** [Hubbard, Michael])

Comment: The following additional oversights/shortcomings, taken together within complete design issues, require that the entire DEIS be revised and reissued as a Supplemental DEIS so that the public is provided the opportunity to review and comment on a substantially complete DEIS as required by 40 CFR 1502.2, which addresses how an EIS is to be implemented, and 40 CFR 1502.9 which addresses supplements to the draft and final EIS. ... Inclusion of misleading statements (uranium fuel not independent of foreign suppliers as stated in DEIS). (**0008-62** [Hubbard, Michael])

Response: *Sections 6.1 and 10.6 of the EIS discuss the issue of foreign versus domestic sources of uranium fuel. While the EIS discussion referenced by the commenter is not factually incorrect, a minor clarification has been made to those sections to suggest that foreign fossil-fuel supplies are more dependent on potentially unstable sources than are foreign uranium supplies.*

Comment: PEF would pass on the redesign cost to rate payers at great economic cost. Relocating the plant site would save this cost for our area (**0001-5-8** [Berger, Betty])

Comment: [T]hey say we need nuclear power. Well, guess what? They aren't paying for that. The ratepayer pays for this. And then they add on their 12 percent. (**0002-4-4** [Klutho, Mark])

Comment: Note that the Ocala Star Banner, reported the FPSC's recent approval of Progress Energy's request for $163.6 million surcharge on customers to contribute toward repair to its Crystal River nuclear power plant and their proposed new Levy County plant. "The 4-0 FPSC vote will mean an average $5.53 per month cost increase to Progress Energy's more than 1.6 million Florida customers beginning in 2011". Consumers have no prospect of any return on their investment (call it a tax). Note further the computations of Craig A. Severance, in

Business Risks and Costs of New Nuclear Power, January, 2009, indicating costs of electricity from a similar installation to the Levy proposal to be $0.30 per kWh (prior to any capital cost raise). This five fold increase over current rates - without the surcharge - is hardly a "reasonable cost" and a likely barrier to PEF in wholesale markets. (**0015-3** [Hopkins, Norman])

Response: *The purpose of the EIS is to disclose the potential environmental impacts of constructing and operating the proposed LNP. Setting retail power rates is outside the NRC's regulatory purview; those determinations are the responsibility of the FPSC. Because of the dynamic nature of the rate-setting process, including the uncertainty as to how any increase would be distributed between residential, commercial, and industrial customers, analyzing the likelihood and magnitude of future rate changes would entail undue speculation by the review team. Chapter 8 of the EIS was modified to discuss the conditions upon which the FPSC would award cost recovery to PEF stipulated in the granting of its Determination of Need.*

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... There is no discussion of how the general welfare of the people of the United States would be improved by the proposed project. (**0011-14** [Bacchus, Sydney])

Response: *The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the final EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements; it will be based on information provided in the final EIS for this project and any additional information required by the USACE for final evaluation in the USACE's ROD.*

Comment: According to 33 CFR 320.4(q), USACE "may make an independent review of the need for the project from the perspective of the overall public interest." USACE is strongly encouraged to perform such an independent review because NRC failed to create an unbiased DEIS that considered actual costs to construct and decommission the proposed project, adequately consider costs of transporting radioactive materials, ignored future public restoration project costs, and ignored the rising cost of construction materials and the affect of customary delays in large construction projects in general, and of nuclear power plants in particular. Already the proposed LNP is behind the schedule used to estimate construction costs, and this schedule is likely to be further delayed due to contentions granted to be heard in a Petition to Intervene in the COL application by the Atomic Safety Licensing Board (ASLB), and because the DEIS was so incomplete that a supplemental DEIS and public comment period is probable. (**0009-5** [Hubbard, Michael])

Response: *The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the final EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory*

requirements. Specific to this comment, 33 CFR 320.4(q) is the basis for the USACE's general policy for evaluating permit applications in consideration of economics. The evaluation under 33 CFR 320.4(q) will be based on information provided in the final EIS for this project and any additional information required by the USACE for final evaluation in the USACE's ROD. No changes to the EIS were made as a result of this comment.

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... What is the private need for this project, apart from the desire of the applicant to make money? (**0011-16** [Bacchus, Sydney])

Response: *The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the final EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements. Specific to this comment, 33 CFR 320.4(a)(2)(i) states that the relative extent of the public and private need for the proposed structure or work, is one of the general criteria to be considered by the USACE in the evaluation of every application. The USACE's evaluation under 33 CFR 320.4(a)(2)(i) will be based on information provided in the final EIS for this project and any additional information required by the USACE for final evaluation in the USACE's ROD.*

Comment: PUBLIC INTEREST REVIEW - Regarding the Public Interest Review required by 33 C.F.R. 320.4, the DEIS appears to have the following inadequacies ... What benefit does the environment receive from this project? (**0011-17** [Bacchus, Sydney])

Response: *The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the final EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements. Specific to this comment, 33 CFR 320.4(p) states the following: "Environmental benefits. Some activities that require DA permits result in beneficial effects to the quality of the environment. The district engineer will weigh these benefits as well as environmental detriments along with other factors of the public interest." The evaluation under 33 CFR 320.4(p) will be based on information provided in the final EIS for this project and any additional information required by the USACE for final evaluation in the USACE's ROD.*

E.1.26 General Comments in Support of the Licensing Action

Comment: I also want to tell the NRC that I personally am very supportive of this nuclear power plant. (**0001-1-3** [Hollins, Dixie])

Comment: I would support their application. (**0001-2-4** [Houston, Andy])

Comment: We would like to register our support for the Progress Energy Levy County Nuclear Power Station near Crystal River, Florida. (**0034-1** [Fritz, Carol] [Fritz, Charles])

Response: *These comments express support for licensing of new nuclear reactors at the LNP site. Because they did not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS as a result of these comments.*

Comment: When one considers that the Goethe forest, several large land owners and larger homesteads surround this new plant, the location was chosen to impact as few as possible. God Bless America and build this plant! (**0036-2** [Cino, Cynthia])

Response: *This comment expresses support for the proposed location of the LNP. Because it does not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS as a result of this comment.*

E.1.27 General Comments in Support of the Licensing Process

Comment: I read both volumes of this Environmental Impact Statement and I would like to express my gratitude to those who wrote this, shall I say, instrument. For lay persons like myself, it was fairly easy to understand. The staff of your Commission have been very accommodating to me. This very afternoon, I made darn sure I would be here for the -- what's that called, the open house, and they answered every question I had to the best of my -- of their ability, and it is greatly appreciated. (**0001-6-2** [Cannon, Renate])

Response: *This comment provides general information in support of the NRC COL process. Because it did not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS as a result of this comment.*

E.1.28 General Comments in Support of Nuclear Power

Comment: The Levy plant will also play an important role in our strategy to serve Florida's energy future. Based on today's technology, nuclear power is the only large-scale, electric source that is capable of providing carbon-free energy 24 hours a day, 7 days a week. By building fuel diversity and long term fuel savings into our plans, Progress Energy Florida is helping to ensure the long term economic competitiveness and viability of Florida. In short, the Levy nuclear project will help ensure the right balance of reliable, environmentally-responsible and cost-effective power tomorrow. (**0001-4-7** [Elnitsky, John])

Comment: That plant opened in '85, and again, looking back at it, that's some of the greenest work that I've ever done. Probably my insight in the green came after that. It was 25 years ago when I started having kids, when I started looking at the future, and what I was going to leave to my kids on a global scale. (**0001-8-2** [Pantaleo, Greg])

Comment: And I look at what we're doing to this world and the amount of carbon that we're putting out. And I see something like a swap of 2,200 megawatts of the highest carbon output

source that we have, which is coal, but it's going to be decommissioned as the new plants come online. And that kind of capacity of -- that you gain in carbon emissions needs to be -- we need to set the bar for the world on reducing these carbon emissions, guys. And if -- if we're not willing to do it. I mean, they're doing it in France. They're doing it in China. We don't --we should be leading that charge and not following. So, the green building trend in energy, as far as I'm concerned, the ultimate is the nuclear power. Yes, there's some localized disruption and I don't want to minimize that to anybody that might happen to live right behind it. But the -- the global impacts and the positive impacts environmentally, in my mind, so far outweigh the negative impacts that it's -- there's no question in my mind where I want to go with it. (**0001-8-3** [Pantaleo, Greg])

Comment: The Levy plant will also play a vital role in our strategy to serve Florida's energy future. This is a future that includes carbon-free generation, [24] hours a day, 7 days a week, the same way our customers use their electricity. By building fuel diversity and long term fuel cost savings into our plans, Progress Energy Florida is helping ensure the long term economic competitiveness and viability of Florida. In short, the Levy nuclear project will help ensure the right balance of reliable, environmentally-responsible and cost-effective power tomorrow. (**0002-1-7** [Elnitsky, John])

Comment: We are long overdue for continuing the commitment to nuclear power in the US. We are sick and tired of our energy future being decided by lawyers, politicians, the news media, master gardeners masquerading as environmentalists employing questionable science, and last but not least the EPA. (**0034-2** [Fritz, Carol] [Fritz, Charles])

Comment: We are part of an entire generation of Americans that have been cheated out of clean, reliable and inexpensive nuclear power by crackpots threatening the consequences of CO2, global warming, and falsely promising intermittent and inadequate wind, solar and alternative energy sources. You can go back at least 20 years in time and find that in every election cycle those opposed to nuclear power argue that we need alternatives now, and that nuclear power plants take too long to build, and then another 5 years rolls by and no progress is made in alternative energy sources and no new nuclear power plants are built.
(**0034-3** [Fritz, Carol] [Fritz, Charles])

Response: *These comments provide general information in support of nuclear power. Because they do not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS as a result of these comments.*

Comment: Nuclear power is safe and I for one want my grandchildren to not have to be dependent on foreign sources of energy. Each of these resident's concerns must be answered with the good science and technology that will provide safe guards for their issues. (**0036-1** [Cino, Cynthia])

Response: *This comment provides general information in support of nuclear power and the licensing process. No changes to the EIS were made as a result of this comment.*

E.1.29 General Comments in Support of the Applicant

Comment: I can assure you all that they [Florida Power] are a first-class power plant production operation. They are very safe. They are concerned with the environment. (**0001-1-1** [Hollins, Dixie])

Comment: I am a timber grower. I remember when they put the cooling towers there, which have salt drift in them. I asked them to put over some monitor plants there to assure that there was no salt drift contamination to our 7,000 acres of planted pine trees, and they did that and tested them for over four years, with no impact. Those timbers were owned not only by my family, but they own half by Plum Creek, largest industrial timberland owner in the United States of America. They were very sensitive to drainage and drainage of their property and drainage of -- to make sure that they don't back up flood waters onto your own property. They are extremely good for security. They are very high security. (**0001-1-2** [Hollins, Dixie])

Comment: I have been their neighbor. My father has been their neighbor. And I can tell you that's one of the best, securest neighbors that you will ever have. (**0001-1-5** [Hollins, Dixie])

Comment: By its nature, power plants are large consumers of water. But I think Progress Energy has shown itself to be a good steward of that resource. (**0001-2-2** [Houston, Andy])

Comment: Progress Energy Florida is committed to providing safe and reliable electric power to over 1.6 million customers in Florida, every hour of every day. That takes a lot of advanced planning that we are committed to support that reliability and that safety. We operate a nuclear power plant, as well as four fossil power plants, really just about eight miles as the crow flies from our proposed Levy nuclear power plant site. And we do that safely 24 hours a day and will continue. That same commitment to safety will continue with our operations at Levy. (**0001-4-1** [Elnitsky, John])

Comment: Progress Energy Florida has been working with the community leaders and property owners since late 2006, when we first announced our plans to build the proposed Levy County nuclear power project and the 200 miles or so of transmission lines that are associated with it. Since we started that process four years ago, we have remained committed to seeking community input and will continue to remain engaged with the public. In an effort to provide a meaningful dialogue, the company used an innovative and first of a kind community outreach program called the Community Partnership for Energy Planning. This process helped Progress Energy gather information and recommendations from local government and communities. We also helped create the Levy Neighbors Group to give the most up-to-date information to our neighbors who lived the closest to the proposed site. Community input has improved our process. About 5,000 property owners from across the community attended over 22 open houses in 10 different counties to discuss our choices for locating transmission lines and the nuclear power plant. More than 40 other community informational meetings were held across our region and will continue. Based on feedback from the community, more than 90 percent of our preferred corridors for transmission lines were located along, or adjacent to, existing right-of- ways, thereby minimizing the impact on the environment. We are committed to being open

and thorough this process and we will continue to seek public input as we move forward with this important project. (**0001-4-2** [Elnitsky, John])

Comment: Probably more significant, at least maybe in my humble opinion, is the benefit to the community from these employees that make their homes right here in our local community. For example, in Crystal River, our employees have actually been active in chartering schools, founding churches, creating Little League teams --hopefully some of those teams are helping the Rays a little better here -- and continued countless hours to non-profit agencies and community causes. Our employees live and work here. This isn't just a job. This is their community. And they feel a very important sense of attachment to that community. (**0001-4-4** [Elnitsky, John])

Comment: Progress Energy Florida is committed to providing safe and reliable energy for our 1.6 million customers in Florida. And we plan to do that every hour of every day. Planning for the region's future electricity needs is a responsibility the company takes very seriously. (**0002-1-1** [Elnitsky, John])

Comment: Progress Energy Florida has been working with community leaders and property owners since late 2006, when we first announced our plans to build the proposed Levy County nuclear power project and the associated 200 miles or so of transmission cables and transmission lines that go with it. Since we started this process four years ago, we have remained committed to seeking community input and encouraging public discourse like you hear this evening. In an effort to provide a meaningful dialogue, the company used an innovative, first-of-a kind public outreach process that we called the Community Partnership for Energy Planning. This process helped Progress Energy gather input and recommendations from local governments and communities. We also helped create the Levy Neighbors Group to give most up-to-date information to our neighbors who live closest to the site of our proposed plant. About 5,000 property owners and community leaders attended 22 open houses across 10 counties as we narrowed our choices for locating transmission lines. More than 40 other community informational meetings were held across our region. And based on the feedback from those meetings, more than 90 percent of the preferred corridors for transmission lines are located along, or adjacent to existing lines, thereby minimizing the project's impact on the community and the environment. We are committed to being open throughout and during this process, as we continue to seek public input and move forward with this important project. (**0002-1-2** [Elnitsky, John])

Comment: Probably more significant than that is the benefit to community service that these jobs will create as employees forge partnerships with their local communities. For example, in Crystal River alone, our employees have chartered schools, founded churches, created Little League teams and contributed countless hours to non-profit agencies and community causes. Our employees live and work here and we care deeply about our communities. (**0002-1-4** [Elnitsky, John])

Comment: Progress Energy is not only a good job creator, but also a highly conscientious environmental steward, employing dedicated biologists who have demonstrable success in

ecological remediation, fisheries replenishment, and humane avian deterrence-to mention only a few. (**0012-2** [Overa, Beverly])

Comment: Environmental impacts will be closely monitored, I dare say, but I also have confidence in the willingness of Progress Energy to address them. (**0012-4** [Overa, Beverly])

Response: *These comments express support for the applicant, PEF. Because they do not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS as a result of these comments.*

E.1.30 General Comments in Opposition to the Licensing Action

Comment: I would like to ask the Corps of Engineers and the Nuclear Regulatory Commission to revoke the preliminary permit, because we do not need more outmoded, dirty energy that will pollute the Earth for many, many generations. (**0001-11-10** [Minno, Maria])

Comment: I do not deny that the way the world is growing, we're going to need more energy. I do not deny that we need jobs. But the problem I see is the cost of the energy and the cost of the jobs destroying our wetlands and taking our water. I'm sorry. I can't agree with it. (**0001-13-1** [Garvin, Bill])

Comment: The people in South Levy are concerned that we will be sold out, our security and way of life interrupted, and our safety compromised, and our aquifer and environmental changed forever. (**0001-14-10** [Price, Sally])

Comment: I have a lot of reasons for not wanting this plant built. But one of the ones that I brought up tonight is, we cannot spend billions of dollars on something and have absolutely no place to put this toxic nuclear waste. (**0002-3-4** [Lott, Phyllis])

Comment: Simple fact. I do not want two new nuclear plants in my backyard, that is developed by a North Carolina corporation and sends the electric up North. Let their $12,000,000 bonuses pay for the plants and build them in North Carolina. Finish!!!!! (**0018-1** [Foreman, Patricia Parker])

Comment: The conclusions in the LNP DEIS suggest that neither PEF nor the responsible agencies read the geological descriptions in "Chapter 2 — Site Characteristics" of the LNP Fire and Safety Analysis Report [Final Safety Analysis Report] (FSAR). For your convenience I have included some of the more salient excerpts from that chapter with my other exhibits (see Bacchus Exhibit C12). How the Nuclear Regulatory Commission (NRC) could seriously consider a proposal to construct a behemoth, multi-unit nuclear power plant on top of freshwater forested wetlands (one of our most effective carbon sinks) embedded in a fragile karst flood plain riddled with relict sinkholes interspersed with fracture networks in the midst of one of the most environmentally sensitive areas in the state defies comprehension. (**0020-3** [Bacchus, Sydney])

Response: *These comments express opposition to the licensing of new nuclear reactors at the LNP site. The NRC carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment. These comments do not provide specific information related to the environmental effects of the proposed action, and no changes were made to the EIS as a result of these comments.*

Comment: Issuing the combined licenses to PEF at this juncture would be tantamount to a license to kill people and compromise the near shore marine food web in the Gulf of Mexico. (**0006-4** [Hopkins, Norman])

Comment: [I]t is my professional opinion that construction and operation of the proposed LNP and associated required mining would be contrary to the public interest and the comprehensive effort by Congress to restore and maintain the chemical, physical and biological integrity of the nation's waters, as required by the CWA (**0030-1-4** [Bacchus, Sydney])

Comment: I am writing to submit my formal opposition to the construction of the proposed nuclear power plant in Levy County, Florida. I believe the environmental costs to our water, wetlands, coastal environment, and habitats near the proposed site are too great. (**0031-1** [Thuemler, Ronald])

Comment: As all permits have not been finalized, and the environmental impacts are observed, it is considered the wisest course would be not to authorize the nuclear plants to be built in Levy County. (**0041-3** [Berger, Betty])

Response: *These comments provide general information in opposition to the applicant's COL. The NRC has carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment.*

The USACE's final evaluation of the proposed project and final decision whether to issue a DA permit will be documented in a separate ROD by the USACE after issuance of the final EIS. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other laws and regulatory requirements; it will be based on information provided in the final EIS for this project, any additional information required by the USACE for this project, and any additional information required by the USACE for final evaluation in the USACE's ROD.

These comments do not provide specific information related to the environmental effects of the proposed action, and no changes were made to the EIS as a result of these comments.

Comment: I believe the project violates the Deed Terms and Restrictions. The Resolution states the Canal was stopped because of saltwater threats to the Floridan Aquifer. To excavate five feet further is not allowed. Item (21) states restrictions on Canals except for certain benefits. This project is AGAINST the PUBLIC INTEREST. (**0041-2** [Berger, Betty])

Response: *The applicant, PEF, is responsible for obtaining necessary permits from State agencies. The NRC has carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment. This comment provides general information in opposition to the applicant's COL, but does not provide specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of this comment.*

E.1.31 General Comments in Opposition to Nuclear Power

Comment: Nuclear energy is the most expensive energy, if all costs are accounted for. It's also the most toxic energy. People talk about coal having radioactive waste. Well, they're not counting the real radioactive waste that nuclear power plants produce. (**0001-11-1** [Minno, Maria])

Comment: Remember --remember Three Mile Island. I met a woman who'd been there. And her story was, the government told her it was safe when the leaks came out. They said, it's safe, fine. Don't take your child out of school. Don't get out of here. It's fine. And so, she had horrible exposure as a result of that. (**0001-11-11** [Minno, Maria])

Comment: [A]fter the years of research that I've done into sources of energy for the purpose of constructing a comprehensive of the energy situation in America today and putting it on the website that we maintain for teaching, leaves me without any confidence at all that a case could be made for nuclear energy anywhere in the world. (**0002-12-1** [Hopkins, Norman])

Comment: All I ask for is that my tax dollars stop killing and maiming people...innocent or not. Please invest in clean energy. (**0035-1** [Lester, Cecilia])

Response: *These comments provide general information in opposition to nuclear power. Because they do not provide any specific information relating to the environmental effects of the proposed action, no changes were made to the EIS as a result of these comments.*

Comment: The principal arguments presented at the meeting in favor of approving the Combined Licenses for Levy Nuclear Plant Units 1 and 2 appeared to be that nuclear power was the only available suitable technology capable of providing base load, and no environmentally preferable site for such could be found. Whereas, the costs and human harm likely to stem from such a nuclear facility on that site would be disabling, especially as more economic and environmentally preferable arrangements become available. (**0005-1** [Hopkins, Norman])

Response: *This comment provides general information in opposition to nuclear power. The NRC has carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment. This comment does not provide specific information related to the environmental effects of the proposed action and has not been evaluated in the EIS.*

Comment: If it [nuclear power] is so safe, then you need to demand that they take that Price-Anderson Act off the books. Why do we need that after all these years? I mean, I'm a child of the '50s and I remember that it was supposed to be too cheap to meter. And then, what was in the New York Times just months ago? That plant over in Finland, 50 percent over cost, and they won't give a completion date. And this is supposed to be the blueprint for what's coming here. (**0002-4-1** [Klutho, Mark])

Comment: Benefits of the proposed LNP project include electricity for 40 to 60 years with routine and accidental radioactive releases during operation and decommissioning that may offset, to all or some extent, the single benefit of nuclear power: that is, fewer of the standard power plant air pollutants, including carbon dioxide. However, the permanence of the radioactive waste is ONE MILLION YEARS. (**0009-7** [Hubbard, Michael])

Response: *These comments express general opposition to nuclear power. They do not provide any new information relevant to the environmental review. No changes were made to the EIS as a result of these comments.*

E.1.32 Comments Concerning Issues Outside Scope – Emergency Preparedness

Comment: Public safety evacuation. We would be between two. If we get an alarm to leave, which way are we going to go? Most people are joking and saying they'll take a boat and head towards Mexico. (**0001-14-4** [Price, Sally])

Comment: [I]t seems like we don't have as good enough communication between the Town of Inglis, Progress Energy, and the Nuclear Regulatory Commission, specifically as far as public health and safety. When I leave here today, I can give my card to any one of you. I just would like to have better communication between our Chief of Police, which is Chief Dixon, and our Mayor, Bill Lake, particularly with public health and safety. Particularly as we get closer to the start of this build out. (**0001-3-1** [Diamond, Darryl])

Comment: PEF says that Crystal River nuclear site and state residents within 10 miles must be protected from direct radioactive release. They show the area encompassing 10 miles and show the Levy nuclear plants overlapping in the same area. They state the evacuation routes to go north, south, and east to escape radiation release. However, Inglis is like the meat in the sandwich. If both sites are affected, there's Crystal River plant in the south, Levy plants in the north, the Gulf on the west, and the heavy-haul road preventing escape to the east. That would be the only way that Inglis residents could get east to Dunnellon, and they can't get there with a heavy-haul road. And if they did -- one did, there's the radioactive half life of several hundred years, so there's no return. (**0001-5-3** [Berger, Betty])

Response: *These comments relate to the adequacy of emergency plans, which is a safety issue that is outside the scope of the review team's environmental review. As part of its site safety review, the NRC staff will determine, after consultation with the Department of Homeland*

Security and the Federal Emergency Management Agency, whether emergency plans submitted by the applicant meet applicable requirements. No changes were made to the EIS as a result of these comments.

E.1.33 Comments Concerning Issues Outside Scope – Miscellaneous

Comment: Danny's [Roderick] goals seemed to be creating a project that the community would be proud of. Something that he did not want to -- of course, he was expense cautious about what he was doing, but he was also -- and this is just my opinion of Danny. He might have had a different view. But I'm just talking as a businessman and our relationship with Danny. He seemed to be more in tune to what the community as a whole would be proud of out there. Something that would create jobs for Levy County, Citrus County, and benefit the surrounding properties by, you know, what his outlook was for the piece of property. That all changed when Danny left. He's no longer with Progress Energy. But one of the things that he was always very concerned about was, in the development of the property to make sure from the feeling that we had with him, that the surrounding lands were as protected as they possibly could be. He knew that they were going to have an impact. He was willing to talk to us about how it would impact our property; how it would impact the Goethe State Forest; how it would impact the surrounding neighbors' properties. We're not finding any of that from the contacts we've had with Progress Energy. (**0002-10-1** [Seymour, Mike])

Response: *Staffing changes at PEF are not within either the USACE's or NRC's purview. Because this comment does not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS.*

Comment: I would like to meet with someone at Progress Energy, a design representative, to take care of environmental issues that exist at this time. (**0001-12-3** [Hollins, Dixie])

Response: *This comment constitutes a request that is outside the scope of the NRC COL process. These comments provide no new information; therefore, no changes were made to the EIS.*

Comment: SWFWMD does not have the greatest reputation of all the --including people of South Florida Management Water District. I am blessed to live in the territory of Suwannee River Water Management District, praise the Lord. And so, the thing is, the regulations are there, the laws are there, statutes, you name it. The enforcement, that's where the weak link in the chain is. And enough personnel to enforce on a regular basis, is most of the time lacking. (**0001-6-4** [Cannon, Renate])

Response: *The NRC regulates the nuclear industry to protect the public health and safety and the environment. Management practices of the SWFWMD are outside of the NRC's purview. No changes were made to the EIS as a result of this comment.*

Comment: [M]e living as close as I do, I've had no environmentalist come on my property, contact me, talk to me, or say anything at all about my home site and where I live. (**0001-7-16** [Smith, Robert])

Response: *This comment suggests procedures that are not essential components of the NRC's process for conducting an environmental review for a COL as set forth in 10 CFR 51 and 52. The comment did not provide new information relevant to this EIS; therefore, no changes were made to the EIS.*

Comment: PRACTICTICABLE ALTERNATIVES -Corps' regulation 40 C.F.R. 230.10(3) specifies that, unless there is no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem ..." the discharge of dredge and fill material is not permitted for an activity that is not water dependent. The rule further establishes that "practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise. The rule also provides, "In addition, where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise."). The production of energy/electricity is not a water-dependent activity. For example, comparable amounts of energy/electricity could be produced by roof-top solar installed in the metropolitan areas that would be using the energy proposed for production at the rural Levy County project site panels - without dependency of project-site water.

Because the DEIS lacks a meaningful discussion of practicable alternatives, the proposed project should be denied. Considering the significant size of the proposed project and the large adverse impacts to wetlands and potential adverse impacts to federally endangered and threatened species, a detailed analysis of practicable alternatives must be provided, in accordance with Regulatory Guidance Letter, No. 93-2, "Guidance on Flexibility of the 404(b)(1) Guidelines and Mitigation Banking" 11 (August 23, 1993), which provides in relevant part that "The amount of information needed to make such a determination and the level of scrutiny required by the [Section 404(b)(1) Guidelines] is commensurate with the severity of the environmental impact and the scope/cost of the project." It also provides that "[g]enerally, as the scope/cost of the project increases, the level of analysis should also increase." The rules require detailed analysis of alternatives for this proposed project before further consideration of this application.

In this case, "practicable alternatives" clearly are available. For example, the Florida Solar Energy Center promotes roof-top solar as an environmentally sound alternative to producing electricity. (**0011-2** [Bacchus, Sydney])

Response: *The review team conducted its environmental review and prepared this EIS in accordance with the requirements of NEPA, 10 CFR Part 52, and 10 CFR Part 51. The comments appear to be specifically in regard to the USACE's determination of the Least Environmentally Damaging Practicable Alternative (LEDPA) under the CWA. The USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit will*

be documented in a separate USACE ROD after issuance of the EIS. USACE's ROD will reference information in this EIS and present any additional information required by the USACE to support its permit decision. The final evaluation and determination (including the determination of the LEDPA) will be made in the ROD pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements. The actions suggested in this comment fall outside the scope of these guiding regulations, and consequently no changes were made to the EIS.

Comment: Invalidation of State Certification - Ignoring the overwhelming evidence that even the recalibrated model is grossly inadequate (as described in this comment letter and my previous affidavits) the recalibrated model raises the question of whether the state certification has been invalidated. Evidence described and presented in my affidavit, incorporated as Bacchus Exhibit A2, suggests that not only was the state certification based on the original model (determined by NRC and the Corps to be a "poor fit"), but that the Florida's reviewing agencies have not even reviewed the recalibrated model. Consequently, the site certification may have been invalidated by the recalibrated model, rendering the LNP DEIS premature. (**0020-28** [Bacchus, Sydney])

Comment: I would like to provide brief explanation regarding our [Withlacoochee Area Residents, Inc] objection to the Florida CWA Section 401 certification of consistency as related in the PEF Levy DEIS. We do not understand the State's actions in review of the application due to limited scope and the appearance of inconsistent application. (**0037-1** [Hilliard, Dan])

Response: *The issue of the applicant's compliance with the State Conditions of Certification, or compliance with Section 401 of the CWA, is outside the jurisdiction of the NRC and USACE, and must be determined by the State of Florida. The issue raised in this comment is outside the scope of the environmental review process and was not addressed in the EIS.*

Comment: Florida Water Plan 1995 lists several Florida Statutes and Florida Administrative Codes and addresses general issues, water supply, flood protection, flood plain management, water quality, natural systems, coordination and evaluation. The plan of PEF would violate many of these laws. PEF violates the Levy County Comprehensive Plan. (**0001-5-12** [Berger, Betty])

Response: *This comment is not specific and only asserts that PEF violates regulations. The issue of the applicant's compliance with Florida statutes and administrative codes must be determined by the State of Florida. NRC has no jurisdiction. The issues raised in this comment are outside the scope of the environmental review process and were not addressed in the EIS.*

E.1.34 Comments Concerning Issues Outside Scope – NRC and USACE Oversight

Comment: And I have a question for the NRC. If the NRC is neutral, why does the NRC today sound to me like a PR firm for Progress Energy? And why is the NRC so hot on growth in rural

Florida? I used to write environmental impact reports for the Corps of Engineers, and I know that you can't believe everything you see in them. Because basically, what gets published and what gets put out to the public is what not necessarily the people at the agency want to see put out, but what is politically correct. (**0001-11-9** [Minno, Maria])

Response: *The NRC's responsibility is to regulate the nuclear industry to protect the public health and safety within existing policy. The issue raised in this comment is outside the scope of the environmental review process and was not addressed in the EIS.*

Comment: I hear from the Nuclear Regulatory Commission that conservation and efficiency are the same thing. No, they're not. They're not synonymous. Now, see, you people can't reasonably be making a determination on something like these plants when you think that conservation and efficiency mean the same thing (**0002-4-3** [Klutho, Mark])

Response: *This comment provides general information in opposition to the NRC's COL process. The NRC carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment. No changes were made to the EIS as a result of this comment.*

Comment: And as far as the Army Corps of Engineers, I'm just wondering, is this the same group of people who designed the levies in New Orleans, Rodman Dam, and rerouted the rivers going into the Everglades that's caused a lot of the problems down there? (**0002-9-9** [Seiling, Barbara])

Response: *Comment noted. As for the project being evaluated in this EIS, the USACE's final evaluation of the proposed project and final decision whether to issue a USACE permit will be documented in a separate USACE ROD after issuance of the EIS. The USACE's ROD will reference information in the EIS and present any additional information required by the USACE to support its permit decision. The final evaluation and determination in the ROD will be made pursuant to the USACE's statutory authority and regulatory responsibilities under NEPA, the CWA, the 404(b)(1) Guidelines, the USACE's Public Interest Review, and other applicable laws and regulatory requirements.*

E.1.35 Comments Concerning Issues Outside Scope – Safety

Comment: Also, I've seen a tornado go directly over the property where that Progress Energy entrance is up there. (**0001-14-6** [Price, Sally])

Comment: What kind of study has been done on the new nuclear power plant on hurricane? They say they're moving it there because of the hurricanes. Well, I don't think the new power plant, the AP-1000 or whatever, has it been tested for a hurricane? (**0001-7-14** [Smith, Robert])

Comment: When I was an engineer in the reactor building in that -- that was when the Three Mile Island incident happened. We spent a year or so relooking at things, safened it up. The response from the industry, between the nuclear industry and the NRC, was tremendous. The beefing up of the steel. The things that we went back and retrofit to make that a safe plant. (**0001-8-1** [Pantaleo, Greg])

Comment: And God forbid there ever is an accident and there's a radioactive leak. At least we've got a 50 percent chance that the winds may be blowing out to the open water and not inland where the people and plants and fresh water is. So, I think from a safety concern, it would make more sense to put it out in Crystal River. (**0002-5-6** [Jones, Art])

Comment: EPA is requesting additional information on a number of issues including the on-going structural safety analysis of the AP1000 shield building. (**0003-2** [Mueller, Heinz J])

Comment: The NRC is urged not to issue a COL for the Two Unit AP1000 proposed for the Levy County Site because of flawed electrical systems inherent to the AP1000 that fail to meet AP1000 compliance documents as well as NRC safety requirements and regulations. The AP1000 design is flawed because it has failed to comply with the requirements of IEEE Standard 603 requiring the electrical portion of the safety systems that perform safety functions be classified as Class 1E. IEEE Standard 603 is listed by AP1000 as a compliance document with no exceptions; however, AP1000 does not comply with its requirements. IEEE Standard 603 is also endorsed by NRC Regulatory Guide 1.153, and defines the functional requirements of the Safety System, and directs that electrical portions of the Safety System be classified as Class 1E; AP1000 also indicates complete conformance with Regulatory Guide 1.153, but the design fails to comply. The details of flawed electrical of electrical design are found identified in the six attachments of detailed correspondence between Mr. Michael Johnson, NRC Director, New Reactors, and his staff. I had initially written to Mr. Johnson identifying safety flaws in the electrical design of the AP1000, and though a response was received from Mr. Johnson, as well as from Mr. Bergman, Mr. Chopra, and Mr. Jaffe; the final disposition from the Mr. Jaffe was that NRC did not have the time to review every concern that was brought to their attention; and therefore, no further action was planned to be undertaken by the NRC. The safety flaw I have identified in the electrical system of the AP1000 remain open and unresolved and is the basis for requesting that the COL not be issued until the NRC addresses and dispositions this safety concern. (**0022-1** [Baxter, Farouk])

Response: *The issues raised in the comments are outside the scope of the environmental review and were not addressed in the EIS. The safety assessment for the proposed licensing action was provided as part of the application. The NRC is in the process of developing a Safety Evaluation Report that analyzes all aspects of reactor and operational safety. The following are examples of how NRC addresses operational safety issues. NRC maintains resident inspectors at each reactor site. These inspectors monitor the day-to-day operations of the plant and perform inspections to ensure compliance with NRC requirements. In addition, the NRC has an operational experience program, which ensures that the safety issues found at one plant are properly addressed at the others, as appropriate. Finally, the design of any new reactors or storage facility will have already benefitted from lessons learned at existing reactors*

and incorporate new safety features that would be impracticable to backfit onto existing plants. The NRC will only issue a license or permit if it can conclude that there is reasonable assurance: (1) that the activities authorized by the license or permit can be conducted without endangering the health and safety of the public, and (2) that such activities will be conducted in compliance with the rules and regulations of the Commission.

Comment: Our [PEF] most important commitment, though, is to safety. The safety of our customers and our employees. We have worked hard to achieve an outstanding safety and environmental stewardship record at our nearby Crystal River Nuclear Plant, and that performance will continue with our operations of the nuclear facility in Levy County. (**0002-1-8** [Elnitsky, John])

Response: *This comment provides general information in support of the applicant. It does not provide any new information relevant to the environmental review and was not addressed in the EIS.*

Comment: The FEIS should address the status of the Westinghouse AP1000 certification review and related issues, particularly the analysis of the structural integrity of the AP1000. We understand that the Safety Evaluation Report will address these issues in even more detail, and that the certification review may be completed as soon as December 2010. EPA understands that Revision 15 of the AP1000 design is codified in 10 CFR Part 52, Appendix D, and that because the NRC staff is currently reviewing Revision 17, the EIS incorporates results of the review of Revision 15 and insights from the ongoing review of Revision 17. EPA concurs with NRC's plan to conduct an additional environmental review if changes result in the final design being significantly different from the design considered in the DEIS. (**0003-8** [Mueller, Heinz J])

Response: *The issues addressed in this comment involve reactor safety, which is outside the scope of the EIS, and will be addressed in the Safety Evaluation Report. No changes to the EIS as a result of this comment.*

E.1.36 Comments Concerning Issues Outside Scope – Security and Terrorism

Comment: The security is a major problem. How will you guard all four sides of it? (**0001-14-3** [Price, Sally])

Response: *Comments related to security and terrorism are safety issues that are not within the scope of the environmental review. The NRC is devoting substantial time and attention to terrorism-related matters, including coordination with the Department of Homeland Security. As part of its mission to protect public health and safety and the common defense and security pursuant to the Atomic Energy Act, the NRC staff is conducting vulnerability assessments for the domestic use of radioactive material. In the time since September 2001, the NRC has identified the need for license holders to implement compensatory measures and has issued several orders to license holders imposing enhanced security requirements. Finally, the NRC has taken actions to ensure that applicants and license holders maintain vigilance and a high degree of security awareness. Consequently, the NRC will continue to consider measures to*

prevent and mitigate the consequences of acts of terrorism in fulfilling its safety mission. Additional information about the NRC staff's actions regarding physical security since September 11, 2001, can be found on the NRC's public web site (www.nrc.gov).

Comment: It occurs to me that there may be a national security issue. (**0006-1** [Hopkins, Norman])

Response: *Comments related to security and terrorism are safety issues that are not within the scope of the NRC's environmental review. This comment was general in nature and did not provide new information relevant to this EIS; therefore, no changes were made to the EIS.*

Comment: Having large monolithic electric power generation and grid systems exposed to today's cyber-terrorism doesn't make much sense to me. Hydrogen energy storage and PV systems have begun to take on an appeal. (**0006-2** [Hopkins, Norman])

Response: *This comment addresses security and terrorism issues. Safety and terrorism issues are not within the scope of the NRC's environmental review; therefore, no changes were made to the EIS.*

Comment: What safety measures will be put in place to prevent stray bullets from the use of high powered rifles on both of these tracts [Robinson Property and Goethe State Forest] from damaging the plant or the workers on the LNP site? (**0023-10** [Avery-Smith, Ellen] [Smith, Charles])

Comment: What security will be in place to prevent the public or others from using the Goethe State Forest to gain access to the LNP site? (**0023-12** [Avery-Smith, Ellen] [Smith, Charles])

Response: *These comments address plant security issues. Such comments are considered to be safety-related issues that are not within the scope of the NRC's environmental review; therefore, no changes were made to the EIS.*

Comment: Since no longterm repository exists, and is not likely to exist for several decades, high-level radioactive wastes are generally stored at the nuclear plant where they were generated, scattered across the nation. This creates the potential for accidents and terrorist strikes. The transportation of new and spent fuels also creates opportunities for accidents and terrorist attack. Obviously, creating more potential for accidents or attack, by authorizing new nuclear power plants, would not be considered as being in the public's best interest. (**0009-12** [Hubbard, Michael])

Response: *This comment addresses security, terrorism, and plant safety issues. Safety-related issues, including those related to security and terrorism, are not within the scope of the NRC's environmental review; therefore, no changes were made to the EIS.*

E.1.37 General Editorial Comments

Comment: Section 2.4.1.3, Page 2-78, Line 32: "spoon-leavf" should be "spoon-leaf". (**0010-1-11** [Kitchen, Robert])

Comment: Section 2.4.2.1, Page 2-88, Line 16: "CFBC" mislabeled as "CBFC". (**0010-1-12** [Kitchen, Robert])

Comment: Section 2.4.2.1, Page 2-96, Line 12: Need to add space between "stations" and "for". (**0010-1-14** [Kitchen, Robert])

Comment: Section 2.3.3.1, Page 2-32, Line 37: Bunglow Pass should be "Bungalow Pass". (**0010-1-6** [Kitchen, Robert])

Comment: Section 2.4.1.1, Page 2-45, Line 16: "levels" should be singular (or replace with "incidence"). (**0010-1-7** [Kitchen, Robert])

Comment: Section 2.4.1.1, Page 2-46, Line 6: "firelag" should be "fireflag". (**0010-1-8** [Kitchen, Robert])

Comment: Section 2.9.3.1, Page 2-180, Line 9: "Proposed Units 3 and 4" should read "Proposed Units 1 and 2". (**0010-2-3** [Kitchen, Robert])

Comment: Section 2.9.4, Page 2-181, Line 3: "wind direction ambient temperature" should read "wind direction, ambient temperature". (**0010-2-4** [Kitchen, Robert])

Comment: Section 3.4.2.4, Page 3-29, Line 22: Recommend striking "long" from "long spreader swales." Long is too subjective. (**0010-2-7** [Kitchen, Robert])

Comment: Section 5.2.3.1, Page 5-13, line 3: Fischer is misspelled. (**0010-3-1** [Kitchen, Robert])

Comment: Section 5.7.1, Page 5-78, Line 23: The PEF reference should be 2009a rather than 2008a. (**0010-3-10** [Kitchen, Robert])

Comment: Section 5.3.2.1, Page 5-49, Line 31: Change "expected in" to "expected to". (**0010-3-5** [Kitchen, Robert])

Comment: Section 5.4.3,1, Page 5-64, Line 20: Typo: "in the 50 mile region," instead of "in the 50 mi,". (**0010-3-7** [Kitchen, Robert])

Comment: Section 9.2.2.1, Page 9-11, Lines 28-29: NPDES is National Pollutant Discharge Elimination System not "National Pollution Discharge Elimination System" - correct in acronym listing but not in text when introduced. (**0010-4-3** [Kitchen, Robert])

Comment: Section 10, Page 10-1, lines 13-15: Statement should be rewritten as "On August 26, 2009 the Florida Governor and Cabinet (acting as the Siting Board) approved the Site Certification with specified Conditions of Certification for LNP Units 1 and 2, associated facilities, and transmission lines …" (**0010-4-4** [Kitchen, Robert])

Comment: Essential Fish Habitat Assessment, Section 3, Page F-19, Line 6: Text "Error! Reference source not found" inserted into paragraph. (**0010-4-7** [Kitchen, Robert])

Response: *These editorial corrections were incorporated in the EIS.*

Comment: Section 2.4.1.2, Page 2-53, Line 34: Add the word "River" before the word "Management". (**0010-1-10** [Kitchen, Robert])

Response: *The correct name of the organization is the "St. Johns River Water Management District." This editorial correction was incorporated into Section 2.4.1.2 of the EIS.*

Comment: 2.6.2.2 "Minoriy" Population (Volume 2, Contents) correct typo. (**0003-7** [Mueller, Heinz J])

Response: *The editorial correction was made in the EIS Table of Contents.*

Comment: Section 3.5, Page 3-40, Line 28: Reference 10 the SCA application at FDEP website ... it is no longer available online. (**0010-2-9** [Kitchen, Robert])

Response: *The reference was corrected by deleting the sentence referring to a url. This editorial correction was incorporated in the EIS.*

Comment: Essential Fish Habitat Assessment, Section 4.2.2: There is no section 4.2.2 between 4.2.1 and 4.2.3 in Appendix F. (**0010-4-9** [Kitchen, Robert])

Response: *The sections in the EFH were renumbered in the EIS.*

E.2 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20, “Standards for Protection Against Radiation.”

10 CFR Part 50. Code of Federal Regulations, Title 10, Energy, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.”

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

33 CFR Part 320. Code of Federal Regulations, Title 33, *Navigation and Navigable Waters*, Part 320, “General Regulatory Policies.”

33 CFR Part 332. Code of Federal Regulations, Title 33, *Navigation and Navigable Waters*, Part 332, “*Compensatory Mitigation for Losses of Aquatic Resources*.”

40 CFR Part 190. Code of Federal Regulations, Title 40, Protection of Environment, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

40 CFR Part 1508. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 1508, "Chapter V - Council on Environmental Quality, Terminology and Index."

72 FR 57416. October 9, 2007. "Limited Work Authorizations for Nuclear Power Plants." *Federal Register*. U.S. Nuclear Regulatory Commission.

75 FR 81032. December 23, 2010. "Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation" Federal Register. U.S. Nuclear Regulatory Commission.

75 FR 81037. December 23, 2010. "Waste Confidence Decision Update" Federal Register. U.S. Nuclear Regulatory Commission.

75 FR 49539 August 13, 2010. "Notice of Availability of the Draft Environmental Impact Statement for Combined Licenses for Levy Nuclear Plant Units 1 and 2" Federal Register. U.S. Nuclear Regulatory Commission.

Atomic Energy Act of 1954, as amended. 42 USC 2011 et seq.

CH2M HILL Nuclear Business Group (CH2M HILL). 2009. *Aquatic Ecology Sampling Report, Levy Nuclear Plant.* 338884-TMEM-087 Rev. 1, Englewood, Colorado. Accession No. ML091260523.

Clean Water Act. 33 USC 1251 et seq. (Also referred to as the Federal Water Pollution Control Act [FWPCA])

DeSantis, L.R.G., S. Bhotika, F.E. Putz, and K. Williams. 2007. Sea-level rise and drought interactions accelerate forest decline on the Gulf Coast of Florida, USA. Global Change Biology 13:2349-2360.

Entrix. 2010. Progress Energy Florida – Levy Nuclear Plant and Associated Transmission Lines Wetland Mitigation Plan. PA08-51B. April 23, 2010.

Environmental Services, Inc. and Taylor Engineering, Inc. (EIS and TEI). 2011. *Levy Nuclear Plant and Associated Transmission Lines Wetland Mitigation Plan Comprehensive Design Document.* Jacksonville, Florida. Accession No. ML11308A066

Florida Administrative Code (Fla. Admin. Code) 40D-4.301. 2009. "Conditions for Issuance of Permits." *Florida Administrative Code Annotated*.

Florida Administrative Code (Fla. Admin. Code) 40D-4.302. 2009. "Additional Conditions for Issuance of Permits." *Florida Administrative Code Annotated*.

Florida Administrative Code (Fla. Admin. Code) 62-345 "*Uniform Mitigation Assessment Method*." *Florida Administrative Code Annotated.*

Florida Department of Environmental Protection (FDEP). 2009. Letter from Mr. Michael Halpin, Florida Department of Environmental Protection, to Dr. Stuart Santos, U.S. Army Corps of Engineers, dated September 8, 2009, regarding Levy Nuclear Plant PA08-51 Water Quality Certification. Accession No. ML12073A194.

Florida Department of Environmental Protection (FDEP). 2011a. Letter from Mr. Michael Halpin, Florida Department of Environmental Protection, to Dr. Stuart Santos, U.S. Army Corps of Engineers, dated February 18, 2011, regarding Levy Nuclear Plant PA08-51C Water Quality Certification. Accession No. ML12073A194.

Florida Department Of Environmental Protection (FDEP). 2011b. *Conditions of Certification, Progress Energy Florida Levy Nuclear Power Plant*. PA08-51C. Modified January 25, 2011. Available at http://www.dep.state.fl.us/siting/files/certification/pa08_51_2010_C.pdf.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008a. Gopher Tortoise Permitting Guidelines. Approved September 2007. Tallahassee, Florida. Available at http://www.nbbd.com/gophertortoise/0804-PermitGuidelines.pdf.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008. Bald Eagle Management Plan (*Haliaeetus leucocephalus*). Adopted April 9, 2008. Tallahassee, Florida. Available at http://myfwc.com/docs/WildlifeHabitats/Eagle_Plan_April_2008.pdf.

Florida Public Service Commission (FPSC). 2008. *Final Order Granting Petition for Determination of Need for Proposed Nuclear Power Plants*. Final Order PSC-08-0518-FOF-EI, Docket No. 080148-EI dated August 12, 2008. Accessed April 29, 2009 at http://www.psc.state.fl.us/dockets/orders/SingleDisplay.aspx?OrderNumber=PSC-08-0518&Method=ByNumber.

Florida State Historic Preservation Office (Florida SHPO). 2010. Letter from Laura Kammerer, Florida SHPO, to the Nuclear Regulatory Commission, dated September 20, 2010, regarding the Draft Environmental Impact Statement (DEIS) for the Combined Licenses for Levy Nuclear Plant Units 1 and 2: Draft Comment, Levy County. Accession No. ML102740568.

Hopkins, N. and D. Hopkins. 2010. *Submission by Norman Hopkins and David Hopkins*. Accession No. ML102860837.

Inglis Hydropower, LLC. (Inglis). 2009. *Before the Federal Energy Regulatory Commission, Application for License for a Minor Water Power Project, Inglis Hydropower Project, No. 12783*. Inglis Hydropower, LLC., Dover, Florida.

International Commission on Radiological Protection (ICRP). 2004. "Doses to Infants from Ingestion of Radionuclides in Mother's Milk." ICRP Publication 95. Ann ICRP 34(3-4).

Marine Mammal Protection Act of 1972 as amended. 16 USC 31 et seq.

Mortellaro, S., S. Krupa, L. Fink and J. VanArman. 1995. Literature Review on the Effects of Groundwater Drawdowns on Isolated Wetlands. South Florida Water Management District, West Palm, Florida. 44 pp.

National Academy of Sciences, National Academy of Engineering, and National Research Council of the National Academies. 2010. *Electricity from Renewable Resources --- Status, Prospects, and Impediments*. The National Academies Press. Washington, D.C.

National Cancer Institute (NCI). 1990. Cancer in Populations Living Near Nuclear Facilities. National Institutes of Health, Washington, D.C.

National Environmental Policy Act of 1969, as amended (NEPA). 42 USC 4321 et seq.

National Historic Preservation Act of 1966 (NHPA). 16 USC 470 et seq.

National Marine Fisheries Service (NMFS) 2010. Letter from Mr. Miles M. Croom, NMFS, to NRC, U.S. Army Corps of Engineers, dated October 26, 2010, regarding review of the Levy Nuclear Plant Draft Environmental Impact Statement and Essential Fish Habitat Assessment.

National Marine Fisheries Service (NMFS). 2010. Letter from Roy E. Crabtree, NMFS, to NRC, dated November 26, 2010, regarding Levy Nuclear Plants Units 1 and 2.

NOAA 2010. *Tampa Bay Area, FL – Temperatures ≤ 32°F in Tampa, Florida, Number of Days Each Month*. Accessed May 17, 2010 at http://www.srh.noaa.gov/tbw/?n=tpa32orless. Accession No. ML101930592.

Progress Energy Florida (PEF). 2008a. LWA part of Rev. 0 appl. Accession No. ML082261380.

Progress Energy Florida (PEF). 2008b. *Archaeological and Cultural Resources*. 2 EVC-SUBS-00105, Revision 1. Accession No. ML090760294.

Progress Energy Florida, Inc. (PEF). 2009a. Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage. Revision 1, St. Petersburg, Florida. Accession No. ML092860995.

Progress Energy Florida, Inc. (PEF). 2009d. Letter from Gary Miller, Progress Energy Carolinas, to NRC, dated June 12, 2009, regarding Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review. Accession No. ML091740487.

Progress Energy Florida, Inc. (PEF). 2009c. Letter from Gary Miller, Progress Energy Carolinas, to NRC, dated August 31, 2009, regarding Supplement Information Related to Environmental Review- Figure Native Files and CREC 1993/1994 Annual Salt Drift Report. Accession No. ML092470545.

Progress Energy Florida (PEF). 2009b. Letter from Garry Miller, Progress Energy Carolinas, to the NRC, dated May 1, 2009, regarding Notification to Withdraw Request for a Limited Work Authorization, Levy Nuclear Plant, Units 1 and 2 Accession No. ML091250350.

Progress Energy Florida (PEF). 2009e. Letter from John Elnitsky (PEF, Vice President, Nuclear Plant Development) to U.S. Nuclear Regulatory Commission dated December 4, 2009 in response to letter from Donald Habib (NRC) dated November 4, 2009, "Levy Nuclear Plant, Units 1 and 2, Docket Nos. 52-029 and 52-030, Response to Request for Additional Information Letter No. 073 Related to Solid Waste Management System." NPD-NRC-2009-241. Accession No. ML093450353.

Progress Energy Florida, Inc. (PEF). 2010. Letter from Robert H. Kitchen, PEF, to NRC, dated October 25, 2010, regarding Comments on Draft Environmental Impact Statement for the Levy Nuclear Plants Units 1 and 2 (75 FR 49539-August 13, 2010).

Progress Energy Florida, Inc. (PEF). 2011a. *Levy Nuclear Plant Units 1 and 2 COL Application, Part 2, Final Safety Analysis Report.* Revision 3, St. Petersburg, Florida. Accession No. ML11308A011.

Progress Energy Florida, Inc. (PEF). 2011b. Letter from Robert Kitchen, PEF to Osvaldo Collazo, USACE, dated October 20, 2011, regarding response #3 to Corps Position Letter dated June 23, 2011. Accession No. ML113010076.Progress Energy Florida, Inc. (PEF). 2011c. Letter from Robert Kitchen, PEF to Osvaldo Collazo, USACE, dated September 20, 2011, regarding response #1 to Corps Position Letter dated June 23, 2011. Accession No. ML11298A331.

Progress Energy Florida, Inc. (PEF). 2011d. Letter from Robert Kitchen, PEF to Osvaldo Collazo, USACE, dated November 10, 2011, regarding response #5 to Corps Position Letter dated June 23, 2011. Accession No. ML11335A255.

Public Service Company of New Hampshire (Seabrook Station, Units 1 & 2), CLI-77-8, 5 NRC 503, 526 (1977), aff'd, New England Coalition on Nuclear Pollution v. NRC, 582 F.2d 87 (1st Cir. 1978)

Rivers and Harbors Appropriation Act of 1899, as amended. 33 USC 403 et seq.

Suwannee River Water Management District (SRWMD). 2010. Water Supply Assessment. Accessed December 14, 2011 at http://www.srwmd.state.fl.us/documents/Water%20Resources/Water%20Supply%20Planning/SRWMD_WSAR_120610.PDF.

U.S. Army Corps of Engineers (USACE). 2011a. Letter from Donald W. Kinard, USACE, to Jamie Hunter, PEF, dated January 3, 2011, regarding Jurisdictional Verification, Blowdown Pipeline Route 2. Accession No. ML110060190.

U.S. Army Corps of Engineers (USACE). 2011b. Letter from Donald W. Kinard, USACE, to John J. Hunter, PEF, dated March 2, 2011, regarding Approved Jurisdictional Verification (PEF/LNP Site – North, South and Access Parcels). Accession No. ML110660224.

U.S. Army Corps of Engineers (USACE). 2011c. Letter from Donald W. Kinard, USACE, to Robert Kitchen, PEF, dated November 1, 2011, regarding Approved Jurisdictional Verification (PEF/LNP Site – Transmission Lines). Accession No. ML113080018.

U.S. Army Corps of Engineers (USACE). 2011d. Letter from Osvaldo Collazo, USACE, to John Elnitsky, PEF, dated June 23, 2011, regarding Levy position letter of requests for response to comments and questions. ML111751510.U.S. Department of the Army and Environmental Protection Agency (USDA and EPA). 1989. Memorandum of Agreement: Between the Department of the Army and the Environmental Protection Agency Concerning the Determination of the Section 404 Program and the Application of the Exemptions Under Section 404(F) of the CWA. January 19, 1989.

U.S. Department of Energy (DOE). 2002. *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*. DOE/EIS-0250, Office of Civilian Radioactive Waste Management, Washington, D.C. [Transportation Reference from Steve Maheras]

U.S. Fish and Wildlife Service (FWS). 2007. National Bald Eagle Management Guidelines. Washington, D.C. Available at http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf. Accession No. ML101960349.

U.S. Fish and Wildlife Service (FWS). 2011. Letter from Ms. Annie Dziergowski, U.S. Fish and Wildlife Service, to Chief, Rulemaking and Directives Branch, U.S. Nuclear Regulatory Commission, regarding Biological Opinion for Levy Nuclear Power Plant Units 1 and 2, Application for Combined Licenses (COLs) for Construction Permits and Operating Licenses, (NUREG-1941) ML113530504.

U.S. Geological Survey (USGS). 2009. Streamflow for Old Withlacoochee River near Inglis Dam recorded by the U.S. Geological Survey (USGS) from October 1, 1969 through September 5, 2009. Washington, D.C. Accessed at http://waterdata.usgs.gov/usa/nwis/uv?site_no=02313230

U.S. Global Change Research Program (GCRP). 2009. Global Climate Change Impacts in the United States. T.R. Karl, J.M. Melillo, and T.C. Peterson, eds. Cambridge University Press, New York. Available at http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf.

U.S. Nuclear Regulatory Commission (NRC). 1976. Preferred Alternative Closed-Cycle Cooling System. NUREG-0038. Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1996. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. NUREG-1437. Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2000. Environmental Standard Review Plan — Standard Review Plans for Environmental Reviews for Nuclear Power Plants. NUREG-1555, Vol. 1, Washington, D.C. Includes 2007 revisions.

U.S. Nuclear Regulatory Commission (NRC). 2007a. Meteorological Monitoring Programs for Nuclear Power Plants. Regulatory Guide 1.23, Rev. 1. Washington D.C. ML092640178.

U.S. Nuclear Regulatory Commission (NRC). 2007b. *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition*, NUREG-0800. Office of Nuclear New Reactors. Washington D.C.

U.S. Nuclear Regulatory Commission (NRC). 2010. *Draft Environmental Impact Statement for Combined Licenses (COLs) for Levy Nuclear Plant Units 1 and 2; Draft Report for Comment.* NUREG-1941. Office of New Reactors. Washington, D.C. Accession No. ML102140231.

Appendix F

Key Consultation Correspondence

Appendix F

Key Consultation Correspondence

Table F-1 identifies correspondence received during the evaluation process for the combined construction permit and operating license (COL) application for the siting of two new nuclear units, Levy Nuclear Plant (LNP) Units 1 and 2, in Levy County, Florida. In addition, full copies of the Biological Assessments and Essential Fish Habitat documents are included in this appendix.

Table F-1. Key Consultation Correspondence

Source	Recipient	Date of Letter
Section 106 Consultation		
Advisory Council on Historic Preservation		
U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	Advisory Council on Historic Preservation (Mr. Don Klima)	November 6, 2008 (ML082740502)
Advisory Council on Historic Preservation (Ms. Charlene Dwin Vaughn)	U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	February 9, 2009 (ML090620074)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Advisory Council on Historic Preservation (Mr. John M. Fowler)	August 5, 2010 (ML101960003)
Florida Division of Historical Resources		
U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	Florida Division of Historical Resources (Mr. Frederick Gaske)	November 5, 2008 (ML082740519)
Florida Division of Historical Resources (Mr. Frederick Gaske)	U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	December 11, 2008 (ML090650566)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Florida Division of Historical Resources (Mr. Frederick Gaske)	August 5, 2010 (ML101980006)
Florida Division of Historical Resources (Mr. Scott Stroh)	U.S. Nuclear Regulatory Commission	September 20, 2010 (ML102740568)
Progress Energy Florida (Mr. Robert Kitchen)	Florida Division of Historical Resources (Ms. Laura Kammerer)	May 13, 2011 (ML111990144)
Progress Energy Florida (Mr. Robert Kitchen)	Florida Division of Historical Resources (Ms. Laura Kammerer)	December 14, 2011 (ML113530213)
Florida Division of Historical Resources (Ms. Laura Kammerer)	Progress Energy Florida (Mr. Robert Kitchen)	January 31, 2012 (ML12045A090)

Table F-1. (contd)

Source	Recipient	Date of Letter
Native American Tribes		
U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	Miccosukee Tribe (Honorable Chairman Billy Cypress)	November 5, 2008 (ML082740531)
U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	Seminole Tribe of Florida (Honorable Chairman Mitchell Cypress)	November 5, 2008 (ML082740536)
The Miccosukee Tribe of Indians of Florida (Mr. Steve Terry)	U.S. Nuclear Regulatory Commission (Ms. Jessie Muir)	December 10, 2008 (ML090120781)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Miccosukee Tribe (Mr. Steve Terry)	August 25, 2009 (ML092120229)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Perdido Bay Tribe (Chief Micco Bobby Johns Bearheart)	August 31, 2009 (ML092120271)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Seminole Nation of Oklahoma (Chief Leonard Haro)	May 27, 2010 (ML101310622)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Muscogee Nation of Florida (Chairwoman Anne Tucker)	May 27, 2010 (ML101370530)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)`	Seminole Tribe of Florida (Honorable Mitchell Cypress)	August 5, 2010 (ML101980004)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Perdido Bay tribe, Southeastern Lower Muscogee Creek Indians (Chief Bobby Johns Bearheart)	August 5, 2010 (ML101980005)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Seminole Nation of Oklahoma (Chief Leonard Harjo)	August 5, 2010 (ML101980002)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Muscogee Nation of Florida (Honorable Ann D. Tucker)	August 5, 2010 (ML101980003)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	Miccosukee Tribe (Mr. Steve Terry)	August 5, 2010 (ML101970275)
U.S. Nuclear Regulatory Commission (Mr. Douglas Bruner)	Seminole Tribe of Florida (Mr. Craig Tepper)	November 2, 2010 (ML103370719)
Seminole Tribe of Florida (Mr. Craig Tepper)	U.S. Nuclear Regulatory Commission (Mr. Douglas Bruner)	November 5, 2010 (ML103370721)
U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	U.S. Nuclear Regulatory Commission (Mr. Douglas Bruner)	December 2, 2010 (ML103370545)
U.S. Nuclear Regulatory Commission (Mr. Allen Fetter)	Seminole Tribe of Florida (Mr. Willard Steele, Tribal Historic Preservation Officer)	April 12, 2011 (ML110970618)
U.S. Nuclear Regulatory Commission (Mr. Allen Fetter)	Seminole Tribe of Florida (Mr. Craig Tepper)	April 12, 2011 (ML110970624)

Table F-1. (contd)

Source	Recipient	Date of Letter
U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	Seminole Tribe of Florida (Mr. Willard Steele, Tribal Historic Preservation Officer)	May 24, 2011 (ML111721679)
U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	Seminole Tribe of Florida (Ms. Anne Mullins and Mr. Elliott York)	May 24, 2011 (ML11172A220)
Seminole Tribe of Florida (Mr. Willard Steele, Tribal Historic Preservation Officer)	U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	June 20, 2011 (ML11172A221)
U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	Seminole Tribe of Florida (Ms. Anne Mullins and Mr. Elliott York)	February 8, 2012 (ML12039A198)
Ecological Consultation		
U.S. Fish and Wildlife Service		
U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	U.S. Fish and Wildlife Service (Mr. Jay Herrington)	November 5, 2008 (ML082750418)
U.S. Fish and Wildlife Service (Mr. Dave Hankla)	U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	February 9, 2009 (ML090720063)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	U.S. Fish and Wildlife Service (Ms. Linda Walker)	August 5, 2010 (ML102020483)
Progress Energy Florida (Ms. Amy C. Dierolf)	U.S. Nuclear Regulatory Commission (Mr. Douglas Bruner), U.S. Fish and Wildlife Service (Ms. Stefanie Barrett),and U.S. Fish and Wildlife Service (Mr. Al Bagozo)	January 10, 2011 (ML110700543)
Progress Energy Florida (Ms. Amy C. Dierolf)	U.S. Nuclear Regulatory Commission (Mr. Douglas Bruner), U.S. Fish and Wildlife Service (Ms. Stefanie Barrett),and U.S. Fish and Wildlife Service (Mr. Al Bagozo)	February 3, 2011 (ML110700676)
Progress Energy Florida (Ms. Amy C. Dierolf)	U.S. Nuclear Regulatory Commission (Mr. Douglas Bruner), U.S. Fish and Wildlife Service (Ms. Stefanie Barrett),and U.S. Fish and Wildlife Service (Mr. Al Bagozo)	February 10, 2011 (ML110700560)
Progress Energy Florida (Mr. Robert Kitchen)	U.S. Fish and Wildlife Service (Ms. Annie Dziergowski)	April 25, 2011 (ML111790029)
Progress Energy Florida (Mr. Robert Kitchen)	U.S. Fish and Wildlife Service (Ms. Annie Dziergowski)	May 31, 2011 (ML111380330)
Progress Energy Florida (Mr. Robert Kitchen)	U.S. Fish and Wildlife Service (Ms. Annie Dziergowski)	September 14, 2011 (ML112760086)
Progress Energy Florida (Mr. Robert Kitchen)	U.S. Fish and Wildlife Service (Ms. Annie Dziergowski)	November 4, 2011 (ML113080814)

Table F-1. (contd)

Source	Recipient	Date of Letter
U.S. Fish and Wildlife Service (Ms. Annie Dziergowski)	U.S. Nuclear Regulatory Commission	December 1, 2011 (ML113530504)
U.S. National Marine Fisheries Service		
U.S. Nuclear Regulatory Commission (Mr. Gregory Hatchett)	U.S. National Marine Fisheries Service (Mr. David Bernhart)	November 5, 2008 (ML082750414)
U.S. National Marine Fisheries Service (Mr. Mark Sramek)	U.S. Nuclear Regulatory Commission (Mr. Michael Masnik)	November 24, 2008 (ML091180043 and ML091180051)
U.S. National Marine Fisheries Service (Mr. Robert Hoffman)	U.S. Nuclear Regulatory Commission	December 11, 2008 (ML083510905)
U.S. National Marine Fisheries Service (M:s. Shelley Norton)	U.S. Nuclear Regulatory Commission/Pacific NW National Laboratory (Ann Miracle)	December 17, 2008 (ML090120793)
U.S. National Marine Fisheries Service (Mr. Miles Croom)	U.S. Army Corps of Engineers (Colonel Paul Grosskruger)	March 23, 2009 (ML091230014)
U.S. National Marine Fisheries Service (Mr. Miles Croom)	U.S. Army Corps of Engineers (Colonel Paul Grosskruger)	May 6, 2009 (ML 091320681)
U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf)	U.S. National Marine Fisheries Service (Mr. David Bernhart)	August 5, 2010 (ML102020516)
U.S. National Marine Fisheries Service (Mr. Miles Croom)	U.S. Army Corps of Engineers (Colonel Alfred A Pantano)	September 3, 2010 (ML110070856)
U.S. Army Corps of Engineers (Colonel Alfred A Pantano)	U.S. National Marine Fisheries Service (Mr. Miles Croom)	September 13, 2010 (ML110070856)
U.S. National Marine Fisheries Service (Mr. Miles Croom)	U.S. Nuclear Regulatory Commission (Ms. Cindy Bladely) and U.S. Army Corps of Engineers (Colonel Alfred A Pantano)	October 26, 2010 (ML103080057)
U.S. National Marine Fisheries Service (Mr. Roy Crabtree)	U.S. Nuclear Regulatory Commission (Mr. Robert Schaaf) and U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	November 26, 2010 (ML103370190)
U.S. Army Corps of Engineers (Mr. Gordon Hambrick)	U.S. National Marine Fisheries Service (Mr. Miles Croom)	December 10, 2010 (ML110120632)
U.S. Nuclear Regulatory Commission (Mr. Scott Flanders)	U.S. National Marine Fisheries Service (Mr. Miles Croom)	December 22, 2010 (ML103190723)

Essential Fish Habitat Assessment

National Marine Fisheries Service

Levy Nuclear Plant Units 1 and 2
Combined License Application

U.S. Nuclear Regulatory Commission
Docket Nos. 52-029 and 52-030

U.S. Army Corps of Engineers
Permit Application

Levy County, Florida

August 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Jacksonville District

1.0 Introduction

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 USC 1801 et seq.) identified the importance of habitat protection to healthy fisheries. The amendments, known as the Sustainable Fisheries Act of 1996 (Public Law 104-297), strengthened the governing agencies' authority to protect and conserve the habitat of marine, estuarine, and anadromous animals (Gulf of Mexico Fishery Management Council [GMFMC] 2004). Essential fish habitat (EFH) is defined as the waters and substrate necessary for spawning, breeding, feeding, or growth to maturity. Identifying EFH is an essential component in the development of fishery management plans (FMPs) to evaluate the effects of habitat loss or degradation on fishery stocks and take actions to mitigate such damage. This responsibility was expanded by the National Marine Fisheries Service (NMFS) to ensure additional habitat protection (NMFS 1999). The consultation requirements of Section 305(b) of the MSFCMA provide that Federal agencies consult with the Secretary of Commerce on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH.

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from Progress Energy Florida, Inc. (PEF) for NRC-authorized combined construction permits and operating licenses (COLs) to construct and operate two new nuclear power reactors on a greenfield site in Levy County, Florida. The U.S. Army Corps of Engineers (USACE) is reviewing an application from PEF for a Department of the Army (DA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Federal Water Pollution Control Act (Clean Water Act) to perform site-preparation activities and supporting facilities at the site for a proposed nuclear power-generation station with two Westinghouse Electric Company, LLC (Westinghouse) AP1000 pressurized water reactors (Units 1 and 2). The USACE is cooperating with the NRC to ensure to the maximum extent practicable that the information presented in a single environmental impact statement (EIS), prepared under the National Environmental Policy Act of 1969, as amended (NEPA) document, is adequate to fulfill the requirements of USACE regulations; the Clean Water Act Section 404(b)(1) guidelines, which contain the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into waters of the United States; and the USACE public-interest review process. Decisions by the NRC to issue the COLs and the USACE to issue a DA permit will be made following issuance of the final EIS.

The proposed Levy Nuclear Plant (LNP) Units 1 and 2 would be located on a greenfield site (Figure 1-1). The LNP site is in Levy County, Florida, approximately 10 mi northeast of the Crystal River Energy Complex (CREC), an energy facility also owned by PEF, and 30 mi due west of Ocala, Florida. This EFH assessment examines the potential impacts of the proposed actions on species listed in Table 1-1. These species are described further in Section 4.0, and the impacts to them are discussed in Section 5.0.

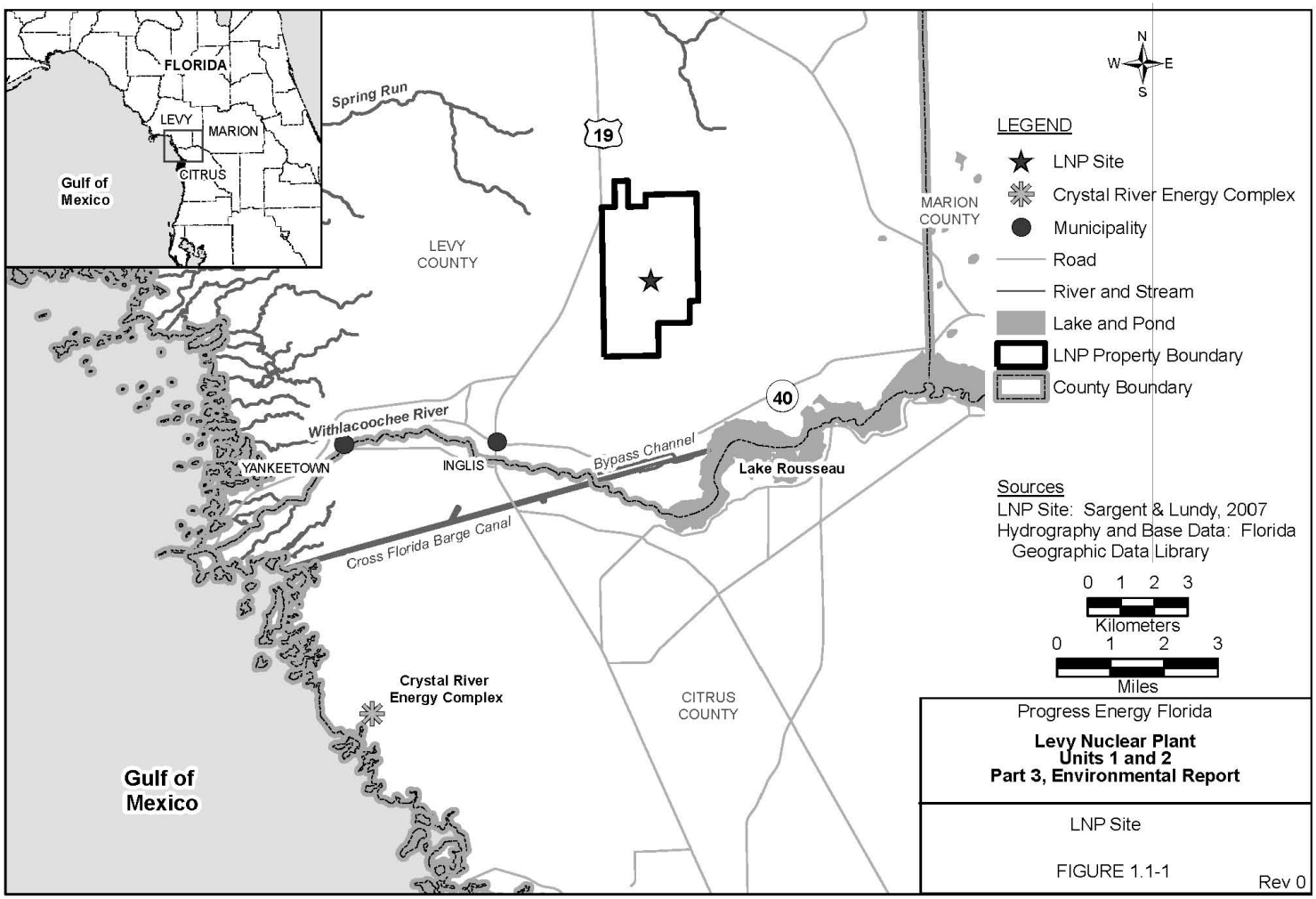

Figure 1-1. Location of the LNP Site (PEF 2009a)

The review team is aware of recent events in the Gulf of Mexico associated with the Deepwater Horizon oil spill. To date, information associated with aquatic and terrestrial resources are preliminary and inconclusive. Although not included in this EFH, the review team will consider information associated with the oil spill for the LNP project as it becomes available.

Table 1-1. Ecoregion 2 Designated EFH for Gulf of Mexico Fishery Management Council Managed Species

Common Name	Species	System	Life Stage
Spanish mackerel	*Scombermorus maculatus*	Estuarine/marine marine	Adults Eggs, larvae, juveniles
Gray triggerfish	*Balistes capriscus*	Marine	Eggs, larvae, juveniles
Golden tilefish	*Lopholatilus chamaeleonticeps*	Marine	Eggs, larvae, juveniles
Goldface tilefish	*Caulolatilus chrysops*	Marine	Eggs, larvae
Blueline tilefish	*Caulolatilus microps*	Marine	Eggs, larvae
Banded rudderfish	*Seriola zonata*	Marine	Larvae, juveniles
Almaco jack	*Seriola rivoliana*	Marine	Eggs, juveniles
Hogfish	*Lachnolaimus maximus*	Estuarine/marine	Juveniles
Lesser amberjack	*Seriola fasciata*	Marine	Eggs, larvae, juveniles
Greater amberjack	*Seriola dumerili*	Marine	Eggs, larvae, juveniles
Dwarf sand perch	*Diplectrum bivittatum*	Marine	Juveniles
Schoolmaster	*Lutjanus apodus*	Marine estuarine/marine	Eggs, larvae Juveniles
Gray (mangrove) snapper	*Lutjanus griseus*	Marine marine/estuarine estuarine/marine	Eggs larvae, juveniles, adults
Vermillion snapper	*Rhomboplites aurorubens*	Marine	Eggs, juveniles, adults
Red snapper	*Lutjanus campechanus*	Marine	Eggs, larvae, juveniles, adults
Dog snapper	*Lutjanus jocu*	Marine estuarine/marine	Eggs, larvae juveniles
Blackfin snapper	*Lutjanus buccanella*	Marine	Eggs, juveniles
Lane snapper	*Lutjanus synagris*	Marine estuarine/marine	Eggs larvae, juveniles
Yellowtail snapper	*Ocyurus chrysurus*	Marine marine/estuarine	Eggs, adults juveniles
Scamp	*Mycteroperca phenax*	Marine	Eggs, larvae, juveniles

Table 1-1. (contd)

Common Name	Species	System	Life Stage
Speckled hind	*Epinephelus drummondhayi*		
Rock hind	*Epinephelus adscensionis*	Marine	Eggs, larvae, juveniles
Red hind	*Epinephelus guttatus*	Marine	Eggs, larvae, juveniles
Yellowedge grouper	*Epinephelus flavolimbatus*	Marine	Eggs, larvae, juveniles, adults
Warsaw grouper	*Epinephelus nigritus*	Marine	Eggs, larvae, juveniles
Nassau grouper	*Epinephelus striatus*	Marine	Eggs, larvae, juveniles
Red grouper	*Epinephelus morio*	Marine marine/estuarine	Eggs, larvae, adults juveniles
Black grouper	*Mycteroperca bonaci*	Marine estuarine/marine marine/estuarine	Eggs, larvae juveniles adults
Gag grouper	*Mycteroperca microlepis*	Marine marine/estuarine	Eggs, larvae, adults juveniles
Red drum	*Sciaenops ocellatus*	Marine estuarine marine/estuarine	Eggs larvae, postlarvae, juveniles, adults
White shrimp	*Litopenaeus setiferus*	Marine estuarine/marine estuarine	Eggs larvae juveniles
Pink shrimp	*Farfantepenaeus duorarum*	Marine Estuarine	Eggs, larvae, adults Juveniles
Florida stone crab	*Menippe mercenaria*	Estuarine/marine	Eggs, larvae, juveniles
Gulf stone crab	*Menippe adina*	Estuarine/marine estuarine	Eggs, larvae juveniles
Coral	classes Hydrozoa and Anthozoa	Marine	All stages

Source: NMFS 2008

2.0 Environmental Setting

The proposed LNP site is located in a primarily rural area in Levy County, approximately 4 mi northeast of the town of Inglis and approximately 8 mi east of the Gulf of Mexico (Figure 1-1). The LNP site is currently a greenfield site approximately 3105 ac in size. The LNP footprint would occupy 300 ac for two reactors and the associated power production infrastructure near

the center of the site (Figure 2-1). Two AP1000 reactors are proposed with an electrical output of 1000 MW(e) and 3415 MW(t) each. The waterbodies associated with, or potentially affected by, the action are the Cross Florida Barge Canal (CFBC), the Old Withlacoochee River (OWR)(a remnant arm of the Withlacoochee River) downstream of the Inglis Dam, and the Crystal Bay area of the Gulf of Mexico associated with the CREC. The CFBC and OWR waters are estuarine due to the lower salinities attributed to the freshwater resources from Lake Rousseau.

2.1 Cross Florida Barge Canal

In an effort to provide maritime navigation between the Atlantic Ocean and the Gulf of Mexico, construction of a 12-ft-deep by 150-ft-wide Florida cross-peninsular waterway began in the mid-1930s (Noll and Tegeder 2003). Originally intended to be a 171-nautical-mi canal, only 4 percent was complete by 1965 due to lack of funding and congressional support for several decades. Continued local opposition and lack of government funding eventually prompted an injunction that halted the construction in 1971, leaving a western portion from the newly constructed Inglis Lock to the Gulf of Mexico and an eastern stretch forming Lake Ocklawaha between the St. Johns Lock and Rodman Dam. Official deauthorization for the barge canal came in 1991, and the Cross Florida Greenway State Recreation and Conservation Area took over the former barge canal properties. In 1998, the canal and lands associated were renamed the Marjorie Harris Carr Cross Florida Greenway and Conservation Area (Noll and Tegeder 2003). The section of western CFBC affiliated with the proposed action is the 7.4-mi stretch from Inglis Lock west to the Gulf of Mexico. It ranges in depth from 8.6 to 18.2 ft and in width from 207 to 262 ft. The Inglis Lock is currently no longer functional, and allows some leakage of freshwater from Lake Rousseau into the CFBC (FDEP 2005). The Inglis Dam was built in 1909 to impound the Withlacoochee River to form 3700-ac Lake Rousseau. An approximately 1.5-mi portion of the historical downstream segment of the OWR runs into the western CFBC below the Inglis Lock. A 1.7-mi channel was constructed upstream of the Inglis Lock to reconnect Lake Rousseau waters with the downstream 11-mi portion of the Withlacoochee River, serving as a bypass around the CFBC. The CFBC lies 8 mi to the south of the proposed LNP site and is the preferred source for cooling water (Figure 2-1).

The CFBC discharges into the Withlacoochee Bay estuary in the Gulf of Mexico and is influenced by tidal changes. The CFBC is not designated as an Outstanding Florida Water as defined by Florida Administrative Code (FAC) 62-302.700. The CFBC is influenced by tidal salt water from the Gulf of Mexico, freshwater contributions from subsurface springs, leakage of Lake Rousseau waters through the Inglis Lock, and periodic releases of freshwater from Lake Rousseau over the Inglis Dam downstream to the OWR (CH2M Hill 2009a).

Water-quality characteristics show a wedge of salt water extending from the surface waters where the CFBC meets the Gulf of Mexico up toward the Inglis Lock, where persistent salinities

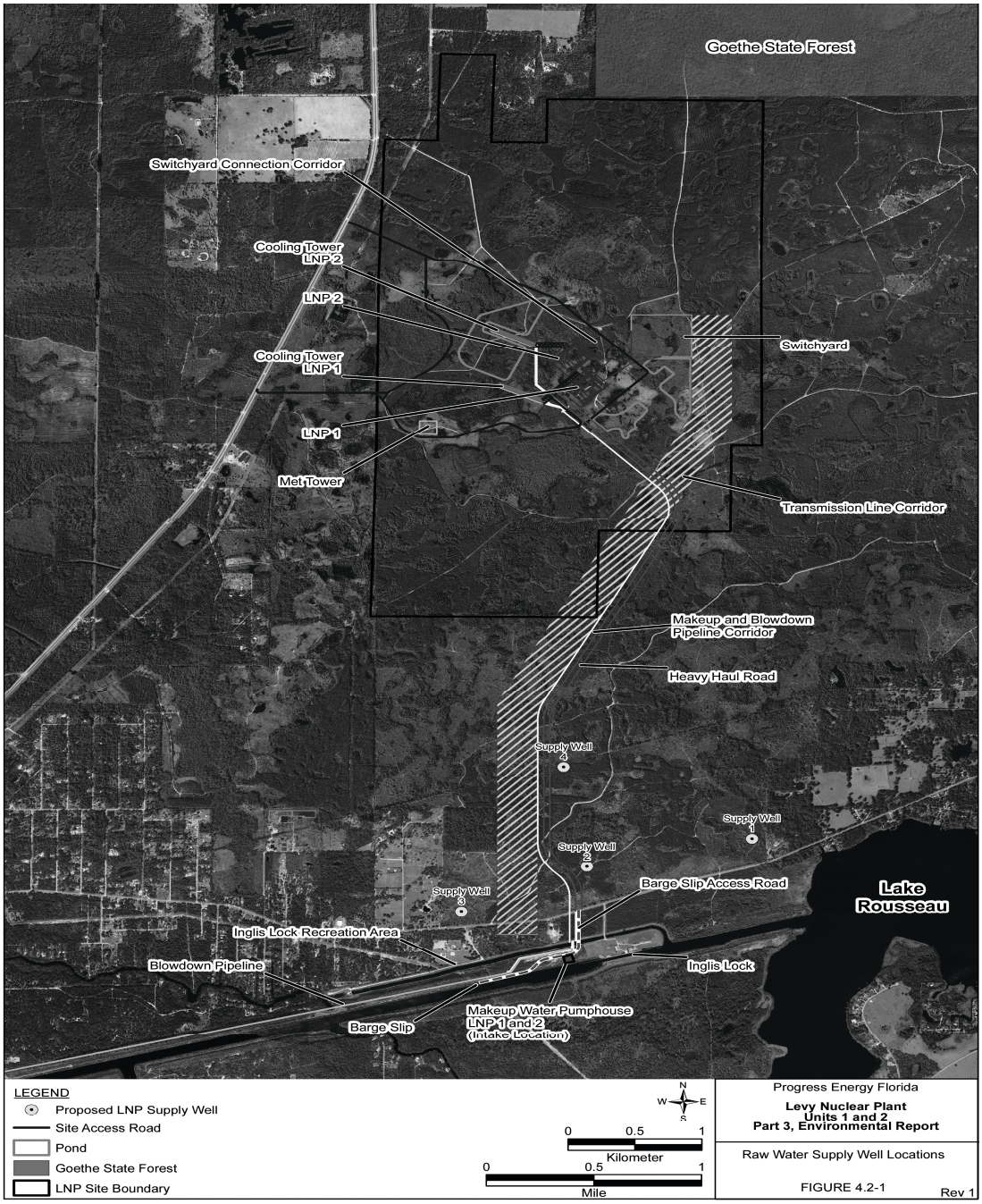

Figure 2-1. LNP Site Map (PEF 2009a)

range from an average of 5.75 practical salinity scale (pss) units at the surface to 16.87 pss at a depth of 4 m, and salinities just outside the mouth of the CFBC average 17.83 pss at the surface and 25.91 pss at 4 m (CH2M Hill 2009b). Sediment profiles for the CFBC within the 7.4-mi stretch from the Inglis Lock to the Gulf of Mexico are predominated by 49.2 to 60.7 percent silt, 17.1 percent sand, and 28.6 percent clay. Just 0.5 mi outside the mouth of the CFBC, the sediment profile shifts dramatically to primarily sand (average 83 percent) as is common with nearshore estuarine habitat (CHM2 Hill 2009b).

Analytical chemistry analyses of water samples taken along the length of the CFBC show a general trend of decreasing total organic carbon and increasing dissolved oxygen from the Inglis Lock to the nearshore Gulf of Mexico. Over 30 samples were taken at four stations along the length of the CFBC over the course of a year (October 2007 – November 2008) (CH2M Hill 2009b). Ammonia, nitrate, total nitrogen, organophosphate, total phosphate, and chlorophyll a concentrations were slightly elevated near the location of the proposed intake compared to the further downstream CFBC and nearshore sampling locations, with the exception of higher levels of chlorophyll a at Station 2 compared to Station 1 (Figure 2-2). Total suspended solids tended to be more concentrated moving from Station 1 to the nearshore sampling stations. Surface water quality is discussed in EIS Section 2.3.3.1.

Species sampling results in the CFBC from October 2007 to September 2008 are presented in EIS Section 2.4.2.1 and provided below in Table 2-1 and Table 2-2. Species abundance and diversity are greatest at the mouth and offshore of the CFBC compared to the upper end of the canal near the Inglis Lock.

2.2 Old Withlacoochee River

The OWR that flows from below the Inglis Dam into the CFBC is approximately 1.5 mi long; it originates from the Lake Rousseau's Inglis Dam and varies in width from 20- to 30-ft (Figure 2-3). The flow within the OWR is variable primarily due to weather patterns and the need to control Lake Rousseau water levels during rain events by spill over the Inglis Dam into the OWR. The periodic higher flows have led to scouring of the bottom habitat down to bedrock in the center of the OWR, and the sediments along the sides are primarily sand mixed with organic materials (CH2M Hill 2009a).

Salinity profiles at 1-m depth in this remnant arm range from 0.14 pps below the Inglis Dam to 4.38 pps where the OWR joins with the CFBC. In June and August 2008, sampling was conducted at three locations: the junction of the OWR with the CFBC, halfway between the junction and the Inglis Dam, and just downstream of the Inglis Dam within this portion of the OWR. Analytical chemistry analysis of water samples show no significant differences in ammonia, nitrate, nitrite, total nitrogen, organophosphate, total phosphate, chlorophyll a, or total suspended solids between the three sampling stations for the June sampling event. Dissolved

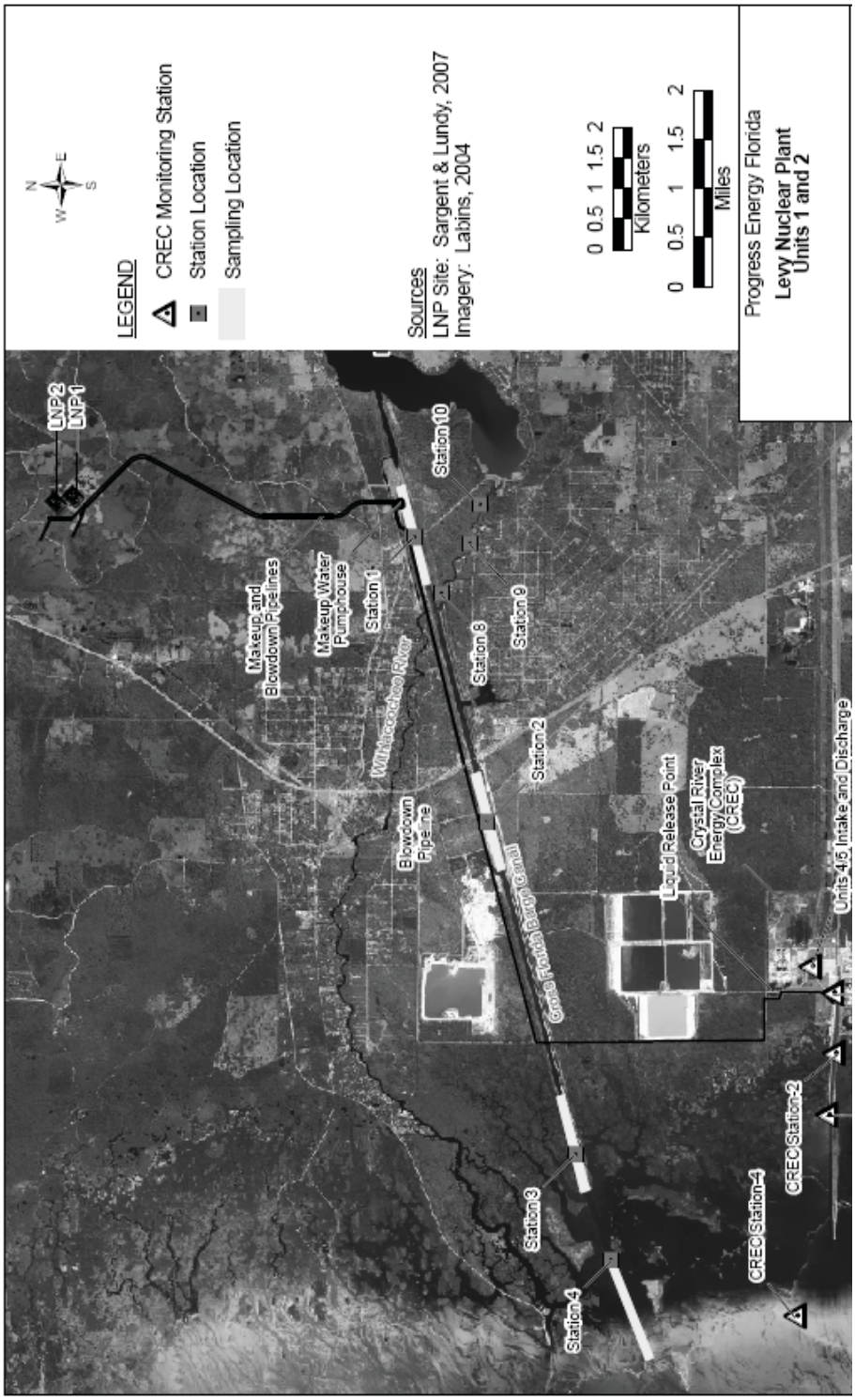

Figure 2-2. The Locations for Aquatic Species Sampling in the CFBC and OWR (CH2M Hill 2009a)

Table 2-1. Motile Macroinvertebrates Sampled in the CFBC and CREC with Catch per Unit Effort (CPUE) >1.0 from October 2007 through November 2008 by Trawl and Crab Trap

		Total Catch Per Unit Effort Across Trawl and (Crab Trap) for All Sampling Events					
Common Name	**Scientific Name**	**CFBC 1**	**CFBC 2**	**CFBC 3**	**CFBC 4**	**CREC 3**	**CREC 4**
Jellyfish	Cyaneidae	-	1.5	-	-	-	-
Common eastern nassa	*Nassarius vibex*	-	-	-	-	-	1.5
Atlantic brief squid	*Lolliguncula brevis*	-	-	5	-	-	2
Palaemonid shrimp	Palaemonidae	-	-	-	-	-	1.5
Pink shrimp	*Farfantepenaeus duorarum*	-	1.5	2.5	-	-	5.5
Hippolyte shrimp	*Hippolyte*.	-	-	-	-	-	1.5
Decorator crab	*Stenocionops furcata*	-	-	-	-	-	2
Yellowline arrow crab	*Stenorhynchus seticornus*	-	-	-	-	-	7
Hermit crab spp.	*Pagurus* spp.	-	-	-	3	-	-
Mud crab	Xanthidae	-	-	-	3.5	3	-
Florida stone crab	*Menippe mercenaria*	-	-	-	-	(3.6)	2 (1.6)
Portunid crab	*Portunus* sp.	-	-	-	-	-	1.5
Blue crab	*Callinectes sapidus*	-	4.5 (2.5)	4 (4.3)	-	-	-

Source: CH2M Hill 2009b

Table 2-2. Fish Species Sampled in the CFBC, OWR, and CREC with CPUE >1.0 from October 2007 through November 2008 by Beach Seine, Trawl, Cast Net, Gill Net, and Minnow Trap

		Total Number Collected Across All Sampling Gear and Events								
Common Name	**Scientific Name**	**CFBC 1**	**CFBC 2**	**CFBC 3**	**CFBC 4**	**OWR 8**	**OWR 9**	**OWR 10**	**CREC 3**	**CREC 4**
Spinner shark	*Carcharhinus brevipinna*	-	-	-	-	-	-	-	4	1
Blacktip shark	*Carcharhinus limbatus*	-	-	-	-	-	-	-	-	7
Bull shark	*Carcharhinus leucas*	-	8	-	-	-	-	-	1	-
Bonnethead shark	*Sphyma tiburo*	-	-	-	2	-	-	-	-	1
Cownose ray	*Rhinoptera bonasus*	-	-	1	-	-	-	-	-	3
Spotted eagle ray	*Aetobatus narinari*	-	-	-	-	-	-	-	2	1
Atlantic stingray	*Dasyatis sabina*	-	1	-	2	-	-	-	1	1
Southern stingray	*Dasyatis americana*	-	-	-	2	-	-	-	-	1
Longnose gar	*Lepisosteus osseus*	2	-	1	3	-	-	-	-	1
Tidewater silverside	*Menidia peninsulae*	-	-	-	-	-	-	-	113	-

Table 2-2. (contd)

Common Name	Scientific Name	Total Number Collected Across All Sampling Gear and Events								
		CFBC 1	CFBC 2	CFBC 3	CFBC 4	OWR 8	OWR 9	OWR 10	CREC 3	CREC 4
Inland silverside	*Menidia beryllina*	-	-	-	-	7	-	4	-	-
Halfbeaks	Hemiramphidae	-	-	-	-	-	-	-	10	-
Atlantic needlefish	*Strongylura marina*	7	2	9	3	-	-	-	2	1
Redfin needlefish	*Strongylura notata*	2	-	4	-	-	-	-	3	-
Killifishes	*Fundulus* spp.	-	-	-	-	-	-	-	60	-
Seminole killifish	*Fundulus seminolis*	-	-	-	-	-	-	22	-	-
Bluefin killifish	*Lucania goodei*	-	-	-	-	-	-	97	-	-
Goldspotted killifish	*Floridichthys carpio*	7	-	-	-	-	-	-	285	-
Mullets	Mugilidae	-	9	30	-	-	-	-	-	-
Striped (black) mullet	*Mugil cephalus*	8	6	24	35	-	-	-	21	9
White mullet	*Mugil curema*	8	27	14	51	-	-	-	36	1
Atlantic spadefish	*Chaetodipterus faber*	-	-	2	-	-	-	-	2	3
Gobys	Gobiidae	4	20	13	7	-	-	-	1	2
Skilletfish	*Gobiesox strumosus*	-	4	2	-	-	-	-	-	-
Sunfishes	Centrarchidae	4	-	-	1	-	1	4	-	-
Largemouth bass	*Micropterus salmoides*	1	-	-	-	1	5	17	-	-
Silver perch	*Bairdiella chrysoura*	-	95	398	246	-	-	-	1	149
Common snook	*Centropomus undecimalis*	-	4	-	-	-	-	-	1	-
Whitefin shark sucker	*Echeneis neucratoides*	-	-	1	1	-	-	-	-	-
Mojarras	Gerreidae.	-	-	8	-	3	-	-	38	1
Spotfin mojarra	*Eucinostomus argenteus*	198	290	125	37	4	-	-	84	100
Polka-dot batfish	*Ogcocephalus cubifrons*	-	-	-	4	-	-	-	-	2
Grunts	Haemulidae	-	-	2	1	-	-	-	-	-
Pigfish	*Orthopristis chrysoptera*	-	2	6	11	-	-	-	3	28
Snappers	Lutjanidae	8	20	14	-	-	-	-	5	2
Atlantic croaker	*Micropogonias undulatus*	-	8	2	1	-	-	-	-	2
Black drum	*Pogonias cromis*	4	13	-	1	-	-	-	11	1

Table 2-2. (contd)

Common Name	Scientific Name	Total Number Collected Across All Sampling Gear and Events								
		CFBC 1	CFBC 2	CFBC 3	CFBC 4	OWR 8	OWR 9	OWR 10	CREC 3	CREC 4
Red drum	*Sciaenops ocellatus*	2	1	-	-	-	-	-	1	1
Spot	*Leiostomus xanthurus*	-	17	-	17	-	-	-	-	3
Sand seatrout	*Cynoscion arenarius*	-	23	16	12	-	-	-	-	4
Spotted seatrout	*Cynoscion nebulosus*	-	-	-	-	-	-	-	-	5
Spanish mackerel	*Scomberomorus maculatus*	-	-	2	4	-	-	-		5
Atlantic bumper	*Chloroscombrus chrysurus*	-	6	4	24	-	-	-	-	29
Leatherjacket	*Oligoplites saurus*	-	-	1	1	-	-	-	4	-
Bay anchovy	*Anchoa mitchilli*	100	706	704	125	1	2	-	-	1
Striped anchovy	*Anchoa hepsetus*	2	4	3	-	-	-	-	-	-
Atlantic thread herring	*Opisthonema oglinum*	-	-	2	2	-	-	-	-	10
Herrings	Clupeidae	4	-	-	-	-	-	-	-	-
Ladyfish	*Elops saurus*	9	15	24	6	-	-	-	-	1
Gulf menhaden	*Brevoortia patronus*	591	73	9	226	-	-	-	-	-
Yellowfin menhaden	*Brevoortia smithi*	-	1	3	-	-	-	-	-	17
Scaled sardine	*Harengula jaguana*	24	41	47	21	1	-	-	-	-
Pinfish	*Lagodon rhomboides*	13	54	61	26	2	-	-	2	91
Sheepshead	*Archosargus probatocephalus*	9	6	-	-	1	1	-	63	2
Southern kingfish	*Menticirrhus americanus*	-	-	1	6	-	-	-	-	-
Crevalle jack	*Caranx hippos*	-	2	-	-	-	-	-	1	1
Blue runner	*Caranx crysos*	-	-	-	-	-	-	-	-	4
Hardhead catfish	*Ariopsis felis*	-	5	18	33	-	-	-	6	11
Gafftopsail catfish	*Bagre marinus*	2	2	2	-	-	-	-	-	5
Flounders	*Paralichthyidae*	-	1	2	6	-	-	-	-	1
Pufferfish	*Spheroides* sp.	-	1	1	-	-	-	-	-	1

Source: CH2M Hill 2009b

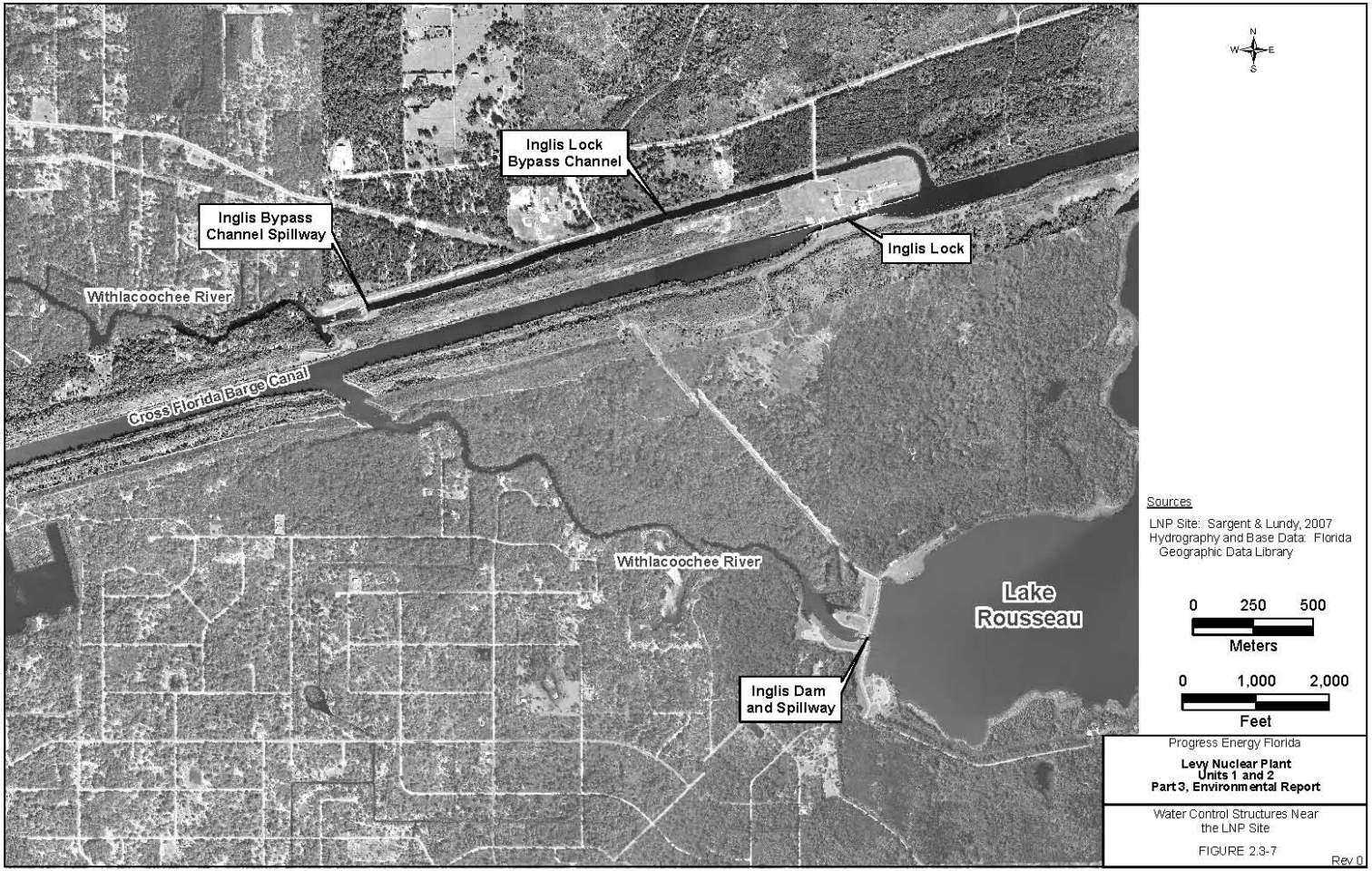

Figure 2-3. Water Control Structures Near the Proposed LNP Site (PEF 2009a)

oxygen was highest near Inglis Dam following a high-volume water release during the August sampling, which also significantly lowered the nitrate/nitrite concentration (CH2M Hill 2009b).

Biological sampling in the OWR was performed using beach seine, cast net, minnow trap, and crab traps. Gill nets and trawling were not used because manatees were present in the river. Crab traps yielded only two crustaceans and were not considered further in biological analyses. Fish caught near the Inglis Dam were representative of fish species that prefer euryhaline or freshwater conditions, with killifish species (*Fundulus* spp.) and largemouth bass (*Micropterus salmoides*) representing the abundant species at that location. In a similar fashion, fish caught near the junction of the OWR and the CFBC were represented by silverside species (*Menidia* spp.) and mojarra species (*Eucinostomus* spp.), which were also caught in the CFBC and prefer more saline environments. The midway location for sampling did not yield as many species as either of the other locations, which may be due to the variable salinity or water quality conditions for that region. Benthic macroinvertebrate sampling mirrored the fish sampling results with euryhaline dipteran species predominant at the CFBC-OWR junction, freshwater oligochaetes and amphipods near the Inglis Dam, and a paucity of organisms and limited diversity at the midpoint (CH2M Hill 2009a).

2.2.1 Crystal Bay

Aquatic species and habitats associated with the discharge from CREC into Crystal Bay have been characterized historically from CREC operations (Stone and Webster 1985) and were recently sampled from April through November 2008. Following installation of helper cooling towers in the early 1990s, the applicant has quantified the extent of seagrass beds in the Gulf of Mexico in the vicinity of the CREC discharge (Estevez and Marshall 1993, 1994, 1995). Previously affected seagrass areas were observed to recover with colonization by shoal grass (*Halodule wrightii*) a dominant, quick-growing seagrass. However, between 1995 and 2001, overall seagrass abundance declined, likely from a number of environmental influences (Marshall 2002). No seagrass habitat is present at the point of discharge or at the 1.4-mi nearshore sampling location. A few seagrass beds just to the north of the point of discharge were identified in 1993, and greater coverage of this same area by *Halodule wrightii* (increase of 19.5 percent beyond previously noted seagrass perimeter) was noted for this same area in 2001 (Marshall 2002).

Sediments at the CREC point of discharge and in nearshore waters (1.4 mi from point of discharge) are dominated by sand and silt. Surface salinities at the discharge mouth and nearshore waters ranged between 28.2 and 31.5 pss, with salinities increasing slightly at increasing depths (CH2M Hill 2009b). Average dissolved oxygen generally decreases along the CREC discharge canal from the discharge origin at 6.28 mg/L to 5.05 mg/L at the point of discharge into Crystal Bay. Average dissolved oxygen then increases to 5.61 mg/L in nearshore waters surrounding the point of discharge. Average temperatures at the point of

discharge (31.9°C) were 6°C higher than average temperatures recorded 1.4 mi away in nearshore waters during the 2008 sampling events (CH2M Hill 2009b).

Analytical chemistry analyses of water samples taken in September and November 2008 show no significant differences in total organic carbon, dissolved oxygen, ammonia, nitrate, nitrite, total nitrogen, organophosphate, total phosphate, chlorophyll a, or total suspended solids between the point of discharge and 1.4 mi away in nearshore waters (Figure 2-4).

Fish, plankton, and macroinvertebrate sampling in the CREC discharge area of Crystal Bay are indicative of coastal salt marsh and nearshore species and show biodiversity commensurate with similar habitat sampling at CFBC stations 3 and 4 (EIS Section 2.4.2). However, several of the top forage fish species are notably absent (bay anchovy, scaled sardine, and silver perch) from the CREC point of discharge and nearshore water habitats.

3.0 Proposed Federal Action

The proposed Federal actions are the issuance of a COL for the construction and operation of two new nuclear reactors at the proposed LNP site pursuant to Title 10 of the Code of Federal Regulations (CFR) Part 52, and a DA permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" to those activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erecting support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside of the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this EFH assessment, and both are being discussed together as construction for the purposes of the NRC/USACE joint EFH consultation.

Prerequisites to construction activities include, but are not limited to, documentation of existing site conditions within the Levy County site and acquisition of the necessary permits (e.g., COLs, local building permits, Clean Water Act Section 402(p) National Pollutant Discharge Elimination System (NPDES) construction and industrial stormwater permits, a DA permit, and a Clean Water Act Section 401 Certification). After these prerequisites are met, planned construction

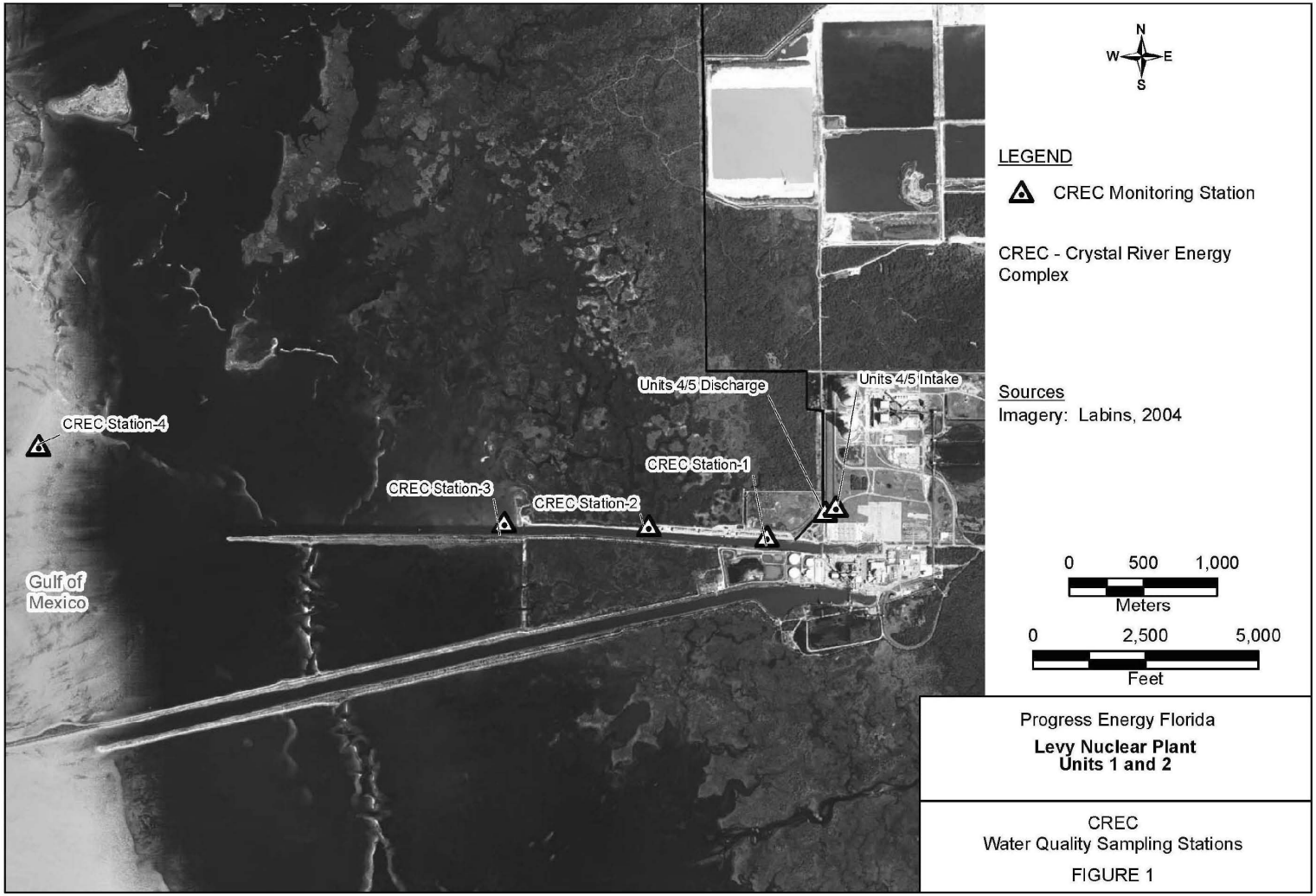

Figure 2-4. Aquatic Sampling Locations for CREC (CH2M Hill 2009b)

activities could proceed pursuant to 10 CFR 50.10(c), which may include the activities described in 10 CFR 50.10(a). Following construction, the planned operation of the new reactors would be authorized if the Commission finds, under 10 CFR 52.103(g), that all acceptance criteria in the COLs are met.

Construction and operation activities could potentially affect the species and/or habitats listed in Table 1-1. These following construction and operation activities were determined to potentially affect these species and habitats based on habitat affinities and life-history considerations and the nature, spatial, and temporal considerations of the activity:

- Construction
  - new dredging and construction of a barge slip and boat ramp on the shoreline of the CFBC
  - installation of the cooling-water intake structure (CWIS) on the CFBC shoreline
  - installation of the cooling-water discharge system, including dredging and placement of discharge piping in the CFBC
  - connection of discharge piping with the existing CREC discharge canal
  - vessel movements associated with in-water work; vessel transportation of large components via barge for LNP site
  - new transmission-line corridors and towers
- Operation
  - impingement, entrainment, and maintenance activities associated with the CWIS
  - salinity changes in the CFBC and OWR
  - discharge plume from the cooling-water system (thermal, chemical, and physical effects)
  - maintenance of transmission-line corridor rights-of-way.

3.1 Cooling-Water Intake System

The proposed closed-cycle cooling system and cooling-water intake and discharge systems for the LNP site are described in the following sections. The LNP would use a closed-cycle cooling system that would draw in water from a new intake structure on the north shore of the CFBC, 0.5 mi downstream of the Inglis Lock, and heat removal would be accomplished via mechanical draft cooling towers. The blowdown water would discharge via pipeline to the existing CREC discharge canal (Figure 3-1).

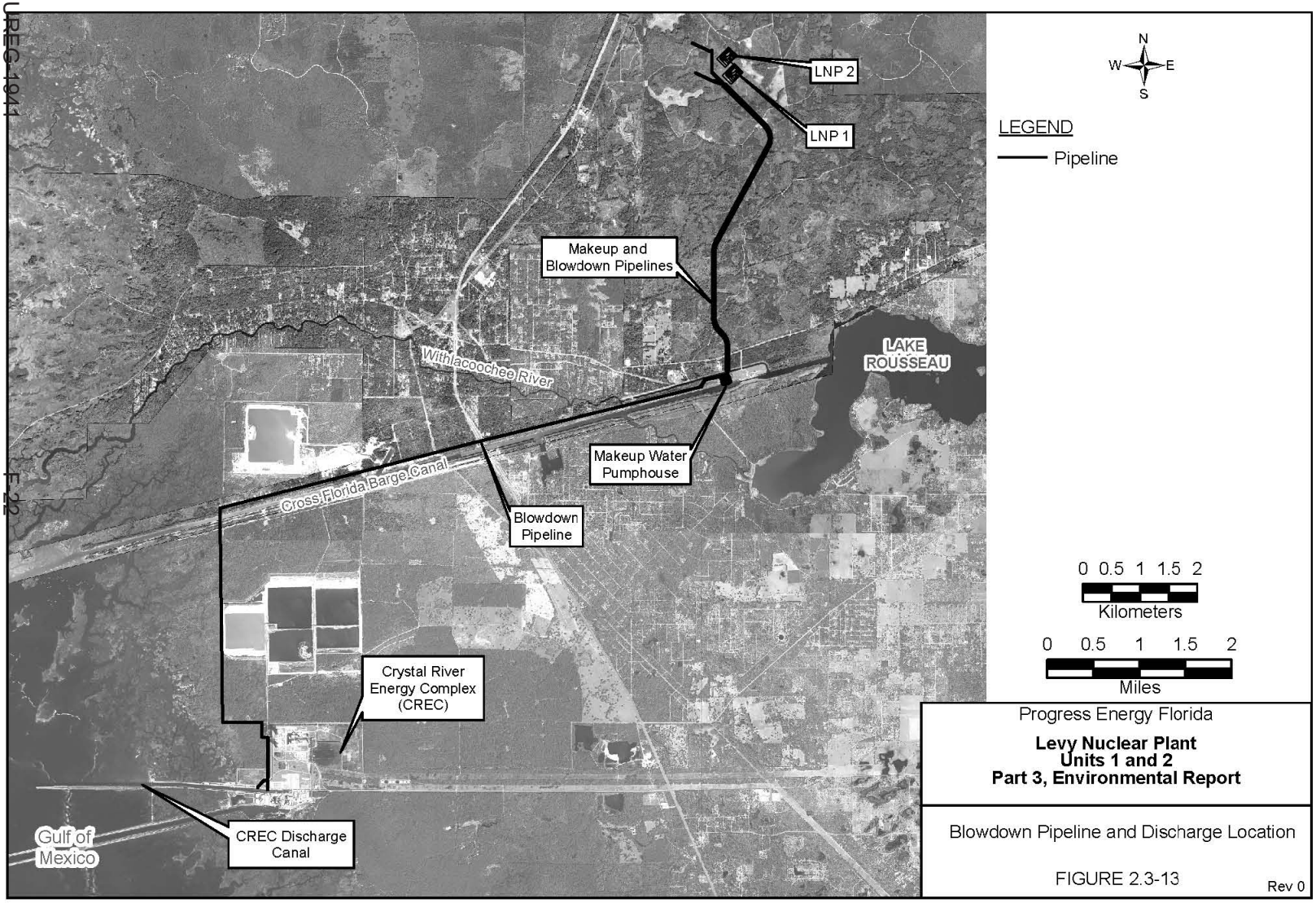

Figure 3-1. Location of Blowdown Pipeline and Discharge (PEF 2009a)

In its Environmental Report (ER), PEF stated that a closed-cycle, mechanical draft system would be used for proposed LNP Units 1 and 2. Depending on the quality of the makeup water, closed-cycle, recirculating cooling-water systems can reduce water use by 96 to 98 percent of the amount that the facility would use if it employed a once-through cooling system (66 FR 65256). This significant reduction in water withdrawal rate results in a corresponding reduction in impingement and entrainment. PEF has stated that the proposed LNP Units 1 and 2 intake structure would comply with U.S. Environmental Protection Agency (EPA) Phase I 316(b) (66 FR 65256) and have a design through-screen velocity of less than 0.5 fps (PEF 2009a). However, the CFBC near the proposed intake essentially is a dead end with tidal exchange the only appreciable flow not including the freshwater flows from the lock and intermittent flows over the Inglis Dam following rain events. For the LNP Units 1 and 2 CWIS, PEF assessed 316(b) impacts of withdrawal of cooling water from the CFBC. The approach velocity for the intake bays would be 0.25 fps at the bar screens and 0.5 fps for through-screen flow. To achieve these low velocities, the inlet area would be larger than 106.1 ft^2 (CH2MHill 2009c). The zone of hydraulic influence would extend 5 mi from the CWIS in the CFBC towards the mouth. The CFBC is tidally influenced, and, beyond the 5-mi zone of influence, the average current velocity in the remaining 2 mi of CFBC towards the mouth is greater than the CWIS-induced velocity 90 percent of the time.

3.2 Cooling-Water Discharge System

The effluent discharge from proposed LNP Units 1 and 2 would be directed into the CREC discharge. Discharge pipelines from the LNP would run alongside the northern bank of the CFBC before crossing the canal and continuing on to the CREC. The LNP discharge pipeline (two 54-in. high-density polyethylene [HDPE] pipes, per the conceptual design) will discharge directly into the CREC discharge canal just downstream of the discharge culverts for CREC Units 4 and 5. CREC Units 4 and 5 discharge into a concrete-lined, open channel. This 0.7-mi open channel drains directly into the CREC discharge canal approximately 1.1 mi from the Gulf of Mexico (PEF 2009b). The discharge volume of the LNP Units 1 and 2 blowdown water would be 81.34 Mgd and would be combined with the CREC Units 1 through 5 discharge of 1651.8 Mgd in the CREC discharge canal, which opens into the Gulf of Mexico. The LNP discharge would account for only 4.9 percent of the total discharge flow and would have little physical scouring impact at the terminus of the discharge canal (PEF 2009a). In EIS Section 5.2.3.1, the review team describes its independent assessment of the incremental impacts of proposed LNP Units 1 and 2 on the water temperatures within the CREC discharge and the Gulf of Mexico. The addition of LNP Units 1 and 2 discharge would result in increase discharge volume of 87.93 Mgd, but with no significant increase in thermal plume temperature or salinity over current conditions, as discussed in EIS Section 5.3.2.1.

In addition, Florida Department of Environmental Protection (FDEP) (FDEP 2010) Conditions of Certification states that PEF would retire its two oldest, once-through coal-fired units at the

CREC by December 31, 2020 if LNP Units 1 and 2 are licensed, built, and begin commercial operation. CREC Units 1 and 2 cessation of operations would significantly reduce the discharge flow from the CREC discharge canal even with the additional discharge flow from LNP Units 1 and 2 (Table 3-1).

Table 3-1. Comparison of NPDES Discharge Volumes Under Different Operation Scenarios.

Operating Unit	CREC Current Combined Discharge (Mgd)	Percent of Total Discharge	Addition of LNP Units 1 & 2 to current CREC (Mgd)	Percent of Total Discharge	Addition of LNP Units 1 & 2 to current CREC (Mgd) with Decomissioning of CREC Units 1 & 2	Percent of Total Discharge
CREC 1	446	23.5	446	22.5	-	-
CREC 2	472	24.8	472	23.8	-	-
CREC 3	979.9	51.6	979.9	49.5	979.9	92.3
LNP 1 & 2	-	-	81.3	4.4	81.3	7.6

Source: PEF 2009d
Note: CREC discharge rates are given as current maximum NPDES-permitted volumes.
CREC Units 4 and 5 are not listed in table because they withdraw cooling water from the discharge of CREC Units 1 through 3, and through evaporative cooling during operation actually reduce station discharge flow.

3.3 Chemical Discharges

Other discharge-related impacts include the chemical treatment of the cooling water. The ER indicates that chemicals would be added to the circulating, service, and blowdown water systems (PEF 2009a). Intake structures such as the pump suction housings and sensor tubes will be coated with a copper-based anti-fouling substance to minimize fouling of these structures. In addition, ClamTrol (CT1300) will be injected every 21 days at a concentration not to exceed 4.5 ml per liters, into the CWISs to prevent biofouling of marine invertebrates (PEF 2009b). Chemical treatment of cooling water at LNP would likely be similar to that occurring at CREC. The use of chemicals in the existing CREC discharge is regulated by an NPDES permit, which is issued by the FDEP. The chemical concentrations at the outfall for the existing units meet the NPDES limits (FDEP 2008). Table 3-2 (ER Table 5.3.2-1) lists the water-treatment chemicals, their use, and the concentration that is anticipated to be discharged from proposed LNP Units 1 and 2 blowdown. The concentrations in the discharge are significantly lower than the LC50 (the concentration that is lethal to 50 percent of the sample population) obtained from the Material Safety Data Sheets (PEF 2009a). The CREC effluent discharge and water flow from the Gulf of Mexico would further dilute the concentration of these chemicals.

Table 3-2. Chemical Discharges to the Gulf of Mexico from Proposed LNP Units 1 and 2

Chemical	Use	Concentration at Discharge Point
Sodium hypochlorite	Biocide	0.2 ppm residual chlorine or 0.36 sodium hypochlorite
Ammonium chloride	Algaecide	0.2 ppm residual chlorine or 0.303 ppm ammonium chloride
Sulfuric acid	pH adjuster	2.237 ppm sulfuric acid
Orthopolyphosphate	Corrosion inhibitor	30 ppm orthopolyphosphate
Polyacrylate	Silt dispersant	150 ppm polyacrylate
Phosphonate	Antiscalant	20 ppm phosphonate

Source: PEF 2009a

3.4 Transmission-Line Corridors

Connection from the proposed LNP to the Citrus substation corridor would cross the Withlacoochee River bypass channel, CFBC, and the OWR. Existing and new corridors extending to the proposed Central Florida South substation would cross the Withlacoochee River at the border of Citrus and Marion Counties and Two Mile Prairie Lake (PEF 2009a). Connection of the CREC switchyard to the new Citrus substation would use existing corridors bordering estuarine habitat within Crystal Bay, which is considered EFH.

Beyond the first substation, existing corridors are proposed for the transmission lines extending 50 mi from the Kathleen substation to the Griffin substation and extending west to the Lake Tarpon substation. This corridor crosses the following Outstanding Florida Waters: Blackwater Creek, Trout Creek, the Hillsborough River, and Cypress Creek (PEF 2008). Other waterbodies include Flint Creek, tributaries of Hollomans Branch, Brushy Creek, Rocky Creek, and numerous unnamed intermittent and perennial tributaries of the previously named waterbodies. None of these waterbodies are considered EFH and are not designated aquatic critical habitats.

4.0 Potential Impact of Plant Construction and Operation on Biota and Habitat

This section describes the potential impacts from the construction and operation of the proposed LNP Units 1 and 2 on Federally managed estuarine and marine species and their habitats in the CFBC, OWR, and Crystal Bay area of the Gulf of Mexico. The construction and operation activities that could affect Federally managed estuarine and marine species based on habitat affinities and life-history characteristics and the nature and spatial and temporal considerations of the activities are briefly discussed below.

4.1 General Construction

Impacts on the EFH in the CFBC from construction of proposed LNP Units 1 and 2 would be associated mainly with the construction of new water intake structure, discharge piping systems, and a barge slip. These activities would result in temporary water quality changes and temporary and permanent loss or conversion of aquatic habitat in the CFBC, but they are not anticipated to impact aquatic habitat or water quality in the OWR.

The major construction events associated with building proposed LNP Units 1 and 2 that would affect EFH in the Crystal Bay area of the Gulf of Mexico include connection of the discharge outfall with the existing CREC discharge canal. No construction is planned at the point of discharge for the CREC or in nearshore waters. All work would be conducted in accordance with Federal, State, and local permits that would be obtained by PEF. Because the facilities would be built inland or use existing transmission-line corridors, EFH in the CFBC, OWR, and Gulf of Mexico likely would not be adversely affected by the installation of new transmission facilities for the proposed LNP Units 1 and 2.

4.1.1 Dredging and Pipeline Trenching

Construction for both the barge slip and the intake structure would occur in primarily upland areas behind an earth bank separating construction activities from the CFBC until excavation is complete. Steel sheet piling would be installed at the barge slip and in a cofferdam for intake structure construction. Piles would be installed from land using a pile hammer. Turbidity barriers and erosion control measures would be installed in the canal during activities associated with sheet-pile installation to control impacts on water quality. Construction activities are expected to commence with installation of permanent piling over 60 weeks for the barge slip and over 13 weeks for temporary piling at the intake structure. Removal of temporary piling at the intake structure is expected to occur following 6 months of construction activities. Turbidity barriers and erosion control measures are expected to be installed commensurate with piling installation activities and will remain in place before operations (PEF 2008). Use of water quality control measures should prevent impacts on the few species that inhabit the portion of the CFBC near the proposed intake.

Dredging would be necessary for construction of a trench in the CFBC for placement of discharge piping. Using EPA Method 1311, sediments would be tested before construction for toxicity characteristics to determine final disposition of dredged spoil materials. Non-hazardous sediments would be used to backfill pipeline trench, as fill material onsite, or disposed of in upland areas. Sediments deemed unsuitable for use would be appropriately disposed of in landfills approved for hazardous disposal (PEF 2009c). Residual water from dredging activities would be tested for compliance with NPDES and Florida surface-water-quality standards (FDEP 2008). Discharge piping from the LNP site to the CREC discharge would run parallel along the northern CFBC berm, enter and exit CFBC water supported by anchor piers along

both CFBC berms, and run south to CREC along an existing transmission-line corridor (PEF 2009a). Initially proposed routing of the discharge pipeline south of the CFBC crosses several tidal creeks and would adversely impact approximately 4.5 acres of salt marsh habitat. The review team is aware that PEF has proposed to the FDEP an alternate route to avoid this important habitat. FDEP has not made a decision on the proposal. Impacts to habitat related to the discharge pipeline, irrespective of the final routing, would be primarily due to its excavation, placement, and burial associated with construction.

4.1.2 Discharge Pipeline Connection

The LNP discharge pipeline (two 54-in. HDPE pipes, per the conceptual design) will discharge directly into the CREC discharge canal just downstream of the discharge culverts for CREC Units 4 and 5. The discharge canal is a concrete-lined, open channel. This 0.7-mi open channel drains directly into the CREC discharge canal approximately 1.1 mi from the Gulf of Mexico. A headwall structure will be necessary to join the LNP discharge piping to the CREC discharge canal (PEF 2009b). No construction will be conducted beyond the point of discharge into the concrete discharge canal for CREC.

4.1.3 Vessel Movements

Vessel use during the dredging or the installation of the in-water structures, and transportation of large components for proposed LNP Units 1 and 2 may affect the aquatic resources of the CFBC, particularly the benthos. The main effects from using vessels would include turbulence from propellers (prop wash), anchor cable scraping across the canal bottom, and accidental spills of materials overboard. Vessels would be used during the installation of the cooling-water discharge pipeline and during the offloading of materials from barges. Vessel operation during construction would cause short-term, localized impacts on EFH in the CFBC, but impacts on water quality and habitat in the OWR are not anticipated. These impacts should not affect the general resources in the area of the site or the region along this coast of the Gulf of Mexico.

4.1.4 Transmission-Line Corridors

PEF would site the new 500-, 230-, and 65-kV transmission lines in accordance with the Florida Electrical Power Plant Siting Act (PPSA), Chapter 403 of the Florida Statutes (FS), and Chapter 62-17 of the FAC. In addition, PEF would comply with all applicable laws, regulations, and permit requirements and would use good engineering and construction practices (FDEP 2008), which includes leaving a 25-ft buffer of existing vegetation along the banks, with mature heights not exceeding 12 ft at locations where the right-of-way crosses a navigable waterway (PEF 2008).

4.2 Operation

For EFH in the CFBC and OWR, the primary concerns related to water intake withdrawals are those related to the amount of water drawn from the CFBC, and the potential for organisms to be impinged on the intake screens or entrained into the cooling-water system. PEF stated that a closed-cycle, mechanical draft cooling system would be used for proposed LNP Units 1 and 2 (PEF 2009b). The intake system for proposed LNP Units 1 and 2 would incorporate fish and invertebrate protection measures to reduce entrainment and impingement. The intake flow design rate for proposed LNP Units 1 and 2 would not exceed a through-screen flow velocity of 0.5 fps.

4.2.1 Impingement and Entrainment

Impingement and entrainment studies have been conducted for the nearby CREC intake structures. The study was performed in 1983 and 1984 to examine impingement and entrainment for three intakes providing cooling water for CREC fossil-fueled Units 1 and 2 and nuclear Unit 3 (Stone and Webster 1985). Although the operation of these three units has more than 13 times higher withdrawal rates (1897–1613 Mgd) and twice the through-screen velocity (1.0 fps) than those proposed for LNP (122 Mgd with less than 0.5 fps through-screen velocity), the impingement and entrainment studies provide contextual information regarding impacts on relevant species that are present in the Gulf of Mexico and may be affected by LNP operations.

Impingement and entrainment studies were conducted to assess impacts as required under NPDES Permit FL0000159 for CREC (Stone and Webster 1985). Sampling for impingement rates occurred four times over a 24-hour period once every 2 weeks for 1 year by examination of collection baskets attached to screen wash effluents. The three units were assessed by individual intake, but results are combined for discussion purposes here. The highest abundances of organisms were collected in the spring, with bay anchovy (*Anchoa mitchilli*) collected in the greatest numbers with estimates of more than 87,000 impinged annually. Polka-dot batfish (*Ogcocephalus cubifrons*) and spot (*Leiostomus xanthurus*) were two other species also collected in significant numbers. These three species represented more than 72 percent of the selected indicator fish impinged. In 1997, the State of Florida set an annual commercial harvest limit of 85,000 lb of bay anchovy for the counties of Wakulla, Franklin, Gulf, Bay, Okaloosa, and Walton (FFWCC 1997). Eighty-seven thousand anchovies represents approximately 350 lb (average 0.004 lb per fish), indicating the number of impinged anchovy only represent a small fraction of the annual commercial harvest limit of 85,000 lb. The numbers of invertebrates impinged were much higher for inverterbrates than for fish, with pink shrimp (*Farfantepenaeus duorarum*) and blue crab (*Callinectes sapidus*), the predominant species. Like fish, invertebrate impingement was highest in the spring. More than 640,000 pink shrimp and 383,000 blue crab were impinged over a year. These impingement numbers represent 0.6 percent and 0.7 percent, respectively, of the annual commercial fisheries for

Citrus County in 1982 (Stone and Webster 1985), and reflect impingement rates for a through-screen velocity of 1.0 fps. By comparison, LNP Units 1 and 2 potential impingement impacts should be notably less with a through-screen velocity of no more than 0.5 fps and a significantly reduced intake flow rate.

Plankton samples were collected from 15 stations offshore in the vicinity of the CREC intake canal every 2 weeks for 15 months using 505-μm mesh with a 1-m mouth towed for 3 minutes from bottom to surface at a constant flow rate. These samples were analyzed for estimation of entrainment of eggs and larvae for CREC intakes 1 through 3. April and May were peak collection times for eggs, while invertebrate meroplankton were collected in the highest numbers in July and August. Bay anchovy eggs, larvae, and juveniles were most abundant and, using conservative assumptions regarding life history and mortality, represent approximately 21.7 million adults lost per year (Stone and Webster 1985). Recreationally important fish entrained included larvae and/or juveniles of silver perch (6602 adult equivalents as assessed for bay anchovy), spotted sea trout (*Cynoscion nebulosus* , 900 adult equivalents), red drum (*Sciaenops ocellatus* ,18 adult equivalents), spot (*Leiostomus xanthurus* 690,000 adult equivalents), and striped mullet (*Mugil cephalus,* 5985 adult equivalents). With the exception of spot, the entrainment impact on these fish represents less than 0.2 percent of the estimated annual harvest for each species. The 1982 commercial harvest of spot for Citrus and Levy Counties was equivalent to the estimated numbers (based on weight) of entrained spot (Stone and Webster 1985).

Invertebrate sampling indicated that shrimp, stone crab (*Menippe mercenaria*), and brief squid (*Lolliguncula brevis*) could be entrained. Although no pink shrimp were collected, other shrimp post-larvae and juveniles were assessed without distinguishing species and represent more than 29,000 adult equivalents. Florida stone crab zoeal through megalops stages and brief squid were collected and estimated to represent 3652 and 3600 (194 lb) adult equivalents, respectively. With a commercial harvest of shrimp exceeding 1 million pounds, the number of entrained shrimp is minimal. Likewise, the number of entrained brief squid is small with commercial landings of squid in Pasco and Pinellas Counties in 1986 exceeding 2900 lb (FFWCC 1986). Impact on entrained stone crabs is difficult to estimate because the commercial fishery is renewable and only the claws are harvested. However, more than 950,000 lb of claws were harvested in Citrus and Levy Counties in 1982, and, assuming that claws make up half the weight (Lindberg and Marshall 1984), the loss of commercial harvest due to entrainment would be less than 0.01 percent. By comparison, the CREC withdrawal of water from the Gulf of Mexico is between 1897 and 1613 Mgd, which is 13 times greater than the proposed water withdrawal of 122 Mgd from the CFBC for proposed LNP Units 1 and 2. Entrainment impacts for LNP are expected to be significantly less than for CREC.

For the LNP Units 1 and 2 CWIS, PEF estimated potential impacts from withdrawal of cooling water from the CFBC based on design and construction technology, baseline biological characterization, and zone of influence. The through screen velocity for the intake would be 0.5

fps or less. To achieve the low velocity, the inlet area would need to be larger than 106.1 ft^2 (CH2M Hill 2009c). The zone of hydraulic influence would extend 5 mi from the CWIS in the CFBC. The CFBC is tidally influenced, and, beyond the 5-mi zone of influence, the average current velocity is greater than the CWIS-induced through-screen velocity 90 percent of the time. Sampling in the area of the proposed CWIS indicated a biologically depauperate environment with relatively poor water quality (PEF 2009a). However, operation of the CWIS would modify the temperature, salinity, and dissolved oxygen conditions in the vicinity of the CWIS and may attract aquatic biota, enhancing the area. Using conservative assumptions that the water quality may approach similar attributes as those observed in the CFBC near sampling Station 3 at the mouth, the number and diversity of species is likely to increase for the life stages of organisms that are mobile and actively feeding. However, the portion of the CFBC sampled near Station 3 is not a known spawning area, and zooplankton likely drift in and out of this area under tidal influence. Therefore, the potential for impingement and entrainment of aquatic organisms during operation of the CWIS would likely increase only due to zone of hydraulic influence and not from colonization or use of habitat near the CWIS. However, the overall impingement and entrainment of aquatic organisms for LNP are still expected to be significantly less than the impingement and entrainment that occur at the CWIS for the CREC.

4.2.2 Aquatic Thermal Impacts

In EIS Section 5.2.3.1, the review team describes its independent assessment of the incremental impacts of proposed LNP Units 1 and 2 on the water temperatures using the current CREC discharge flow plus the power uprate for CREC Unit 3 on the Gulf of Mexico. A three-dimensional coastal ocean model was used in the assessment of the impact on the Gulf of Mexico. In addition, the review team modeled the discharge with the two LNP units operating, CREC Unit 3 power uprate, and CREC Units 1 and 2 shut down. During summer conditions at ebb tide the surface-water temperatures near the CREC point of discharge channel would be slightly less under the proposed conditions when compared to current conditions that include operation of CREC Units 1 through 5. The discharge volume of the plume would be increased with the addition of LNP Units 1 and 2, but only slightly. The increase in surface-water temperature at the entrance of CFBC channel immediately to the north, would be between 0.05°C and ~0.1°C during the summer months at ebb tide (Figure 4-1). Similar trends in thermal plume temperatures would be observed during winter conditions with the addition of LNP discharge resulting in a slight temperature drop immediately at the CREC discharge canal, and a slight increase in surface-water temperature beyond the immediate discharge area. Surface-water temperatures at the mouth of the CFBC are expected to increase by less than 0.5°C over the current conditions (Figure 4-2). The increased plume size attributable to the operation of two units at the LNP site would likely have minimal impact on aquatic biota that

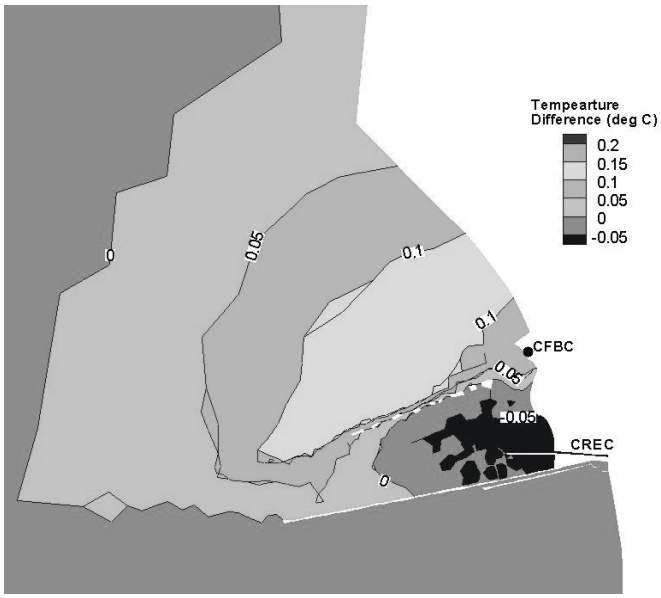

Figure 4-1. Thermal Plume Analysis Using the FVCOM (Finite Volume Community Ocean Model) Showing the Temperature Difference Between the Current and Proposed Thermal Discharge Under Summer Conditions at Ebb Tide

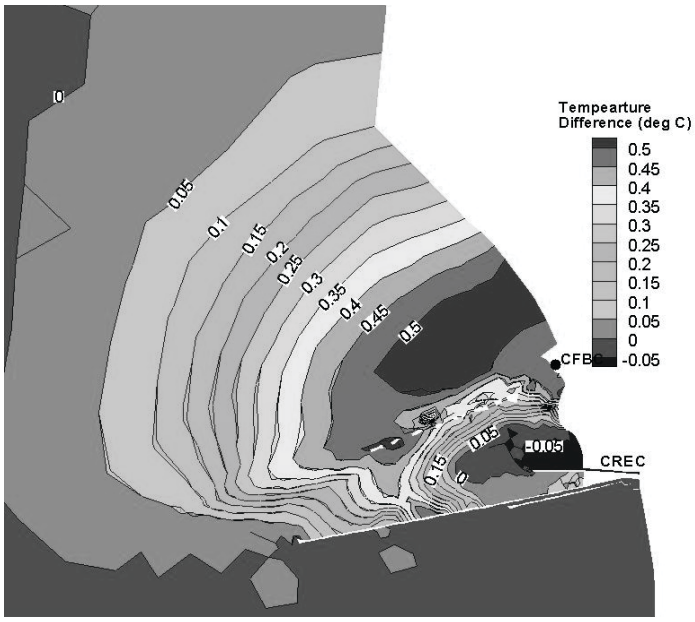

Figure 4-2. Thermal Plume Analysis Using the FVCOM Showing the Temperature Difference Between Current and Proposed Thermal Discharge Under Winter Conditions at Ebb Tide

forage near the CFBC under both extreme conditions primarily because of the small contribution LNP would have on the extent of the plume. Habitat usage is not expected to be detectably affected by operation of LNP at the point of discharge given the minimal addition of discharge volume and temperature change.

4.2.2.1 Chemical Impacts

The use of chemicals in the existing CREC discharge is regulated by an NPDES permit, which is granted by the FDEP. The chemical concentrations at the outfall for the existing units meet the NPDES limits (FDEP 2008) and would be required to be under compliance with the addition of the LNP discharge. The minimal increase in discharge contribution from LNP would not significantly increase the total chemical concentrations and is expected to be compliant with NPDES limits (FDEP 2010). Table 3-2 lists the water-treatment chemicals, their use, and the concentrations that are anticipated to be discharged from the proposed LNP Units 1 and 2 blowdown. The concentrations in the discharge are significantly lower than the LC50. The CREC effluent discharge and the Gulf of Mexico would further dilute the concentration of these chemicals.

In addition, the review team evaluated the potential for impact due to the increased salinity associated with the LNP Units 1 and 2 blowdown, which would have a total dissolved solids concentration up to 1.5 times greater than seawater (PEF 2009b). This increase in total dissolved solids is due to evaporative loss of water through the cooling towers. Because the LNP discharge would be combined with CREC discharge prior to the point of discharge into Crystal Bay and the CREC discharge accounts for the vast majority of the discharge volume (>95 percent), the increase in salinity would be slight (0 pps and ~0.5 pps) in the coastal region near the CREC discharge channel and between 0.4 pps and ~0.45 pps at the mouth of the CFBC (Figure 4-3).

Thus, the incremental impacts from the chemical discharges related to the operation of LNP Units 1 and 2 to the Gulf of Mexico are considered to be minimal.

4.2.2.2 Physical Impacts from Discharge

The discharge volume of proposed LNP Units 1 and 2 blowdown water would be 81.34 Mgd and would be combined with the CREC Units 1 through 5 discharge of 1651.8 Mgd in the CREC discharge canal, which opens into the Gulf of Mexico. The LNP discharge would account for only 4.9 percent of the total discharge flow, would have little physical scouring impact at the terminus of the discharge canal (PEF 2009a), and is not likely to affect water quality or habitat in the nearshore environment.

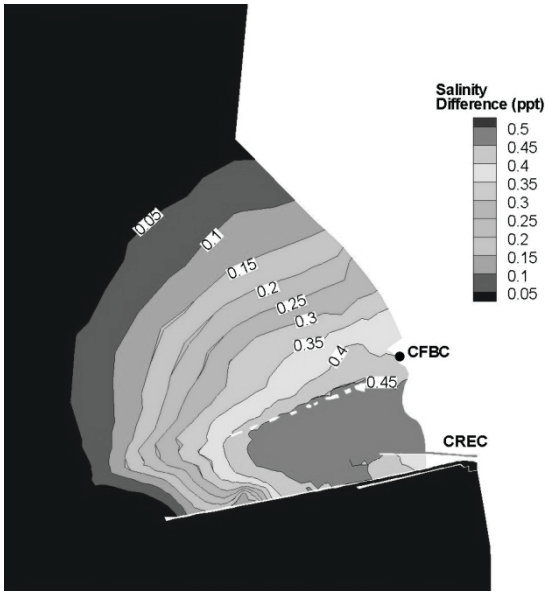

Figure 4-3. Salinity Difference Between the Current and Proposed Discharge Plume at Ebb Tide

4.2.3 Transmission-Line Corridors

Maintenance activities along the four 500-kV, five 230-kV, and two 69-kV transmission lines could lead to periodic temporary impacts on the waterways being crossed. However, it is assumed that the same vegetation management practices currently used by PEF for the existing CREC facility transmission-line rights-of-way would be applied to the existing and proposed new transmission-line right-of-ways. PEF practices and procedures were developed to prevent impacts on surface waters and wetlands; therefore, impacts on aquatic ecosystems from operation and maintenance of transmission lines are expected to be minimal (PEF 2009a). No impacts on aquatic habitats are anticipated from maintenance of the transmission lines.

5.0 Potential Effects of Proposed Federal Actions on EFH Species

During the development of the EFH assessment, NMFS provided a list of species managed by the Gulf of Mexico Fishery Management Council for Ecoregion 2) (NMFS 2008). With the exception of a few species that do not occur in the region of interest or occupy EFHs that would not be affected by the proposed action, these species and life stages that rely on habitats essential for species propagation are detailed below with regard to abundance patterns in Crystal Bay and the CFBC, common depth distributions, relevant migratory and spawning habits, tolerance and preference ranges for temperature and salinity, habitat needs, information

on food preferences, and the impact of the proposed Federal actions on EFH. The affected waterbodies associated with LNP are the nearshore Crystal Bay (marine), CFBC (estuarine), and the OWR (estuarine/freshwater). During the initial review of life history and EFH requirements for each candidate species, some species or life stages were eliminated from further consideration based on salinity or depth requirements or life history information that suggested the presence of some species or life stage is unlikely in Crystal Bay, the CFBC, or the OWR (Table 5-1). To indicate those species and life history stages included in EFH consultation, amended lists of species taken from Table 1-1 are given by waterbody (Tables 5-2 and 5-3). Construction impacts are possible for species and EFH in estuarine habitats associated with the CFBC and OWR. Operation impacts are possible for species and EFH in both estuarine (CFBC and OWR) and marine habitats associated with Crystal Bay up to two miles offshore.

5.1 Species Descriptions and Impact Determination

For each species and life stage, LNP construction and operation were evaluated to determine whether they resulted in (1) no adverse impact, (2) minimal adverse impact, or (3) substantial adverse impact on EFH. To determine impact level, LNP monitoring data, scientific journal articles, NMFS publications, CREC data, technical reports, and other relevant information were reviewed.

5.1.1 Spanish Mackerel

Adult Spanish mackerel (*Scombermorus maculatus*) forage in estuarine and marine nearshore pelagic waters, and eggs and juveniles also occur nearshore marine surface (eggs) and pelagic (juveniles) waters (GMFMC 2004). This species is often found in large schools near the water surface. Juvenile and adult Spanish mackerel are fast moving, voracious predators and feed on other smaller schooling fish. Spawning takes place from May to late August. In the eastern Gulf of Mexico, Spanish mackerel migrate northward during late winter and spring, and migrate southward to wintering grounds in south Florida waters in the fall (FFWCC 2008a). Spanish mackerel were collected at the CFBC mouth and CFBC nearshore areas. However, no adult Spanish mackerel were collected in the OWR, and no identifiable Spanish mackerel eggs or juveniles were collected during sampling activities between October 2007 and November 2008 in the CFBC, OWR, or CREC nearshore region of Crystal Bay.

Table 5-1. Species and Life Stages Excluded from EFH Assessment

Common Name	Life Stages Excluded	Rationale for Exclusion
Spanish mackerel	Larvae (eggs, juveniles, and adults retained)	Depth requirements not present in Crystal Bay[(a)]
Gray triggerfish	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]
Golden tilefish	All life stages	Depth requirements not present in Crystal Bay[(a)]
Goldface tilefish	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]
Blueline tilefish	All life stages	Depth requirements not present in Crystal Bay[(a)]
Banded rudderfish	All life stages	Depth requirements not present in Crystal Bay[(a)]
Almaco jack	All life stages	Depth requirements not present in Crystal Bay[(a)]
Lesser amberjack	Juveniles(eggs and larvae retained)	Depth requirements not present in Crystal Bay[(a)]
Vermillion snapper	Eggs, juveniles, adults	Depth and substrate requirements not present in Crystal Bay[(a)]
Red snapper	Eggs, larvae, juveniles (adults retained)	Depth requirements not present in Crystal Bay[(a)]
Blackfin snapper	All life stages	Depth requirements not present in Crystal Bay[(a)]
Scamp	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]
Speckled hind	All life stages	Depth requirements not present in Crystal Bay[(a)]
Rock hind	Juveniles (eggs and larvae retained)	Substrate requirements not present in Crystal Bay[(a)]
Red hind	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]
Yellowedge grouper	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]
Warsaw grouper	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]
Red grouper	Eggs, larvae (juveniles and adults retained)	Depth requirements not present in Crystal Bay[(a)]

Table 5-1. (contd)

Common Name	Life Stages Excluded	Rationale for Exclusion
Black grouper	Eggs, larvae (juveniles and adults retained)	Depth requirements not present in Crystal Bay[(a)]
Gag grouper	Eggs, larvae, adults (juveniles retained)	Depth requirements not present in Crystal Bay[(a)]
White shrimp	Eggs (larvae and juveniles retained)	Depth requirements not present in Crystal Bay[(a)]
Gulf stone crab	All life stages	Species not present in geographical area
Coral	All life stages	Depth and substrate requirements not present in Crystal Bay[(a)]

(a) Crystal Bay area defined by affected nearshore environment up to 2 mi offshore.
Modified from Table 1-1.

Table 5-2. Designated EFH for Species and Life Stages for the Estuarine Cross Florida Barge Canal and Old Withlacoochee River

Common Name	Species Name	Life Stage
Spanish mackerel	*Scombermorus maculatus*	Adults
Hogfish	*Lachnolaimus maximus*	Juveniles
Schoolmaster	*Lutjanus apodus*	Juveniles
Gray (mangrove) snapper	*Lutjanus griseus*	Larvae, juveniles, adults
Dog snapper	*Lutjanus jocu*	Juveniles
Lane snapper	*Lutjanus synagris*	Larvae, juveniles
Yellowtail snapper	*Ocyurus chrysurus*	Juveniles
Red grouper	*Epinephelus morio*	Juveniles
Black grouper	*Mycteroperca bonaci*	Juveniles, adults
Gag grouper	*Mycteroperca microlepis*	Juveniles
Red drum	*Sciaenops ocellatus*	Larvae, juveniles, adults
White shrimp	*Litopenaeus setiferus*	Larvae, juveniles
Pink shrimp	*Farfantepenaeus duorarum*	Juveniles
Florida stone crab	*Menippe mercenaria*	Eggs, larvae, juveniles

Modified from Table 1-1.

Table 5-3. Designated EFH for the Marine Crystal Bay Up to 2 mi Offshore

Common Name	Species	Life Stage
Spanish mackerel	*Scombermorus maculatus*	Eggs, juveniles, adults
Hogfish	*Lachnolaimus maximus*	Juveniles
Schoolmaster	*Lutjanus apodus*	Eggs, larvae, juveniles
Lesser amberjack	*Seriola fasciata*	Eggs, larvae
Greater amberjack	*Seriola dumerili*	Eggs, larvae, juveniles
Dwarf sand perch	*Diplectrum bivittatum*	Juveniles
Gray (mangrove) snapper	*Lutjanus griseus*	Eggs, larvae, juveniles, adults
Dog snapper	*Lutjanus jocu*	Eggs, larvae, juveniles
Lane snapper	*Lutjanus synagris*	Eggs, larvae, juveniles
Yellowtail snapper	*Ocyurus chrysurus*	Eggs, juveniles, adults
Red snapper	*Lutjanus campechanus*	Adults
Red grouper	*Epinephelus morio*	Juveniles, adults
Black grouper	*Mycteroperca bonaci*	Juveniles, adults
Gag grouper	*Mycteroperca microlepis*	Juveniles
Nassau grouper	*Epinephelus striatus*	Eggs, larvae, juveniles
Rock hind	*Epinephelus adscensionis*	Eggs, larvae
Red drum	*Sciaenops ocellatus*	Eggs, juveniles, adults
White shrimp	*Litopenaeus setiferus*	Larvae
Pink shrimp	*Farfantepenaeus duorarum*	Eggs, larvae, adults
Florida stone crab	*Menippe mercenaria*	Eggs, larvae, juveniles

Modified from Table 1-1.

Construction activities would not occur in nearshore areas, but would occur in a small proportion of available potential foraging habitat within the CFBC at the site of discharge piping entrenchment, barge-unloading facility, and intake structure placement. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor and temporary. Spanish mackerel were also collected in the nearshore area of the CREC discharge. No construction activities are planned for the nearshore areas around the CREC discharge. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by adult and juvenile Spanish mackerel, as well as by their prey. Eggs may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect any life stages of Spanish mackerel in the vicinity. Vegetation management practices in transmission corridors and transmission line

maintenance is not expected to affect EFH species. Therefore, LNP construction activities would likely have a minimal adverse effect on adult Spanish mackerel EFH in the CFBC, and LNP operations would likely have minimal adverse impact on Spanish mackerel eggs, and juvenile EFH.

5.1.2 Hogfish

Juvenile hogfish (*Lachnolaimus maximus*) are found in shallow estuarine and marine areas and near submerged aquatic vegetation (SAV) habitats, where they forage on benthic crustaceans, mollusks, and echinoderms (GMFMC 2004). Hogfish juveniles are all female and transform to males following spawning as females around 3 years of age (FFWCC 2008b). No hogfish were collected during sampling activities in the Crystal Bay area, nearshore of the CFBC, or within the CFBC (CH2M Hill 2009b).

Construction activities would not occur in nearshore areas, but would occur in a small proportion of available potential foraging habitat within the CFBC at the site of discharge piping entrenchment, barge-unloading facility, and intake structure placement. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor and temporary. Juvenile hogfish that may be present should be able to use adjacent unaffected SAV habitats. No construction activities are planned for the nearshore areas around the CREC discharge. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by juvenile hogfish, as well as by their prey. Water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect juvenile hogfish in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect EFH species. Therefore, LNP construction and operations would likely have minimal adverse impact on hogfish juvenile EFH.

5.1.3 Amberjack Species

The greater amberjack (*Seriola dumerili*) and lesser amberjack (*Seriola fasciata*) primarily are found in offshore deepwater marine habitats. Spawning occurs offshore in the spring, and eggs, larvae, and greater amberjack juveniles may drift into shallower marine habitats. Juvenile greater amberjack feed on plankton and small invertebrates (GMFMC 2004). No eggs, larvae, or juveniles were collected during sampling activities in the Crystal Bay area or nearshore of the CFBC (CH2M Hill 2009b).

No construction activities are planned for the nearshore areas around the CREC discharge, and construction activities within the CFBC would not impact marine EFH for both lesser and greater amberjack eggs, larvae, and juveniles. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by juvenile greater amberjack, as

well as by their prey. Eggs and larvae may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect any life stages of greater or lesser amberjack species in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect EFH species. Therefore, LNP construction would likely have no adverse impact on amberjack EFH, and LNP operations would likely have minimal adverse impact on amberjack egg and larvae EFH.

5.1.4 Dwarf Sand Perch

Juvenile dwarf sand perch (*Diplectrum bivittatum*) are demersal and occur in hard-bottom marine habitats that may be present in nearshore areas of Crystal Bay. It is unknown what specific habitat needs juveniles require in these areas. Dwarf sand perch feed on benthic crustaceans and small fish. Juveniles move from shallow marine habitats and move offshore during winter months (GMFMC 2004). No juveniles were collected during sampling activities in the Crystal Bay area or nearshore of the CFBC (CH2M Hill 2009b).

No construction activities are planned for the nearshore areas around the CREC discharge, and construction activities within the CFBC would not impact marine EFH for juvenile dwarf sand perch. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by juvenile dwarf sand perch, as well as by their prey. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect juvenile dwarf sand perch in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect dwarf sand perch juveniles. Therefore, LNP construction and operation would likely have no adverse impact on dwarf sand perch juvenile EFH.

5.1.5 Gray Snapper

For estuarine habitats associated with the CFBC, larval, juvenile, and adult life stages of gray snapper (*Lutjanus griseus*) are considered because this species occupies primarily inshore habitats. Eggs are found primarily in marine waters as part of the plankton community. Larvae are marine, neritic, and planktonic, and are known to be in the Gulf of Mexico from April through November. As they mature, gray snapper move into estuarine habitats and occupy inshore grassy areas. Juveniles and adults are found near SAV in inshore marine and estuarine habitats or near mangroves (GMFMC 2004). Adults move offshore to spawn between June and September. Juvenile and adult gray snapper forage on small fish and crustaceans (FFWCC 2008c). Gray snapper were observed in the CFBC at all three stations from the Inglis Lock to the mouth and in the nearshore area of the CREC discharge (CH2MHill 2009b).

For estuarine habitats associated with the CFBC, larval, juvenile, and adult life stages of gray snapper are considered because this species occupies primarily inshore habitats (GMFMC 2004). Eggs are found primarily in marine waters as part of the plankton community. Adults and juveniles occur in potential foraging habitat within the CFBC at the site of discharge piping entrenchment, barge-unloading facility, and possibly the intake installation. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor, temporary, and largely mitigable. Larvae may move into estuarine habitats, like the CFBC, and become entrained in the cooling-water intake system. However, it is unlikely that appreciable numbers of larvae would be entrained because no larval snapper species were collected over a year of sampling near the mouth or within the CFBC. Juvenile gray snapper that may be present should be able to use adjacent unaffected SAV habitats. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by adult and juvenile gray snapper, as well as by their prey. Eggs and larvae may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect gray snapper in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect gray snapper EFH. Therefore, LNP construction would likely have minimal adverse impact on gray snapper juvenile and adult EFH. LNP operations would likely have minimal adverse impact on gray snapper eggs, larvae and juvenile EFH.

5.1.6 Lane Snapper

Larvae and juvenile lane snapper (*Lutjanus synagris*) may occupy estuarine to marine habitats with SAV or sand, shell, or soft substrate (GMFMC 2004). Mature adults spawn offshore from March through September, and eggs are found primarily in marine waters as part of the planktonic water column. Juveniles feed on small crustaceans and fish and mature to reproductive adults within a year (FFWCC 2008d). Lane snapper were observed in the CFBC at all three stations from the Inglis Lock to the mouth and in the nearshore area of the CREC discharge (CH2MHill 2009b).

Juvenile lane snapper may forage within the CFBC at the site of discharge piping entrenchment, barge-unloading facility, and possibly the intake installation. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor, temporary, and largely mitigable. Larvae may move into estuarine habitats, like the CFBC, and become entrained in the cooling-water intake system. However, it is unlikely that appreciable numbers of larvae would be entrained as no larval snapper species were collected over a year of sampling near the mouth or within the CFBC. Larval and juvenile lane snapper that may be present should be able to use adjacent unaffected SAV habitats. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by juvenile lane snapper, as well as by their prey.

Eggs and larvae may drift near the region of the discharge plume, but EFH for these life stages is defined at a depth range of 4 to 132 m, which would not occur in the discharge plume region. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect lane snapper in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect lane snapper EFH. Therefore, LNP construction would likely have minimal adverse impact on lane snapper juvenile EFH. LNP operations would likely have minimal adverse impact on lane snapper egg, larvae and juvenile EFH.

5.1.7 Schoolmaster

Both larval schoolmaster and schoolmaster eggs are found in marine waters associated with the planktonic water column. Juveniles move into shallow, estuarine waters (GMFMC 2004) However, no life stages of these species were collected during sampling activities in the Crystal Bay area or the CFBC (CH2M Hill 2009b).

Schoolmaster juveniles may forage within the CFBC at the site of discharge piping entrenchment and possibly the intake installation. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor, temporary, and largely mitigable. During operation, impingement losses of juveniles are unlikely due to the low through-screen velocity and limited withdrawal rates for closed-cycle cooling. Eggs and larvae may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect schoolmaster in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect schoolmaster. Therefore, LNP construction would likely have minimal adverse impact on schoolmaster juvenile EFH. LNP operations would likely have minimal adverse impact on schoolmaster egg and larvae EFH.

5.1.8 Dog Snapper

Dog snapper use estuarine, grassy nearshore habitat for juvenile development. Both dog snapper larvae and eggs are found in marine waters associated with the planktonic water column (GMFMC 2004), which occur outside the CFBC. Juveniles may also use sand, shell, or soft bottom estuarine habitat, such as found in the CFBC, for foraging. However, no life stages of these species were collected during sampling activities in the Crystal Bay area or the CFBC (CH2M Hill 2009b).

Disruption of habitat for foraging in the areas of the CFBC near the discharge piping entrenchment, barge-unloading facility, and intake installation is expected to be minor,

temporary, and largely mitigable. During operation, impingement losses of juveniles are unlikely due to the low through-screen velocity and limited withdrawal rates for closed-cycle cooling. Eggs and larvae may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect dog snapper in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect dog snapper. Therefore, LNP construction would likely have minimal adverse impact on dog snapper juvenile EFH. LNP operations would likely have minimal adverse impact on dog snapper egg, larvae, and juvenile EFH.

5.1.9 Yellowtail Snapper

Juvenile yellowtail snapper move into nearshore nursery areas characterized as marine or estuarine with SAV or soft-bottom substrate. Eggs are planktonic and primarily are found in offshore marine waters. Adult yellowtail snapper are found primarily in marine waters, over shallow-to-50-m depth habitats with hard bottom or reef substrates (GMFMC 2004). However, no life stages of these species were collected during sampling activities in the Crystal Bay area or the CFBC (CH2M Hill 2009b).

Juveniles may use potential foraging habitat within the CFBC at the site of discharge piping entrenchment, barge-unloading facility, and possibly the intake installation. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor, temporary, and largely mitigable. Juvenile yellowtail snapper that may be present should be able to use adjacent unaffected SAV habitats. During operation, impingement losses of juveniles are unlikely due to the low through-screen velocity and limited withdrawal rates for closed-cycle cooling. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by juvenile yellowtail snapper, as well as by their prey. Eggs may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. It is likely that adults in the Crystal Bay area would swim away or forage in nearby unaffected areas. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect red snapper in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect adult red snapper. Therefore, LNP construction would likely have minimal adverse impact on yellowtail snapper juvenile EFH. LNP operations would likely have minimal adverse impact on yellow snapper egg and juvenile EFH.

5.1.10 Red Snapper

Adult red snapper prefer sandy and rocky-bottom habitats in marine waters up to 200 m (GMFMC 2004). No life stages of these species were collected during sampling activities in the Crystal Bay area or the CFBC (CH2M Hill 2009b).

No construction activities are planned for the nearshore areas around the CREC discharge, and construction activities within the CFBC would not impact marine EFH for adult red snapper. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by adult red snapper, as well as by their prey. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect red snapper in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect adult red snapper. Therefore, LNP construction and operations would likely have no adverse impact on adult red snapper EFH.

5.1.11 Grouper Species

Juvenile red grouper (*Epinephelus morio*), gag grouper (*Mycteroperca microlepis*), and juvenile black grouper (*Mycteroperca bonaci*) occupy estuarine hard-bottom and SAV habitats, which occur primarily outside of the CFBC, for growth and feeding (GMFMC 2004). Eggs and larvae for the Nassau grouper (*Epinephelus striatus*) and rock hind (*Epinephelus adscensionis*) are planktonic in marine waters (GMFMC 2004). Juvenile Nassau grouper associate with nearshore SAV in marine waters. No life stages of any grouper species were collected during sampling in the CFBC (CH2M Hill 2009b).

Juveniles and adult black grouper may use potential foraging habitat within the CFBC at the site of discharge piping entrenchment, barge-unloading facility, and possibly the intake installation. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor, temporary, and largely mitigable. Juvenile red, black, and gag grouper that may be present should be able to use adjacent unaffected SAV habitats. No construction activities are planned for the nearshore areas around the CREC discharge. The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by adult and juvenile grouper species, as well as by their prey. Nassau grouper and rock hind eggs and larvae may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect grouper species in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect grouper species in the vicinity. Therefore, LNP construction would likely have minimal adverse impact on juvenile red grouper,

juvenile gag grouper, and juvenile and adult black grouper EFH. LNP operations would likely have minimal adverse impact on rock hind and Nassau grouper eggs and larvae, and red grouper, gag grouper, Nassau grouper, and black grouper juvenile EFH.

5.1.12 Red Drum

Red drum (*Sciaenops ocellatus*) larvae and juveniles spend most of their time in estuarine soft-bottom, sand/shell, and SAV habitats actively feeding on mysids, crustaceans, and fish. Adults spend some time near inshore SAV, sandy or hard-bottom foraging habitats, but are predominantly found offshore where spawning activities occur (GMFMC 2004). Red drum move to deep offshore water in the fall to spawn then return to nearshore coastal and estuarine habitats (FFWCC 2007). Red drum larvae, juveniles, and adults were observed at the proposed intake area within the CFBC. However, no red drum eggs were collected during the year-long sampling activities in the CFBC or nearshore waters, Crystal Bay, or OWC (CH2M Hill 2009b).

Construction activities would not occur in nearshore areas, but would occur in a small proportion of available potential foraging habitat within the CFBC at the site of discharge piping entrenchment and intake structure placement. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor and temporary. Larvae may become entrained in the cooling-water intake system in the CFBC as they were collected in the vicinity of the proposed intake. However, it is unlikely that appreciable numbers of larvae will be entrained as, over the year-long sampling events in the CFBC, 23.01 larvae per cubic m were collected near the proposed intake, and 43.31 larvae per cubic m were collected during the same sampling period at the mouth and nearshore waters of the CFBC (CH2M Hill 2009b). When adjusted for potential entrainment using LNP intake flow of 122 Mgd and foregone production assumptions regarding life history and survival (Boreman et al. 1981), this represents approximately 4 adult equivalents entrained in a year, which should not adversely impact red drum populations (CH2M Hill 2009c). The thermal, chemical, and physical changes in the nearshore Crystal Bay environment should be easily avoided by adult and juvenile red drum, as well as by their prey. Red drum eggs may drift into the region of the discharge plume, but the water-quality parameters from discharge operations (chemical and thermal) are not expected to significantly alter the pelagic Crystal Bay environment. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect red drum in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect red drum EFH. Therefore, LNP construction would likely have minimal adverse impact on red drum juvenile and adult EFH. LNP operations would likely have minimal adverse impact on red drum egg, larvae, juvenile, and adult EFH.

5.1.13 Shrimp

Pink shrimp (*Farfantepenaeus duorarum*) and white shrimp (*Litopenaeus setiferus*) migrate from offshore pelagic environment (larvae) to inhabit grassy, estuarine habitats (juveniles) such as those found outside the mouth of the CFBC (GMFMC 2004). Larval pink shrimp may also occupy marine SAV and sand/shell habitats (GMFMC 2004), which are found in Crystal Bay near the point of discharge for CREC and were collected during sampling activities (CH2M Hill 2009b). Although eggs and adult pink shrimp are also found in nearshore environments, they typically are not found in marine waters less than 1 m deep. White shrimp larvae may also be found in the nearshore marine water column, but prefer estuarine habitats (GMFMC 2004) and were not observed during sampling activities in Crystal Bay (CH2M Hill 2009b).

No construction activities are planned for the nearshore areas around the CREC discharge, and the thermal, chemical, and physical changes in the nearshore Crystal Bay environment due to discharge operations are not expected to detectably alter the water column or sediment environments. Juvenile white and pink shrimp may forage within the CFBC at the site of the discharge piping entrenchment, barge-unloading facility, and possibly the intake installation. Disruption of habitat for foraging in these areas of the CFBC is expected to be minor, temporary, and largely mitigable. Pink shrimp larvae EFH is limited to marine habitats, and are not assessed for the estuarine CFBC. White shrimp larvae and pink shrimp juveniles may move into estuarine habitats, such as the CFBC, and become entrained in the cooling-water intake system. However, it is unlikely that appreciable numbers of larvae will be entrained as relatively few juvenile pink shrimp and no larval white shrimp were collected over a year of sampling near the mouth or within the CFBC (CH2MHill 2009b). Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect shrimp species in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect pink or white shrimp EFH. Therefore, LNP construction would likely have minimal adverse impact on white and pink shrimp juvenile EFH. LNP operations would likely have minimal adverse impact on white shrimp egg, larvae, juvenile, and pink shrimp larvae and juvenile EFH.

5.1.14 Stone Crab

The Florida stone crab (*Menippe mercenaria*) occupy estuarine and marine SAV, sand/shell, and hard-bottom habitats as eggs, larvae, and juveniles (GMFMC 2004). Stone crab larvae require high salinity (>30 pps) for effective growth (GMFMC 2004). No significant numbers of Florida stone crab eggs, larvae, or juveniles were observed within the CFBC, which does not contain preferred habitat types, but they were collected at the CFBC mouth and nearshore areas and in the Crystal Bay area of the CREC discharge.

It is possible that construction activities in the CFBC associated with discharge pipeline trenching and placement may disrupt foraging in these areas of the CFBC, but any disruption is

expected to be minor, temporary, and largely mitigable. Stone crab eggs and larvae may drift into the upper portion of the CFBC, and become entrained in the cooling-water intake system. However, it is unlikely that appreciable numbers of eggs or larvae would be entrained as no stone crab eggs or larvae were collected over a year of sampling within the CFBC (CH2M Hill 2009b). Juvenile stone crab should be able to use adjacent unaffected SAV habitats. No construction activities are planned for the nearshore areas around the CREC discharge, and the thermal, chemical, and physical changes in the nearshore Crystal Bay environment due to discharge operations are not expected to detectably alter the water column or sediment environments. Barges moving heavy equipment and bulk commodities are likely to be slow-moving and prop wash and wave action from the vessel movement is not likely to affect stone crab in the vicinity. Vegetation management practices in transmission corridors and transmission line maintenance is not expected to affect stone crab EFH. Therefore, LNP construction would likely have minimal adverse impact on stone crab juvenile EFH. LNP operations would likely have minimal adverse impact on stone crab egg, larvae, and juvenile EFH.

6.0 Mitigation Measures

Four categories of impacts related to LNP construction and operation that could influence EFH are (1) siltation or turbidity during construction; (2) impingement of juveniles or adults; (3) entrainment of eggs, larvae, and zooplankton in the water column; and (4) release of heated cooling water containing biocides or other chemicals. These operations would be regulated under a FDEP permit currently under consideration (PEF 2008).

Construction activities in the CFBC would involve dredging and trenching activities for installation of the intake structure, blowdown pipelines, and connection of the barge slip to the CFBC. To mitigate construction impacts, turbidity barriers and erosion control measures would be installed in the canal during activities associated with sheet-pile installation to control impacts on water quality and would remain in place until the structures are operational (PEF 2008).

Mitigation of operational impacts include the planned use of closed-cycle cooling, the location of the intake structure in the upper reaches of the CFBC in an area of low biological productivity, the design of the intake structure to limit through screen velocities to 0.5 fps, and the use of bar racks on 3.5 in centers to exclude larger organisms from the vertical traveling screens. Such mitigation is consistent with the Phase I requirements of the Clean Water Act Section 316(b) (66 FR 65256). These mitigation measures should significantly reduce impingement and entrainment mortality of fish and shellfish to levels substantially below those resulting from a similar sized facility utilizing once-through cooling.

Discharged cooling water would be combined with existing CREC discharge effluents, which are currently under FDEP regulations for both maximum thermal limits and discharge of chemicals in the effluent (FDEP 2008). The addition of LNP cooling water discharge would not result in appreciable additional thermal impact, and the applicant has applied for a new discharge permit to comply with regulations involving addition of chemical effluent in the total discharge (PEF 2008).

Although the NRC lacks the statutory authority to require any of the above potential mitigation measures, the review team recognizes that such potential mitigation could further reduce adverse impacts on designated EFH and on Federally managed fish and shellfish species in the Gulf of Mexico. The Corps permit, if issued, could include special conditions such as time-of-year restrictions or specific methods of work to ameliorate potential impacts to EFH for the authorized construction activities. EFH Conservation Recommendations necessary to protect EFH may also be included. Mitigation may only be employed after all appropriate and practical steps to avoid and minimize adverse impacts to aquatic resources have been taken. All remaining unavoidable impacts must be compensated to the extent appropriate and practicable.

7.0 Cumulative Impacts

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and future actions that could affect aquatic ecology. For this analysis, the geographic area of interest is the waterbodies connected to the proposed LNP site and offsite facilities, the entire CFBC, Lake Rousseau, the Inglis Lock bypass channel, the OWR, the CREC intake and discharge, and the Levy and Citrus Counties offshore areas of the Gulf of Mexico. The proposed transmission-line corridors are also included in the geographic area of interest. Other watersheds such as the Wacassassa River basin, do not affect water quality or biota in the waterbodies associated with LNP activities and are therefore not considered in the cumulative impacts analysis.

Other actions in the vicinity that have present and reasonably foreseeable future potential impacts on the CFBC and Gulf of Mexico offshore of the CREC include operation of the existing CREC, the proposed uprate of CREC Unit 3, current operation of the Inglis Quarry, widening of the US-19 bridge across the CFBC, a proposed hydropower project on the Inglis Lock bypass channel spillway, proposed Tarmac King Road Limestone Mine, decommissioning of CREC Units 1 and 2, development of a Port District along the CFBC, and natural environmental stressors (e.g., short- or long-term changes in precipitation or temperature and the resulting response of the aquatic community). The review team considered these potential sources of impacts in its evaluation of the cumulative aquatic ecology impacts presented in PEF's ER and Requests for Additional Information.

Historically, the construction and operation of CREC Units 1 through 5 have had some impact on fisheries in the Gulf of Mexico, which PEF mitigates by hatchery supplementation. The Crystal River Mariculture Center began operation October 1991, with red drum, spotted seatrout and pink shrimp among the primary species cultured. Other species such as pinfish (*Lagodon rhomboides*), pigfish (*Orthopristis chrysoptera*), stone crab and blue crab are also cultured and released in the Gulf of Mexico (PEF 2009e). The current CFBC was constructed starting in 1964, but it was never completed as a cross-Florida canal and was officially deauthorized in 1991 (Noll and Tegeder 2003). The western portion of the completed CFBC extends from the Gulf of Mexico to the Inglis Lock at Lake Rousseau and is typical of a tidal canal with marine and estuarine characteristics.

Cumulative impacts on aquatic resources within the CFBC may also include activities or events that are distinct from the LNP site. Activities related to construction of the hydropower system on the Inglis Lock bypass channel could affect the downstream migration of fish from Lake Rousseau to the Withlacoochee River, but would not affect the CFBC or OWR. The US-19 bridge expansion would not include in-water construction, and impacts on the CFBC would likely be mitigated through best management practices to control erosion and stormwater runoff. The Inglis Quarry is located on the north side of the CFBC, and drainage ditches are separated from the CFBC by a containment berm (SDI 2008). Barge traffic within the CFBC is likely to be limited to LNP module transportation and should have minimal impacts on aquatic resources as discussed in EIS Section 4.3.2. The proposed Tarmac King Road Limestone Mine expansion may affect groundwater discharge to the lower Withlachoochee River (see EIS Section 7.2.2). As described in EIS Section 4.2.1, the probable impact on overall reduction in groundwater flux through the region is expected to be small. The CREC Unit 3 power uprate is not expected to have any construction-related impacts except for the construction of additional mechanical draft cooling towers on a portion of the CREC site that has been previously disturbed. Any potential onsite construction-related impacts would be mitigated through the use of BMPs. The contribution of LNP construction-related impacts on impacts related to other nearby construction activities would be minor. Impacts from construction of LNP would be temporary, largely mitigated, and mainly confined to the site.

Once the units begin operation, the review team considered the potential cumulative impacts on the Gulf of Mexico and CFBC related to impingement and entrainment of aquatic organisms and also thermal and chemical releases from both CREC and LNP. Water withdrawn for operation of proposed LNP Units 1 and 2 would require a net intake of 190 cfs (122 Mgd). The source of the 190 cfs, under low-flow conditions, would be 50 cfs from leakage of Lake Rousseau water through the Inglis Lock and freshwater springs, emanating in the CFBC in the vicinity of the intake structure; 70 cfs from the discharge of Lake Rousseau water at the Inglis Dam that would enter the CFBC via the OWR; and an inflow of 70 cfs that would come from the Gulf of Mexico.

Currently, CREC Units 1 through 5 withdraw over 15 times more water from the Gulf of Mexico for operations than the required 190 cfs for LNP Units 1 and 2. The proposed CREC Unit 3 uprate would not increase station water intake flow for CREC Units 1, 2, and 3 (PEF 2007). The additional waste heat generated as a result of the CREC Unit 3 power uprate would be dissipated to the atmosphere by the additional mechanical draft cooling tower planned for construction at the CREC site.

The review team considered the potential incremental cumulative impacts of impingement and entrainment of aquatic organisms related to operation of LNP 1 and 2 along with continued operation of CREC Units 1 through 5. As discussed in EIS Section 5.3.2, the proposed closed-cycle cooling system with mechanical draft cooling towers for proposed LNP Units 1 and 2 would not be expected to result in a discernable impact on populations of aquatic organisms inhabiting Crystal Bay and Withlacoochee Bay areas of the Gulf of Mexico as a result of impingement or entrainment.

The review team is aware that the possibility exists that CREC Units 1 and 2 (fossil-fuel plants), which contribute significantly to the overall impingement and entrainment of aquatic organisms at CREC, would be decommissioned once LNP Units 1 and 2 begin operation. This significant reduction in intake withdrawal volume (greater than 48 percent) at CREC would reduce the cumulative impact of impingement and entrainment related to operation of CREC on aquatic organisms in the Gulf of Mexico, and may result in a net positive impact on local fisheries (see Table 3-1).

The operation of the proposed Inglis hydropower project would involve the use of bar racks to prevent debris and organisms larger than 2 in. from traveling through the turbine (Inglis 2008). Any potential impacts from the Inglis hydropower project are isolated from the impacts on the CFBC because the Inglis Lock bypass channel and Withlacoochee River are not hydraulically connected to the CFBC. The construction and operation of the hydroelectric facility would have no effect on populations of aquatic organisms inhabiting the CFBC. Therefore, the Inglis hydroelectric project will have no detectable incremental cumulative impact on aquatic resources affected by the building and operation of LNP.

The review team also considered the potential cumulative impacts of thermal discharges. The operation of all five units at CREC with the uprate of CREC Unit 3 and without the LNP Units 1 and 2 discharge would result in no thermal increase with the operation of a new helper cooling tower to augment the current modular helper cooling towers (PEF 2007). The review team is aware that the possibility exists that CREC Units 1 and 2 (fossil-fuel plants), which contribute to of the discharge flow, would be decommissioned once LNP Units 1 and 2 begin operation. The review team conducted a thermal analysis of two cases involving the discharge from CREC.

The first case evaluated the thermal discharge from all five units at CREC, the power uprate from CREC unit 3 and the blowdown from LNP 1 and 2. A second analysis involved CREC

Units 3 through 5, the Unit 3 power uprate, and blowdown from LNP 1 and 2 and CREC Units 1 and 2 permanently shutdown. The thermal analyses for these two cases are presented in EIS Section 5.2.3.1. The first scenario concludes that resulting changes in discharges at CREC would be minimal for thermal and chemical impacts with a slight increase in discharge plume size. The addition of LNP Units 1 and 2 discharge would result in an increased discharge volume of 87.93 Mgd, but no significant increase in thermal plume temperature or salinity over current conditions, as discussed in EIS Section 5.3.2.1.

The second scenario, with the absence of CREC Units 1 and 2 not operating, CREC Units 3 through 5 operating, CREC Unit 3 with the power uprate, and LNP Units 1 and 2 operating, would result in a discharge plume much decreased in size when compared to the first scenario. CREC Units 1 and 2 currently contribute 918 Mgd total discharge to the Gulf of Mexico during summer operations. This accounts for greater than 45 percent of the total discharge (PEF 2009d). The predicted thermal plume would decrease during both summer and winter conditions as a result from the decreased discharge plume. Salinity increases would occur under both summer and winter conditions due to increased cycles of concentration with CREC Units 1 and 2 non-operational, but are less than 1.0 psu (see EIS Section 7.2.2). The overall impact on aquatic resources is expected to be minimal.

Both scenarios represent a noticeable temperature and salinity change in the immediate Gulf of Mexico waters compared to the same region prior to CREC operations from a cumulative point of view (as discussed in EIS Section 7.2.2.1). However, habitats and aquatic organisms in this area have adapted to the salinity and temperature changes so that the incremental impacts of LNP 1 and 2 discharge, CREC uprate of Unit 3, and decommissioning of CREC Units 1 and 2 would likely not be noticeable.

The review team considered the potential cumulative impacts from chemical releases, including increases in total dissolved solids in the combined CREC and LNP discharge. CREC Units 1 through 5 are in compliance with the Clean Water Act Section 316(a) (thermal discharges) impacts from cooling-water systems. Chemical releases from the existing unit(s) currently comply with the FDEP NPDES permit requirements, and compliance with the Unit 3 uprate, and decommissioning of CREC Units 1 and 2 are expected to continue and would be monitored in the future. The FDEP will take cumulative chemical releases from the existing and proposed unit, as well as from other industrial sites discharging to the Gulf of Mexico, into consideration before approving a NPDES permit for the proposed unit. Given the lack of other discharges into the immediate area of the CREC discharge, it is likely that the cumulative impacts from LNP discharge combined with the discharge from CREC units 1 through 5 with and without operation of CREC Units 1 and 2 would be minimal.

Anthropogenic activities, such as residential or industrial development near the vicinity of the nuclear facility, can present additional constraints on aquatic resources. Future activities may include shoreline development, such as the proposed Port District, for commercial, industrial,

and residential waterfront development along the CFBC to the west of US-19 (Citrus County 2009); increased water needs; and increased discharge of effluents into the Gulf of Mexico or the CFBC. In addition to direct anthropogenic activities, physical disturbance and climatic events may impose external stressors on aquatic communities. Aquatic ecosystem responses to these events are difficult to predict. The level of impact resulting from these activities or events would depend on the intensity of the perturbation and the resiliency of the aquatic communities. Aquatic ecosystem responses to these events are difficult to predict. Although trends and conditions, such as urbanization, industrialization, and global climate change, could affect aquatic species habitats, none of the identified present or future projects is expected to adversely affect aquatic species in the region of interest.

Cumulative impacts on aquatic ecology resources are estimated based on the information provided by PEF and the review team's independent review. The review team concludes that cumulative impacts on aquatic biota from the construction, preconstruction, and operation of LNP Units 1 and 2 and other past, present, and reasonably foreseeable projects would be noticeable, but not destabilizing for EFH. The incremental impacts from NRC-authorized activities for proposed Units 1 and 2 would be minor because impacts on aquatic resources, while noticeable in the CFBC and in Crystal Bay, would not noticeably alter the EFH of affected and hydrologically connected waterbodies.

8.0 Conclusion

The potential impacts of the construction and operation of proposed LNP Units 1 and 2 on Federally managed species and their EFH near the site have been evaluated. The known distributions and records of the species, the potential ecological impacts of the construction and operation on them, their habitat, and their prey have been considered in this EFH assessment and are summarized in Table 8-1. Based on the project design, the minimal short-term impacts associated with the dredging and intake installation, and the mitigation measures planned for LNP, the review team concludes that construction and operation of LNP would result in a minimal adverse effect on EFH.

Table 8-1. Impacts of LNP Construction and Operations on EFH

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Spanish mackerel	Eggs	M, less than 50 m, planktonic	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	M, less than 50 m, pelagic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Adults	E/M, less than 75 m, pelagic	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities.
Hogfish	Juveniles	E/M, between 3 and 30 m, SAV	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect portion of Crystal Bay SAV.
Lesser amberjack	Eggs	M, planktonic	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, pelagic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Greater amberjack	Eggs	M, 1-183 m, planktonic	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, 1-183 m, pelagic	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	M, 1-183 m, drift algae	No Adverse Effect
Dwarf sand perch	Juveniles	M, hard bottom	No Adverse Effect
Gray (mangrove) snapper	Eggs	M, less than 180 m, planktonic	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M/E, less than 180 m, planktonic	Minimal Adverse Effect. Operation of intake in CFBC may entrain small percentage of population, increase in discharge plume may affect small portion of Crystal Bay.
	Juveniles	M/E, less than 180 m, SAV	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in thermal plume may affect small portion of Crystal Bay SAV.
	Adults	E/M, less than 180 m, sand/shell/soft/hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities.

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Schoolmaster	Eggs	M, less than 90 m, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, less than 90 m, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	E/M, less than 90 m, hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities.
Dog snapper	Eggs	M, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	E/M, SAV	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect small portion of Crystal Bay SAV.

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Lane snapper	Eggs	M, between 4 – 132 m, planktonic	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay.
	Larvae	E/M, between 4 – 132 m, SAV	Minimal Adverse Effect. Operation of intake in CFBC may entrain small percentage of population. Increase in discharge plume may affect small portion of Crystal Bay SAV
	Juveniles	E/M, less than 20 m, SAV, sand/shell/soft bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect small portion of Crystal Bay SAV.
Yellowtail snapper	Eggs	M, between 1 – 183 m, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	M/E, between 1 – 183 m, SAV, soft bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect small portion of Crystal Bay SAV.
	Adults	M, between 1 – 183 m, hard bottom, shoals/banks	No Adverse Effect

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Red snapper	Adults	M, hard/sand/shell bottom	No Adverse Effect
Red grouper	Juveniles	M/E, less than 50 m, hard bottom, SAV	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in thermal plume may affect small portion of Crystal Bay SAV.
	Adults	M, between 3 – 183 m, hard bottom	No Adverse Effect
Black grouper	Juveniles	E/M, SAV, hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in thermal plume may affect small portion of Crystal Bay SAV.
	Adults	M/E, hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities.
Gag grouper	Juveniles	M/E, less than 50 m, SAV, hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in thermal plume may affect small portion of Crystal Bay SAV.

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[a]	Expected Impact
Nassau grouper	Eggs	M, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, between 2 – 50 m, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	M, SAV	Minimal Adverse Effect. Increase in discharge plume may affect small portion of Crystal Bay SAV.
Rock hind	Eggs	M, between 2 – 100 m, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, between 2 – 100 m, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Red drum	Eggs	M, planktonic	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	E, planktonic, SAV, sand/shell/soft bottom	Minimal Adverse Effect. Operation of intake in CFBC may entrain small percentage of population.
	Juveniles	M/E, less than 5 m, SAV, sand/shell/soft/hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect small portion of Crystal Bay SAV.
	Adults	M/E, between 1 – 46 m, SAV, pelagic, sand/shell/soft/hard bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect small portion of Crystal Bay SAV.
White shrimp	Larvae	E/M, less than 64 m, plankton, soft bottom	Minimal Adverse Effect. Operation of intake in CFBC may entrain small percentage of population, Increase in discharge plume may affect small portion of Crystal Bay.
	Juveniles	E, soft bottom	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities.

Table 8-1. (contd)

Common Name	Life Stage	EFH Description[(a)]	Expected Impact
Pink shrimp	Eggs	M, less than 50 m, sand/shell bottom	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Larvae	M, less than 50 m, planktonic, sand/shell bottom	Minimal Adverse Effect, Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	E, less than 64 m, sand/shell bottom, SAV	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities.
	Adults	M, less than 64 m, sand/shell bottom	No Adverse Effect
Florida stone crab	Eggs	E/M, less than 62 m, sand/shell/hard bottom, SAV	Minimal Adverse Effect. Operation of intake in CFBC may entrain small percentage of population. Increase in discharge plume may affect small portion of Crystal Bay SAV.
	Larvae	E/M, less than 62 m, planktonic	Minimal Adverse Effect. Operation of intake in CFBC may entrain small percentage of population. Increase in discharge plume may affect small portion of Crystal Bay
	Juveniles	E/M, less than 62 m, sand/shell/hard bottom, SAV	Minimal Adverse Effect. Construction in CFBC may temporarily disrupt foraging activities. Increase in discharge plume may affect small portion of Crystal Bay SAV.

(a) M = marine; E = Estuarine; SAV = submerged aquatic vegetation substrate.

9.0 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.”

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, Licenses, Certifications, and Approvals for Nuclear Power Plants.”

66 FR 65256. December 18, 2001. "National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities." *Federal Register*. U.S. Environmental Protection Agency.

72 FR 57416. October 9, 2007. “Limited Work Authorizations for Nuclear Power Plants.” *Federal Register*. U.S. Nuclear Regulatory Commission, Washington, D.C.

Boreman, J., C.P. Goodyear, and S.W. Christensen. 1981. “An Empirical Methodology for Estimating Entrainment Losses at Power Plants Sited on Estuaries.” *Transactions of the American Fisheries Society* 110(2):253-260. DOI: 10.1577/1548-8659.

CH2M Hill Nuclear Business Group (CH2M Hill). 2009a. *Estimated Salinity Changes in the Cross Florida Barge Canal and Old Withlacoochee River Channels after Levy Nuclear Plant Intake Operation*. Tech Memo No. 338884-TMEM-079, Rev 1, Denver, Colorado. Accession No. ML091740472.

CH2M Hill Nuclear Business Group (CH2M Hill). 2009b. *Aquatic Ecology Sampling Report.* 338884-TMEM-087 Rev. 1, Englewood, Colorado. Accession No. ML091260523.

CH2MHill Nuclear Business Group (CH2M Hill). 2009c *Supplemental 316(b) Information on Potential Impacts to Aquatic Biota at LNP*. Tech Memo No. 338884-TMEM-088 Rev. 1, Englewood, Colorado. Accession No. ML091260537.

Citrus County. 2009. *Commission Sends Port District Category for Review*. Board of County Commissioners press release. Accessed February 9, 2010 at http://www.citruscountyfl.org/press_release_results.jsp?PRESSKEY=482.

Clean Water Act. 33 USC 1251, et seq. (also referred to as the Federal Water Pollution Control Act [FWPCA]).

Estevez, E.D. and M.A. Marshall. 1993. *1993 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Prepared under FPC Contract S01100 for Florida Power Corporation by Mote Marine Laboratory, Sarasota, Florida. Accession No. ML090750887.

Estevez, E.D. and M.A. Marshall. 1994. *1994 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Prepared under FPC Contract S01100 for Florida Power Corporation by Mote Marine Laboratory, Sarasota, Florida. Accession No. ML090750898.

Estevez, E.D. and M.A. Marshall. 1995. *1995 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Prepared under FPC Contract S01100 for Florida Power Corporation by Mote Marine Laboratory, Sarasota, Florida. Accession Nos. ML090750899 and ML090750940.

Florida Administrative Code 62-17. 2009. "Electrical Power Plant Siting."

Florida Administrative Code 62-302. 2009. "Surface Water Quality Standards."

Florida Department of Environmental Protection (FDEP). 2005. *Inglis Lock Review*. Report No. IA-03-21-2005-128, Office of Greenways and Trails, Tallahassee, Florida. Available at: http://www.dep.state.fl.us/ig/reports/files/IA_3_21_2005_128.pdf.

Florida Department of Environmental Protection (FDEP). 2008. *Conditions of Certification, Progress Energy Florida Crystal River Energy Complex Unit 3 Nuclear Power Plant Unit 4 and Unit 5 Fossil Plant*. Case Number PA 77-09A2, Tallahassee, Florida. Accession No. ML100980527.

Florida Department of Environmental Protection (FDEP). 2010. *Conditions of Certification, Plant and Associated Facilities and Transmission Lines*. Levy Nuclear Power Plant Units 1 & 2, Progress Energy Florida, PA08-51B, Tallahassee, Florida. Modified February 23, 2010. Available at http://www.dep.state.fl.us/siting/files/certification/pa08_51_2010_B.pdf.

Florida Electrical Power Plant Siting Act (PPSA). 2010. 29 *Fla. Stat.* 403.

Florida Fish and Wildlife Conservation Commission (FFWCC). 1997. "Baitfish Trawl Fisheries – Tarp Purse Seine Pilot Program: Baitfish Season Harvest Limits, Ch 46-50, F.A.C (Effective November 12, 1997)" in *Evolution of Each Saltwater Regulation – Marine Fisheries Approved Rules Summary*. Available at http://www.myfwc.com/RULESANDREGS/SaltwaterRules_history.htm.

Florida Fish and Wildlife Conservation Commission (FFWCC). 1986. *Annual Landings Summary; Edited Landings Data through Batch 1015.* Accessed at

http://research.myfwc.com/engine/download_redirection_process.asp?file=sumstate_86.pdf&objid=19224&dltype=article.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008a. Spanish mackerel, *Scomberomorus maculatus* (Mitchill, 1815). Accessed at http://research.myfwc.com/features/view_article.asp?id=5556.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008b. Hogfish, *Lachnolaimus maximus* (Walbaum, 1792). Accessed at http://research.myfwc.com/features/view_article.asp?id=5233.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008c. Gray Snapper, *Lutjanus griseus* (Linnaeus, 1758). Accessed at http://research.myfwc.com/features/view_article.asp?id=5148.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008d. Lane Snapper, *Lutjanus synagris* (Linnaeus, 1758). Accessed at http://research.myfwc.com/features/view_article.asp?id=5284.

Gulf of Mexico Fishery Management Council (GMFMC). 2004. *Final Environmental Impact Statement for the Generic Essential Fish Habitat Amendment to the Following Fishery Management Plans of the Gulf of Mexico (GOM): Shrimp Fishery of the Gulf of Mexico, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Stone Crab Fishery of the Gulf of Mexico, Coral and Coral Reef Fishery of the Gulf of Mexico, Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic*. National Oceanic and Atmospheric Administration, Tampa, Florida.

Inglis Hydropower, LLC. (Inglis). 2008. *Draft License Application for Hydropower License Application, FERC Project, No. 12783*. Draft License Application Inglis Bypass Channel Spillway, Inglis Hydropower Project, No. 12783, Inglis, Florida. Inglis Hydropower, LLC., Dover, Florida.

Lindberg W.J. and M.J. Marshall. 1984. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Florida) – STONE CRAB*. U.S. Fish and Wildlife Service, FWS/OBS-82/11.21, Slidell, Louisiana, and U.S. Army Corps of Engineers TR EL-82-4, Vicksburg, Mississippi.

Magnuson-Stevens Fishery Conservation and Management Act, as amended. 16 USC 1801 et seq.

Marshall, M.J. 2002. *Seagrass Survey: November 2001 Resurvey at the Florida Power Crystal River Generating Facility*. Prepared for Florida Power – A Progress Energy Company by the Coastal Seas Consortium, Inc., Bradenton, Florida. Accession No. ML102040256.

National Environmental Policy Act of 1969, as amended (NEPA). 42 USC 4321, et seq.

National Marine Fisheries Service (NMFS). 1999. *Essential Fish Habitat: New Marine Fish Habitat Conservation Mandate for Federal Agencies*. National Marine Fisheries Service, Habitat Conservation Division, Southeast Regional Office, St. Petersburg, Florida. Accession No. ML101880617.

National Marine Fisheries Service (NMFS). 2008. E-mail from Mark Sramek, NMFS, to Michael Masnick, NRC, dated November 24, 2008, in response to letter dated November 5, 2008, "Endangered and Threatened Species and Critical Habitats under the Jurisdiction of the NOAA Fisheries Service." Accession No. ML091180043.

Noll, S. and M.D. Tegeder. 2003. *From Exploitation to Conservation: A History of the Marjorie Harris Carr Cross Florida Greenway*. Florida Department of Environmental Protection, Tallahassee, Florida. Available at: http://www.dep.state.fl.us/gwt/cfg/pdf/History_Report.pdf.

Progress Energy Florida, Inc. (PEF). 2007. *Site Certification Application Crystal River Unit 3 Power Uprate Project, Crystal River Florida*. St. Petersburg, Florida. Available at: http://publicfiles.dep.state.fl.us/Siting/Outgoing/PEF%20CREC/PEF%20Crystal%20River%20Unit%203%20Uprate/.

Progress Energy Florida, Inc. (PEF). 2008. *Levy Nuclear Plant Units 1 and 2, Site Certification Application, Volumes 1 through 9*. St. Petersburg, Florida. Including Amendments and Supplemental Information. Available at http://www.dep.state.fl.us/siting/apps.htm#ppn1.

Progress Energy Florida, Inc. (PEF). 2009a. *Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage*. Revision 1, Raleigh, North Carolina. Accession No. ML092860995.

Progress Energy Florida, Inc. (PEF). 2009b. Letter from Garry Miller, PEF, to NRC, dated June 12, 2009, regarding Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review." Accession No. ML091740483.

Progress Energy Florida, Inc. (PEF). 2009c. Letter from Garry Miller, PEF, to NRC dated March 27, 2009, regarding Response to USACE Request for Additional Information Regarding the Environmental Review. Accession No. ML090920318.

Progress Energy Florida, Inc. (PEF). 2009d. Letter from Garry Miller, PEF, to NRC, dated July 29, 2009, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review – Hydrology 5.3.2.1-2. Accession No. ML09215337.

Progress Energy Florida, Inc. (PEF) 2009e. *Strong Foundation – Bright Future, 2009 Corporate Responsibility Report*. Accessed July 21, 2009 at http://www.progress-energy.com/aboutus/crr/NaturalResrc.asp.

Rivers and Harbors Appropriation Act of 1899 Section 403, as amended. 33 USC 403.

SDI Environmental Services, Inc. (SDI). 2008. *Inglis Quarry Work Plan Study and Groundwater Modeling.* Prepared for Cemex Construction Materials Florida, LLC. SDI Project No. CEF-010. SDI Environmental Services, Inc., Tampa, Florida. Accessed at http://publicfiles.dep.state.fl.us/DWRM/MineReclamation/Cemex%20Inglis%20Quarry/Inglis%20Quarry%20Work%20Plan%20Study%20and%20Ground%20Water%20Modeling_Nov08.pdf.

Stone and Webster Engineering Corporation (Stone and Webster). 1985. *Crystal River 316 Studies, Final Report*. Prepared for Florida Power Corporation, Stoughton, Massachusetts. Accession No. ML090750823.

Sustainable Fisheries Act of 1996. Public Law 104-297.

Biological Assessment

National Marine Fisheries Service

Levy Nuclear Plant Units 1 and 2
Combined License Application

U.S. Nuclear Regulatory Commission
Docket Nos. 52-029 and 52-030

Levy County, Florida

August 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Jacksonville District

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from Progress Energy Florida, Inc. (PEF) for NRC-authorized combined construction permits and operating licenses (COLs) to build and operate two new nuclear power reactors in Levy County, Florida. The U.S. Army Corps of Engineers (USACE) is reviewing an application from PEF for a Department of the Army (DA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Federal Water Pollution Control Act (Clean Water Act) to perform site-preparation activities and construct supporting facilities. The USACE is cooperating with the NRC to ensure that the information presented in a single environmental impact statement (EIS) prepared under the National Environmental Policy Act of 1969, as amended (NEPA), is adequate to fulfill the requirements of USACE regulations; the Clean Water Act Section 404(b)(1) guidelines, which contain the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into waters of the United States; and the USACE public-interest review process. The NRC and the USACE have prepared this biological assessment (BA) to support their joint consultation with the National Marine Fisheries Service (NMFS) in accordance with Section 7(c) of the Endangered Species Act of 1973, as amended (ESA). Decisions by the NRC to issue the COLs and the USACE to issue a DA permit will be made following issuance of the final EIS.

The proposed Levy Nuclear Plant (LNP) Units 1 and 2 would be located on a greenfield site. The proposed LNP site in Levy County, Florida, is approximately 10 mi northeast of the PEF-owned Crystal River Energy Complex (CREC) and 30 mi due west of Ocala, Florida. Both power generation units would consisste of Westinghouse Electric Company, LLC (Westinghouse) AP1000 pressurized water reactors.

The USACE and the NRC are conducting a joint consultation and have prepared this BA, which examines the potential impacts of building and operating the proposed LNP Units 1 and 2, including proposed transmission lines, on threatened or endangered species pursuant to the ESA. NMFS provided a list of Federally protected species under the jurisdiction of NMFS for the State of Florida (NMFS 2008). This BA examines the effects of the proposed action on seven Federally threatened or endangered species under the jurisdiction of the NMFS (presented in Table 1-1) that could occur in the vicinity of the LNP site, associated offsite facilities, or along proposed transmission-line corridors.

The review team is aware of recent events in the Gulf of Mexico associated with the Deepwater Horizon oil spill. To date, information associated with aquatic and terrestrial resources are preliminary and inconclusive. Although not included in this BA, the review team will consider information associated with the oil spill for the LNP project as it becomes available.

Table 1-1. Federally Listed Aquatic Species Occurring in the Vicinity of the LNP Site and Transmission-Line Corridors

Scientific Name	Common Name	Federal Status[(a)]	Nearest Aquatic Habitat
Mammals			
Balaenoptera musculus	Blue whale	E	Gulf of Mexico
Balaenoptera physalus	Finback whale	E	Gulf of Mexico
Megaptera novaeangliae	Humpback whale	E	Gulf of Mexico
Balaenoptera borealis	Sei whale	E	Gulf of Mexico
Physeter macrocephalus	Sperm whale	E	Gulf of Mexico
Reptiles			
Caretta caretta	Loggerhead sea turtle	T	Gulf of Mexico
Chelonia mydas	Green sea turtle	E	Gulf of Mexico
Eretmochelys imbricata	Hawksbill sea turtle	E	Gulf of Mexico
Dermochelys coriacea	Leatherback sea turtle	E	Gulf of Mexico
Lepidochelys kempii	Kemp's ridley sea turtle	E	Gulf of Mexico
Fishes			
Pristis pectinata	Smalltooth sawfish	E	Gulf of Mexico
Acipenser oxyrinchus desotoi	Gulf sturgeon	T	Gulf of Mexico Suwannee River
Invertebrates			
Acropora palmata	Elkhorn coral	T	Gulf of Mexico
Acropora cervicornis	Staghorn coral	T	Gulf of Mexico

Source: NMFS 2008

(a) Federal status rankings determined by the NMFS under the ESA: E = Federally endangered and T = Federally threatened.

2.0 Proposed Action

The proposed Federal actions are the issuance of COLs for construction and operation of two new nuclear reactors at the proposed LNP site pursuant to Title 10 of the Code of Federal Regulations (CFR) Part 52 and a DA permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

The NRC, in a Final Rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" to those activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the

plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erecting of support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for an NRC COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside of the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies including the USACE. The distinction between construction and preconstruction is not carried forward in this BA, and both are being discussed together as construction for the purposes of the NRC/USACE joint ESA consultation.

Prerequisites to construction activities include, but are not limited to, documentation of existing site conditions within the LNP site and acquisition of the necessary permits (e.g., local building permits, a National Pollutant Discharge Elimination System (NPDES) permit [40 CFR Part 122], a DA permit, and a General Stormwater permit). After these prerequisites are completed, planned construction activities could commence and would include all or some of the activities identified in 10 CFR 50.10(a). Following construction, the planned operation of the new reactors would be authorized if the Commission finds, under 10 CFR 52.103(g), that all of the acceptance criteria in the COLs are met.

The following construction and operation activities could potentially affect the species (Table 1-1) and/or habitats based on habitat affinities and life-history considerations and the nature, spatial, and temporal considerations of the activity:

- Construction
  - new dredging and construction of a barge slip and boat ramp on the shoreline of the Cross Florida Barge Canal (CFBC)
  - installation of the cooling-water intake structure (CWIS) on the CFBC shoreline
  - installation of the cooling-water discharge system to CREC, including dredging and placement of discharge piping in the CFBC
  - connection of discharge piping with the existing CREC discharge canal
  - vessel movements associated with in-water work; vessel transportation of large components via barge for the LNP site
  - new transmission-line corridors and towers
- Operation
  - impingement, entrainment, and maintenance activities associated with the CWIS

- salinity changes in the CFBC and the lower portion of the Old Withlacoochee River (OWR)(a remnant arm of the Withlacoochee River)
- discharge plume from the cooling-water system (thermal, chemical, and physical effects)
- maintenance of transmission-line corridors.

3.0 LNP Site Description

The proposed facilities and existing aquatic ecology resources onsite and along existing and proposed transmission-line corridors are described in the following sections.

3.1 Proposed Facilities

The proposed LNP site is located on a primarily rural area in Levy County approximately 4 mi from the town of Inglis and 8 mi east of the Gulf of Mexico (Figure 3-1). The LNP site is currently a greenfield site approximately 3105 ac in size.

The LNP footprint would occupy 300 ac for two reactors and the associated power-production infrastructure near the center of the site (Figure 3-2). Two AP1000 reactors are proposed with an electrical output of 1000 MW(e) and 3415 MW(t) each. A closed-cycle cooling system would draw makeup water from the CFBC through a CWIS located on the north side of the canal. A portion of the makeup water would be returned to the environment via the discharge to the existing CREC discharge canal (Figure 3-3). The remaining portion of the water would be released into the atmosphere for evaporative cooling through mechanical draft cooling towers.

Four 500-kV transmission lines are proposed to run adjacent to or within the CREC's existing maintained transmission-line corridors that run to the proposed Citrus substation, Central Florida South substation, and the CREC 500-kV switchyard (PEF 2009a). New corridor segments would be necessary to connect the Levy County site to the existing corridors. Connection to the Citrus substation corridor would require clearing a corridor extending south from the southern boundary of the proposed LNP site. Existing and new corridors would extend to the proposed Central Florida South substation, and connection of the CREC switchyard to the new Citrus substation would use existing corridors. Two additional 69-kV lines would be required to support construction at the LNP site and would connect to existing 69-kV lines from the western and the southern boundaries of the LNP site (PEF 2008a).

Additional transmission lines extending beyond these first substations to the electrical grid would also be required. Two 230-kV lines would extend from the Citrus substation to the existing Crystal River East substation; a 230-kV line would extend from the CREC switchyard to the Brookridge substation; another 230-kV line would extend from the Brookridge substation to

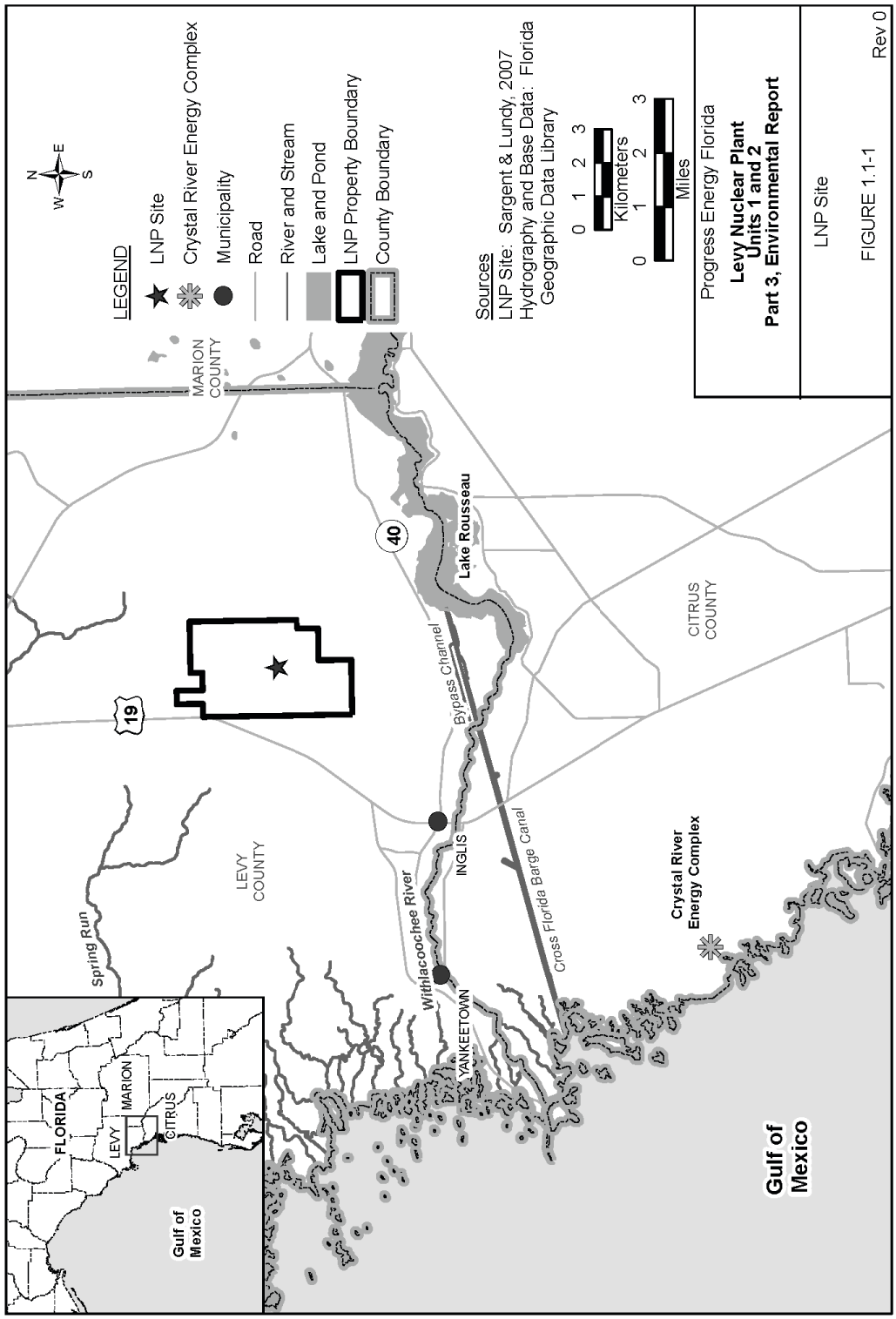

Figure 3-1. Map Showing the LNP Site in Relation to the Gulf of Mexico and Other Waterbodies (PEF 2009a)

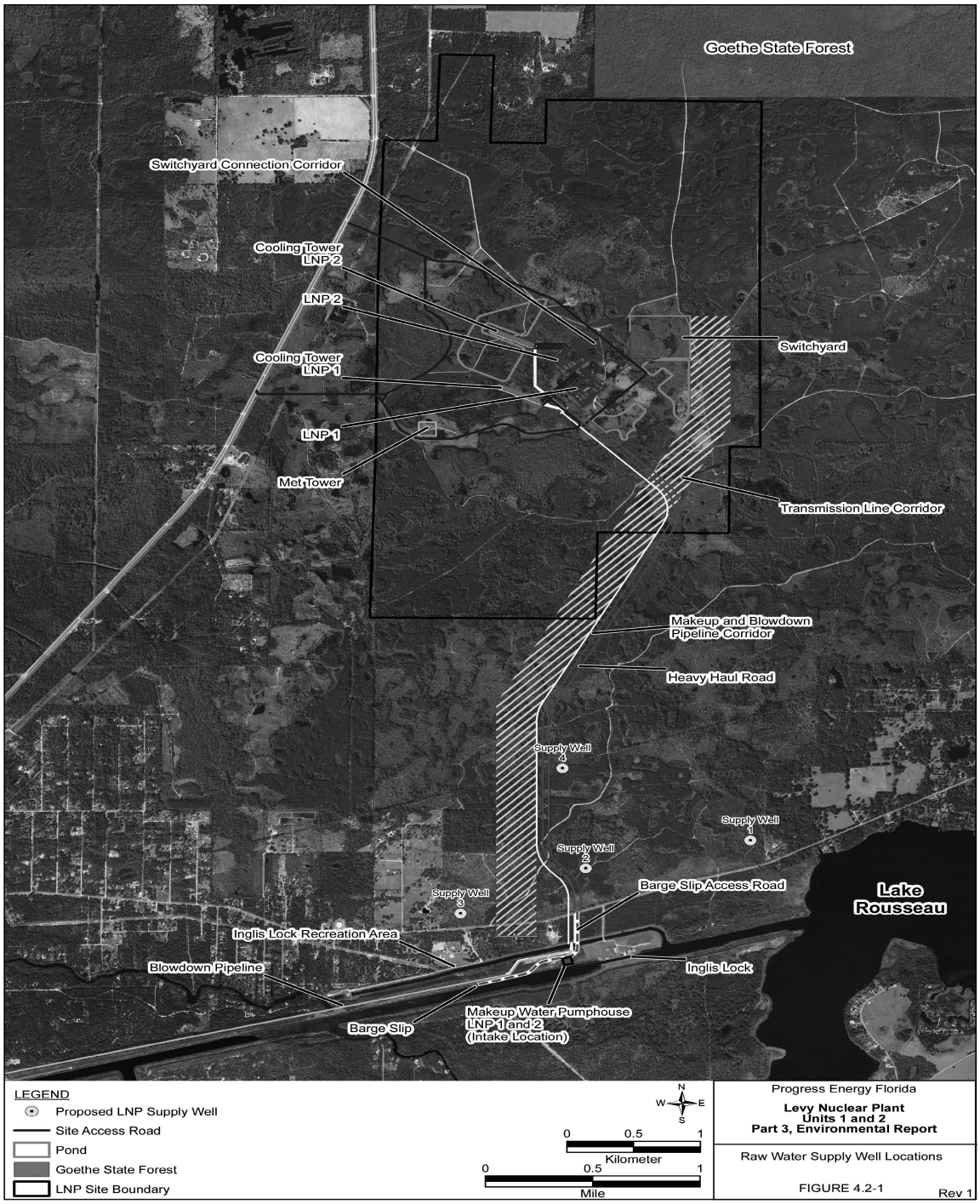

Figure 3-2. Map Showing the Proposed LNP Site Facilities and Infrastructure (PEF 2009a)

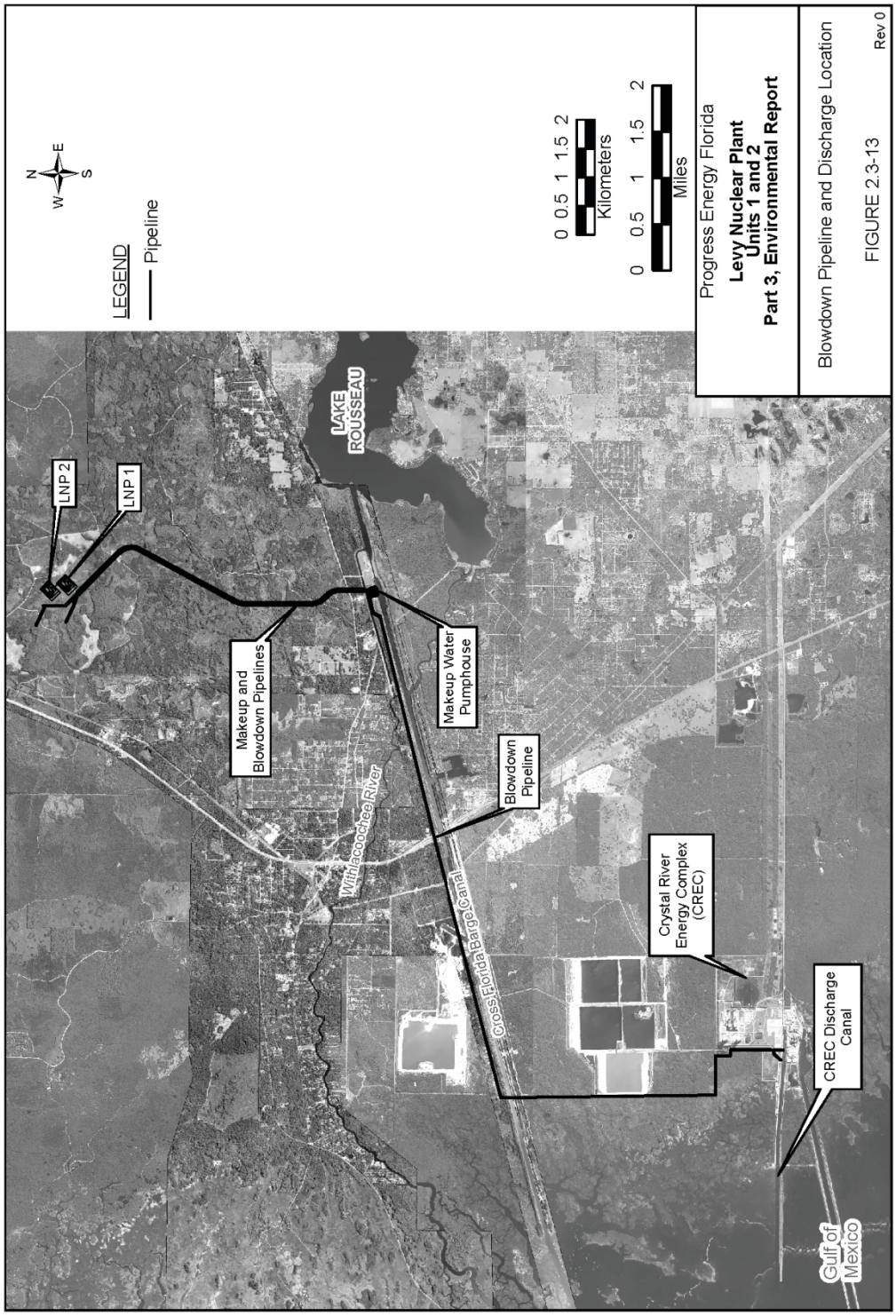

Figure 3-3. Map Showing the Proposed Blowdown Pipeline and Discharge Location (PEF 2009a)

the Brooksville West substation; and the last 230-kV line would extend from the existing Kathleen substation to Griffin substation, then to the Lake Tarpon substation.

3.2 General Aquatic Ecological Resources Onsite

As described in the following sections, site-related aquatic resources are found in the CFBC, OWR, and Crystal Bay.

3.2.1 Cross Florida Barge Canal

In an effort to provide maritime navigation between the Atlantic Ocean and the Gulf of Mexico, construction of a 12-ft-deep by 150-ft-wide Florida cross-peninsular waterway began in the mid-1930s (Noll and Tegeder 2003). Originally intended to be a 171-nautical-mi canal, only 4 percent was complete by 1965 due to lack of funding and congressional support for several decades. Official deauthorization for the barge canal came in 1991, and the Cross Florida Greenway State Recreation and Conservation Area took over the former barge canal properties. The section of western CFBC affiliated with the proposed action is the 7.4-mi stretch from Inglis Lock west to the Gulf of Mexico. It ranges from 8.6 to 18.2-ft deep and from 207 to 262-ft wide. The Inglis Dam was built in 1909 to impound the Withlacoochee River to form 3700-ac Lake Rousseau. An approximately 1.5-mi portion of the historical downstream segment of the Withlacoochee River still runs into the western CFBC below the Inglis Lock (Figure 3-4). A 1.7-mi channel was constructed upstream of the Inglis Lock to reconnect Lake Rousseau waters with the downstream,11-mi portion of the Withlacoochee River, which serves as a bypass around the CFBC. The western portion of the CFBC lies 8 mi to the south of the proposed LNP and is the preferred water source for providing cooling water (see Figure 3-4).

The CFBC discharges into the Withlacoochee Bay estuary in the Gulf of Mexico and is influenced by tidal changes. Water-quality characteristics show a wedge of saltwater extending from the surface waters where the CFBC meets the Gulf of Mexico up toward the Inglis Lock. Characterization of the sediment, salinity, and CFBC biota was conducted over a year of sampling activities from October 2007 through September 2008, and is described further in EIS Section 2.4.2. Overall, fish, plankton, benthic, and macroinvertebrate sampling in the CFBC indicates a biologically diverse and dynamic aquatic community at the offshore and nearshore stations (see EIS Tables 2-9, 2-10, and 2-11). The proposed intake location on the CFBC has a less biodiverse community, but it still has appreciable numbers of sediment-dwelling invertebrates and collections of pelagic species that use the fresher water habitat on a seasonal basis (CH2M Hill 2009b).

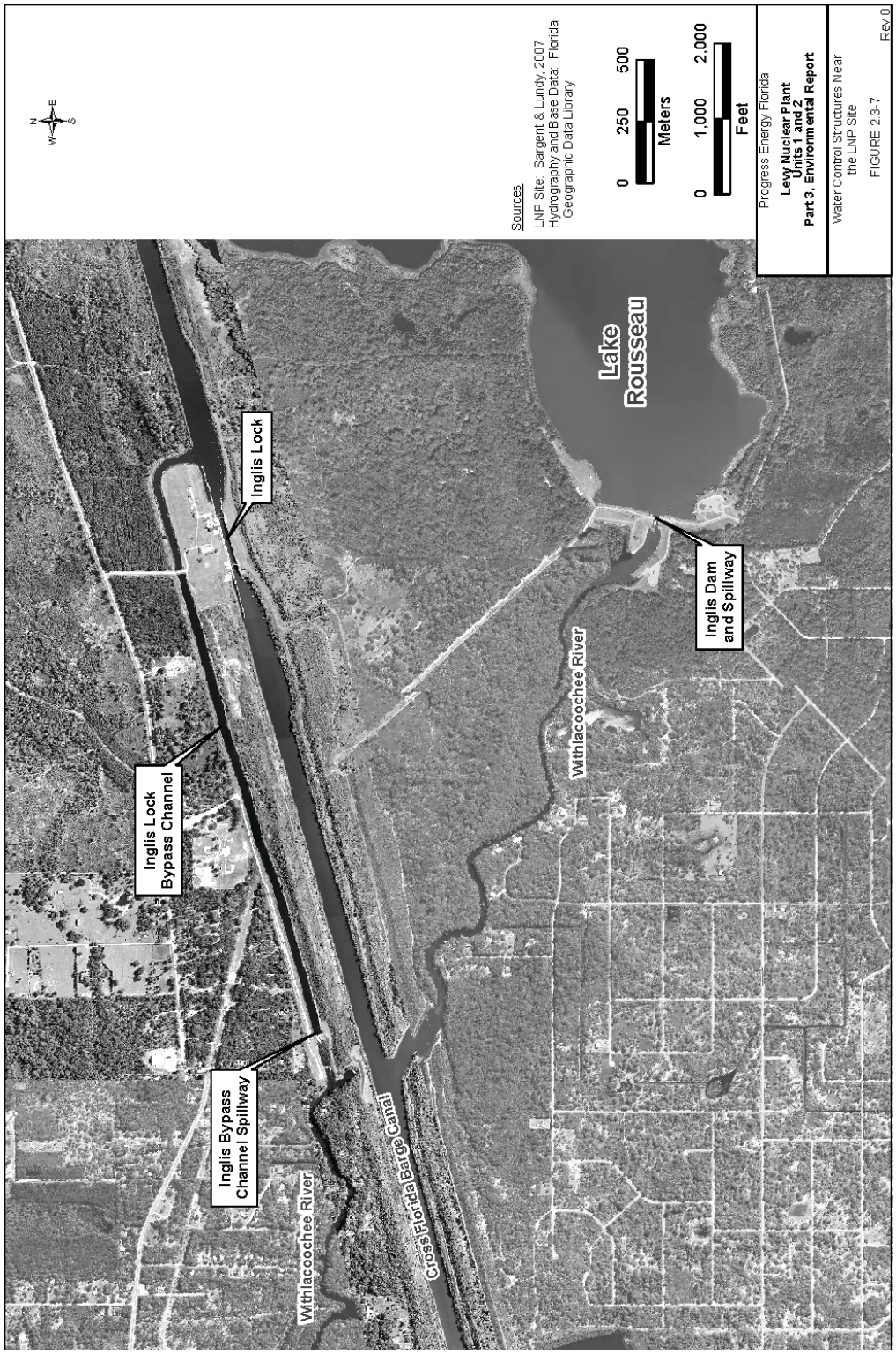

Figure 3-4. The Water-Control Structure near the Proposed LNP Site (PEF 2009a)

3.2.2 Old Withlacoochee River

The portion of the OWR that flows into the CFBC is 1.3 mi long and originates from Lake Rousseau's Inglis Dam. Salinity profiles in the OWR range from 0.14 to 4.38 practical salinity units (psu) at the 3.2-ft depth where it joins with the CFBC (CH2M Hill 2009a). In June and August 2008, sampling was conducted at the junction of the OWR with the CFBC, halfway between the junction and the Inglis Dam and just downstream of the Inglis Dam within this portion of the OWR (Figure 3-4). Benthic macroinvertebrate sampling mirrored the fish sampling results with euryhaline dipteran species predominant at the CFBC-OWR junction station, freshwater oligochaetes and amphipods at the Inglis Dam station, and a paucity of organisms and limited diversity at the midpoint station (CH2M Hill 2009a).

3.2.3 Crystal Bay (Gulf of Mexico)

Aquatic species and habitats associated with the discharge from CREC into Crystal Bay have been characterized using studies conducted during CREC operations (Stone and Webster 1985) and were recently sampled from April through November 2008. Beginning in the early 1990s, seagrass beds have been surveyed as a part of quantifying recovery of the CREC offshore Gulf of Mexico habitats following installation of helper cooling towers (Estevez and Marshall 1993, 1994, 1995). Previously affected seagrass areas were observed to recover with colonization by *Halodule wrightii*, a dominant, quick-growing seagrass. However, between 1995 and 2001, overall seagrass abundance declined, likely from more complex environmental influences (Marshall 2002).

Sampling at the CREC discharge point (Station 3) and immediate offshore Gulf of Mexico area (Station 4) was conducted at multiple time points from April to November 2008 (Figure 3-5). Fish, plankton, and macroinvertebrate sampling in the CREC discharge area of Crystal Bay are indicative of coastal salt marsh and nearshore species and show biodiversity commensurate with similar habitat sampling at nearshore and offshore CFBC sampling locations (EIS Tables 2-9, 2-10, 2-11). However, the influence of CREC discharge may be affecting several of the top forage fish species which are notably absent (bay anchovy, scaled sardine, and silver perch) from the CREC discharge stations.

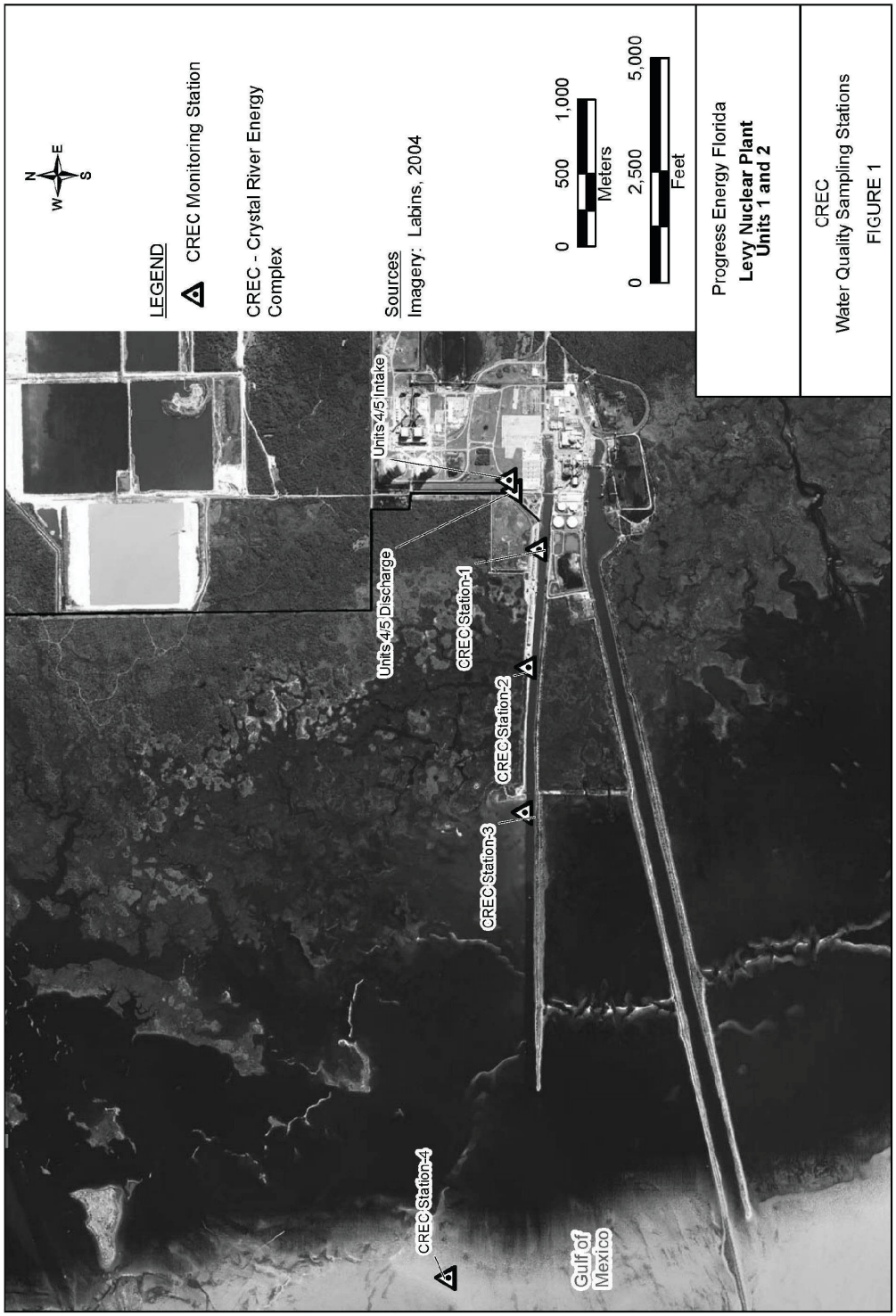

Figure 3-5. Aquatic Sampling Locations for CREC Within the Discharge Canal and Offshore (CH2M Hill 2009b)

3.3 General Aquatic Ecological Resources Along Transmission-Line Corridors

Connection from the proposed LNP to the Citrus substation corridor would cross the Withlacoochee River bypass channel, CFBC, and the OWR. Existing and new corridor extending to the proposed Central Florida South substation would cross the Withlacoochee River at the border of Citrus and Marion Counties and Two Mile Prairie Lake (PEF 2009a). Connection of the CREC switchyard to the new Citrus substation would cross existing corridors over estuarine habitat within Crystal Bay. No known aquatic impacts are currently associated with the existing transmission-line corridors. The existing and proposed transmission-line corridors do not cross any designated critical habitats.

Existing corridors are proposed for the transmission lines extending 50 mi from the Kathleen substation to the Griffin substation and extending west to the Lake Tarpon substation. This corridor crosses the following Outstanding Florida Waters: Blackwater Creek, Trout Creek, Hillsborough River, and Cypress Creek (PEF 2008a). Other waterbodies include Flint Creek, tributaries of Hollomans Branch, Brushy Creek, Rocky Creek, and numerous unnamed intermittent and perennial tributaries of the previously named waterbodies. The review team is unaware of any aquatic impacts currently associated with the existing transmission corridors.

4.0 Environmental Impacts of the Proposed Action

Sections 4.1 and 4.2 provide descriptions of the construction and operation impacts listed in Section 2.0. These construction and operation impacts were determined to potentially affect the species and habitats listed in Table 1-1 based on species habitat affinities and life-history considerations and the type, spatial, and temporal nature of the impacts.

4.1 Construction

This section provides information about the potential aquatic impacts of construction of the proposed new nuclear units at the proposed LNP site and along associated transmission-line corridors.

4.1.1 LNP Site

There are some permanent and temporal shallow ponds on the proposed LNP site that may support small freshwater fish. A few of these would be permanently filled as part of facilities construction, but other onsite ponds would be unaffected. Erosion and runoff control mitigation practices would be used to prevent siltation of preserved ponds onsite (FDEP 2008).

Stormwater management retention and infiltration basins and cessation of forest plantation activities on the site would create improved freshwater aquatic habitat (PEF 2009a).

4.1.2 Cross Florida Barge Canal

The installation of the intake structure, connection of a barge slip and boat ramp to the CFBC, and placement of discharge piping would result in temporary disturbances to the aquatic habitat in portions of the CFBC. Until excavation is complete, preparation of the barge slip would occur on the northern shore of the CFBC in upland areas behind an earth bank that separates building activities from the CFBC. The intake structure would be installed 0.5 mi downstream of the Inglis Lock. Steel sheet piling would be installed at the barge slip and in a cofferdam for intake structure installation. Sheet piles would be installed from land using a pile hammer. Turbidity barriers and erosion-control measures would be installed in the canal during activities associated with sheet-pile installation to control impacts on water quality. Building activities are expected to commence with installation of permanent piling over a 60-week time frame for the barge slip and over a 13-week period for temporary piling at the intake structure. Removal of temporary piling at the intake structure is expected to occur following 6 months of installation activities proposed for an October–March time frame. Turbidity barriers and erosion-control measures are expected to be installed commensurate with piling installation activities and remain in place prior to operations (PEF 2008a). Use of best management practices and water-quality control measures should prevent impacts on the few species that inhabit the portion of the CFBC near the proposed intake. Fish and sea turtles may swim into this portion of the CFBC, but they would be able to swim away or likely would avoid the area due to vibratory noise.

Dredging would be necessary for construction of a trench for the blowdown discharge piping between LNP and CREC. Sediments would be tested before construction using U.S. Environmental Protection Agency (EPA) Method 1311 for toxicity characteristics for determination of final disposition of dredged spoil materials. Non-hazardous sediments would be used to backfill the pipeline trench, as fill material onsite, or disposed in upland areas. Sediments deemed unsuitable for use would be disposed of appropriately in landfills approved for hazardous disposal (PEF 2009d). Residual water from dredging activities would be tested for compliance with NPDES and Florida surface water-quality standards (FDEP 2008). Discharge piping running from the proposed LNP site to the CREC discharge would run parallel along the CFBC berm, then enter and exit CFBC water supported by anchor piers along both CFBC berms (PEF 2009b). Initially proposed routing of the discharge pipeline south of the CFBC crosses several tidal creeks and would adversely impact approximately 4.5 acres of salt marsh habitat. The review team is aware that PEF has proposed to the FDEP an alternate route to avoid this important habitat. FDEP has not made a decision on the proposal. Impacts to habitat related to the discharge pipeline, irrespective of the final routing, would be primarily due to its excavation, placement, and burial associated with construction. Maintenance

dredging for the barge unloading facility and CWIS within the CFBC is not proposed because the depth of the CFBC has not changed since construction in the 1960s and increased sediment load is not predicted under operation conditions (CH2M Hill 2009b).

Vessel use during the dredging or the installation of the in-water structures, and transportation of large components for proposed LNP Units 1 and 2 may affect the aquatic resources of the CFBC, particularly the benthos. The main impacts of using vessels would include turbulence from propellers (prop wash), anchor cable scraping across the canal bottom, and accidental spills of materials overboard. Vessels would be used during the installation of the cooling-water discharge pipeline and during offloading of materials from barges. Vessel operation during construction may cause short-term, localized impacts on aquatic species in the CFBC, but impacts on water quality and habitat in the OWR are not anticipated. These impacts should not affect the general resources in the area of the site or the region along this coast of the Gulf of Mexico.

4.1.3 CREC Discharge Canal

The LNP discharge pipeline (two 54-in. high-density polyethylene pipes, per the conceptual design) would discharge directly into the CREC discharge canal, a concrete-lined, open channel just downstream of the discharge culverts for CREC Units 4 and 5. This 0.7-mi open channel drains directly into the CREC discharge canal approximately 1.1 mi from the Gulf of Mexico. A headwall structure would be necessary to join the LNP discharge piping to the CREC discharge canal (PEF 2009b). No building activities would be conducted beyond the point of discharge into the Gulf of Mexico, so no aquatic impacts would be expected to occur with this activity.

4.1.4 Transmission-Line Corridors

PEF would site the new 500-, 230-, and 65-kV transmission lines in accordance with Chapter 62-17, Florida Administrative Code. In addition, PEF has committed to comply (PEF 2009a) with all applicable laws, regulations, and permit requirements and would use good engineering and construction practices as required by the Florida Department of Environmental Protection (FDEP). PEF states that all work would be conducted in accordance with Federal and State permitting requirements for maintaining water quality and protecting natural resources, such as maintenance of a 15 ft or greater buffer of natural vegetation for installation near waterbodies (Citrus County 2006). PEF plans to leave a 25-ft buffer of existing vegetation with mature heights not exceeding 12 ft at locations where the transmission-line corridor crosses a navigable waterway (PEF 2008a).

Permits required include a DA permit, a FDEP Environmental Resources permit, a FDEP and Southwest Water Management District dewatering permit, and a FDEP NPDES construction stormwater permit (PEF 2009a). County listings for threatened and endangered species have been identified for each delineated corridor. Although several threatened or endangered

species are listed for Levy and Citrus Counties (as outlined in EIS Section 2.4.2), the activities associated with placement of new transmission lines would not require in-water installation activities. Therefore, the review team finds the impacts on aquatic species under jurisdiction of the NMFS due to transmission-line construction and operation, including upgrades to the system beyond the first substation, to be minimal.

4.2 Operation

This section provides information about the potential aquatic impacts of operation of proposed LNP Units 1 and 2 at the site and along associated transmission-line corridors.

4.2.1 Cooling-Water Intake Impacts

PEF stated in its Environmental Report (ER) that a closed-cycle, mechanical draft system would be used for proposed LNP Units 1 and 2. Depending on the quality of the makeup water, closed-cycle recirculating cooling-water systems can reduce water use by 96 to 98 percent versus the amount a facility would use with a once-through cooling system (66 FR 65256) as is used at CREC. This significant reduction in water withdrawal rate results in a corresponding reduction in impingement and entrainment losses. For threatened and endangered aquatic species under the jurisdiction of the NMFS, the primary concerns are related to operation of the intake structure. Water drawn from the cooling-water source (CFBC) has the potential for organisms to be impinged on the intake screens or entrained into the cooling-water system. Impingement occurs when organisms are trapped against the intake screens by the force of the water passing through the CWIS (66 FR 65256). Impingement can result in starvation, exhaustion, asphyxiation (water velocity forces may prevent proper gill movement or organisms may be removed from the water for prolonged periods of time), and descaling (66 FR 65256). Entrainment occurs when organisms are drawn through the CWIS into the proposed LNP Units 1 and 2 cooling system. Organisms that become entrained are normally relatively small benthic, planktonic, and nektonic (organisms in the water column) forms, including early life stages of fish and shellfish that often serve as prey for larger organisms (66 FR 65256). As entrained organisms pass through a plant's cooling system, they are subject to mechanical, thermal, and toxic stresses. No life stages of the aquatic species listed in Table 1-1 are subject to entrainment losses because of their large size and/or habitat requirements.

For the proposed LNP Units 1 and 2 CWIS, PEF assessed 316(b) impacts for withdrawal of cooling water from the CFBC. The through-screen velocity for the intake bays would be less than 0.5 fps. To achieve these low velocities, the inlet area would be larger than 106.1 ft^2 (PEF 2008a). The zone of hydraulic influence would extend from the CWIS to 5 mi west of the CWIS in the CFBC (PEF 2008a) and use an offshore station in the Gulf of Mexico to estimate impingement and entrainment impacts. Sampling in the area of the proposed CWIS indicated a biologically depauperate environment with relatively poor water quality (PEF 2009a). The

species listed in Table 1-1 do not use CFBC habitat for nesting, spawning, or calving. Therefore, based on the percentage of water withdrawn, the planned low through-screen intake velocity, the closed-cycle cooling system design, and the distance away from preferred nesting, spawning, and calving habitat in the Gulf of Mexico, the review team finds that the impacts on the Federally protected species of the Gulf of Mexico from impingement and entrainment would be negligible.

Maintenance of CWIS structures includes the use of screen washes and mechanical scraping to prevent clogging or collection of debris and organisms on intake screens and bar racks. Bar racks would be removed and scraped once per quarter as currently performed at CREC (PEF 2009b). Trash and organisms caught on traveling intake screens would be removed by a high-pressure spray wash and deposited into a collection dumpster. Collected debris and organisms would be disposed of in a licensed landfill.

4.2.2 Discharge Impacts

The effluent discharge from the proposed LNP Units 1 and 2 would be directly into the CREC discharge canal. Section 4.3.2 of the EIS discusses the location and design of the discharge piping. The potential impacts on the Gulf of Mexico from the operation of proposed LNP Units 1 and 2 would include the effects of heated effluents on aquatic resources, chemical impacts, and physical impacts from discharge. The FDEP Conditions of Certification state that PEF would retire its two oldest, once-through coal-fired units at the CREC by December 31, 2020, if LNP Units 1 and 2 are licensed, built, and begin commercial operation without significant delays (FDEP 2010). CREC Units 1 and 2 cessation of operations would significantly reduce the discharge flow from the CREC discharge canal even with the additional discharge flow from LNP Units 1 and 2 (Table 4-1).

4.2.3 Cold Shock

Another factor related to thermal discharges that may affect aquatic biota is cold shock. Cold shock occurs when aquatic organisms that have been acclimated to warm water, such as fish in a power plant's discharge canal, are exposed to a sudden temperature decrease. This sometimes occurs when single-unit power plants shut down suddenly in winter. Cold shock mortalities at U.S. nuclear power plants are "relatively rare" and typically involve small numbers of fish (NRC 1996). Because the temperature decrease from shutting down one unit is moderated by the heated discharge from the units that continue to operate, cold shock is less likely to occur at a multiple-unit plant. The proposed LNP Units 1 and 2 discharge would be 4.4 percent of the total discharge from combining LNP and CREC discharges. Therefore, the review team finds that the possibility of cold shock due to simultaneous shutdown of LNP Units 1 and 2 would be minimal.

Table 4-1. Comparison of NPDES Discharge Volumes Under Different Operation Scenarios During Summer Conditions.

Operating Unit	CREC Current Combined Discharge (Mgd)	Percent of Total Discharge	Addition of LNP Units 1 & 2 to Current CREC (Mgd)	Percent of Total Discharge	Addition of LNP Units 1 & 2 to Current CREC (Mgd) with Decomissioning of CREC Units 1 & 2	Percent of Total Discharge
CREC 1	446	23.4	446	22.3	-	-
CREC 2	472	24.7	472	23.7	-	-
CREC 3	979	51.4	979	49.1	979	90.9
CREC 4 & 5	10.1	0.5	10.1	0.5	10.1	0.9
LNP 1 & 2	-	-	87.8	4.4	87.8	8.2

Source: PEF 2009c
Note: CREC discharge rates are given as current maximum NPDES-permitted volumes.

4.2.4 Heat Stress

The thermal tolerance for aquatic organisms is defined in different ways. Some definitions relate to the temperature that causes fish to avoid the thermal plume, other definitions relate to the temperature that fish prefer for spawning, and still others relate to the temperatures (upper and lower) that may kill individual fishes. Some of these tolerances are termed “preferred temperatures,” “upper avoidance temperatures,” and “lethal temperatures.”

In EIS Section 5.2.3.1, the review team describes its independent assessment of the incremental impacts of proposed LNP Units 1 and 2 on the water temperatures within the CREC discharge and the Gulf of Mexico using a three-dimensional coastal ocean model. During summer conditions at ebb tide, the surface-water temperatures near the CREC discharge channel would be slightly less under the proposed conditions when compared to current conditions that include operation of CREC Units 1 through 5. The discharge volume of the plume would be increased with the addition of LNP Units 1 and 2, but only a slight increase in surface-water temperature (<0.1°C) would result compared to current conditions. Temperature increase at the entrance of CFBC channel would be between 0.05°C and ~0.1°C during the summer months at ebb tide (Figure 4-1). Similar trends in thermal plume temperatures would be observed during winter conditions with the addition of LNP discharge resulting in a slight temperature drop at the CREC discharge canal, and a slight increase in surface-water temperature beyond the immediate discharge area. Surface-water temperatures at the mouth of the CFBC are expected to increase by less than 0.5°C over the current conditions (Figure 4-2). The increased plume size is likely to have minimal impact on aquatic biota that forage near the CFBC under both extreme conditions. Habitat usage is therefore not expected to be affected under operating conditions.

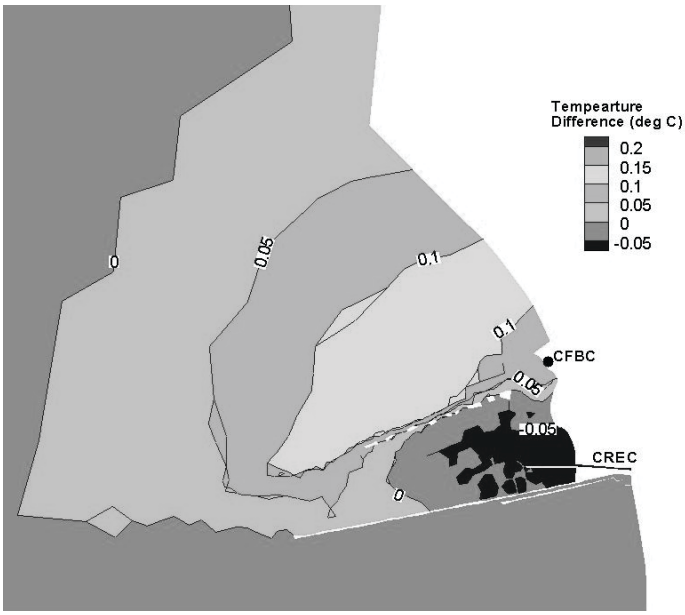

Figure 4-1. Thermal Plume Analysis Using FVCOM (Finite Volume Community Ocean Model) Showing the Temperature Difference Between Current and Proposed Thermal Discharge Under Summer Conditions at Ebb Tide

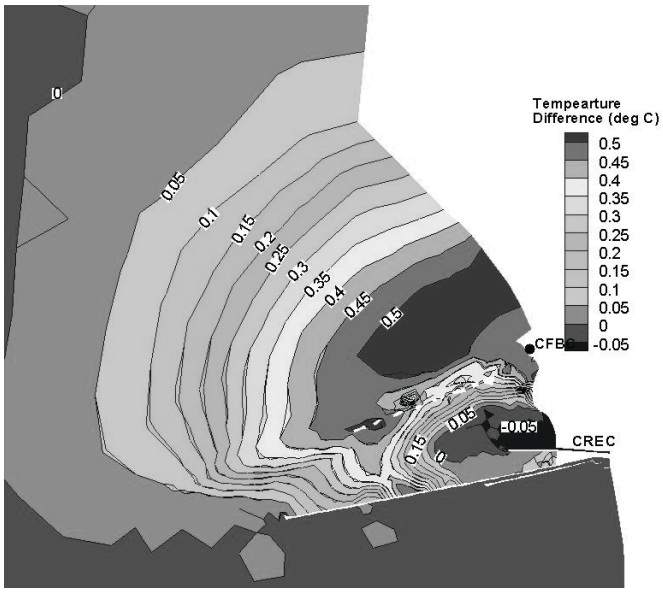

Figure 4-2. Thermal Plume Analysis Using FVCOM Showing the Temperature Difference Between Current and Proposed Thermal Discharge Under Winter Conditions at Ebb Tide

Other discharge-related impacts include the chemical treatment of the cooling water. The ER indicates that chemicals would be added to the circulating, service, and blowdown water systems (PEF 2009a). Intake structures, such as the pump suction housings and sensor tubes, would be coated with a copper-based anti-fouling substance to minimize fouling of these structures. In addition, ClamTrol (CT1300) would be injected every 21 days at a concentration not to exceed 4.5 mL/L into the CWIS to prevent biofouling of marine invertebrates (PEF 2009b). The use of chemicals in the existing CREC discharge is regulated by an NPDES permit, which is granted by the FDEP. The chemical concentrations at the outfall for the existing units meet the NPDES limits (FDEP 2008). Thus, the impacts from the addition of LNP discharge to the Gulf of Mexico would be minimal.

In addition, the NRC staff evaluated the potential for impact due to the increased salinity associated with the LNP Units 1 and 2 blowdown, which would have a total dissolved solids concentration of 1.5 times greater than seawater (PEF 2009b). This increase in total dissolved solids is due to evaporative loss of water through the cooling towers. Because the LNP discharge would be combined with CREC discharge prior to point of discharge into Crystal Bay and the CREC discharge accounts for the vast majority of the discharge volume (>95 percent), the increase in salinity would be slight (0 ppt and ~0.5 ppt) in the coastal region near the CREC discharge channel. The addition of LNP discharge with CREC discharge to the Gulf of Mexico would increase the salinity to between 0.4 ppt and ~0.45 ppt at the mouth of the CFBC (Figure 4-3).

4.2.5 Physical Impacts

The discharge volume of the LNP Units 1 and 2 blowdown water system would be 81.34 Mgd. It would be combined with the CREC Units 1 through 5 discharge of 1651.8 Mgd in the CREC discharge canal, which opens into the Gulf of Mexico. The LNP discharge would account for only 4.4 percent of the total discharge flow and would have little physical scouring impact at the terminus of the discharge canal (PEF 2009a).

4.2.6 Transmission Corridors

Maintenance activities along the four 500-kV, five 230-kV, and two 69-kV transmission lines could lead to periodic temporary impacts on the waterways being crossed. However, it is assumed that the same vegetation-management practices currently used by PEF for the existing CREC facility transmission-line rights-of-way would be applied to the existing and proposed new transmission-line right-of-ways. PEF practices and procedures were developed to prevent impacts on surface waters and wetlands, so impacts on aquatic ecosystems from operation and maintenance of transmission lines would be minimal (PEF 2009a). No impacts on aquatic species are anticipated from maintenance of the transmission lines.

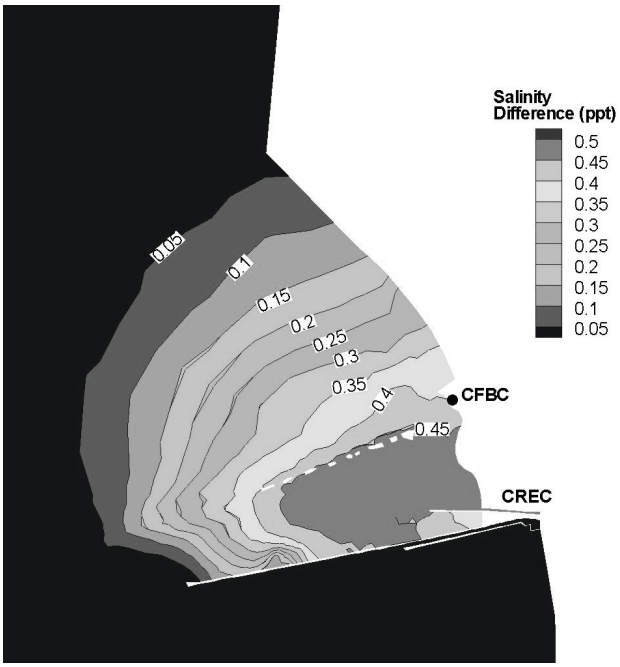

Figure 4-3. Salinity Difference Between the Current and Proposed Discharge Plume at Ebb Tide

5.0 Baseline Conditions for Aquatic Species

This section describes the baseline conditions for aquatic species listed in Table 1-1, which may occur on and in the vicinity of the proposed LNP site and associated transmission-line corridors.

5.1 Whales

The distribution of endangered whales listed in Table 1-1 is worldwide. While there is no habitat used by these whales immediately offshore of the CFBC or the CREC discharge, the deepwater, eastern Gulf of Mexico may serve as a migratory corridor for finback whales (*Balaenoptera physalus*) that migrate toward the lower latitudes from subpolar waters during the winter to calve and then migrate back up the coast to higher latitudes during the summer (NMFS 2009a). Blue (*Balaenoptera musculus*) and humpback (*Megaptera novaeangliae*) whales are rare in the Gulf of Mexico (NMFS 2009b, c). The exact movement patterns of sei (*Balaenoptera borealis*) and blue whales are largely unknown (NMFS 1998, 2009b). Sperm whales (*Physeter macrocephalus*) are rare in waters less than 984 ft deep. Like most north Atlantic cetaceans, sperm whales migrate down the western Atlantic coast in the winter to waters east and northeast of Cape Hatteras, North Carolina. The migration back to the north

starts in the spring with a migration range extending from waters off the coast of Virginia up to the Northeast Channel area. Sightings of sperm whales in the Gulf of Mexico are rare (NMFS 2009d). The migration patterns and population structure of humpback whales in the North Atlantic are well known. Humpbacks migrate to Caribbean waters in the winter to calve and migrate up to waters off New England, Canada, and Greenland in the summer to feed (NMFS 2009c). Due to lack of habitat use for inland waters off Florida's Gulf Coast, the review team concludes that construction and operation of LNP Units 1 and 2 would have no effect on any of the whale species, so they are not considered further.

5.2 Sea Turtles

There are two families and six genera of living sea turtles containing eight species (Pritchard 1996). All but one of the species are in the family Cheloniidae – the leatherback turtle (*Dermochelys coriacea*) is the only living member of the family Dermochelyidae. Five of the eight living species of sea turtles occur in the Gulf of Mexico. These species are the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle, the hawksbill sea turtle (*Eretmochelys imbricata*), and Kemp's ridley sea turtle (*Lepidochelys kempii*). The U.S. Department of the Interior, under the authority of the ESA, lists the loggerhead as threatened. Nesting populations of green turtles in Florida and all leatherback, Kemp's ridley, and hawksbill sea turtles are listed as endangered. Although each of these species nests along the coasts of Florida, no critical habitat has been designated in the State for any of them by NMFS. Formal monitoring of sea turtles in the CREC intake canal began in 1998 following the occurrence of eight sea turtle strandings on the CREC Unit 3 trash racks between 1994 and 1997 (PEF 2008b). A Biological Opinion was issued by NMFS in 1999 that defined an incidental take limit biennially to 50 live takes, 8 mortalities not causally related to CREC operations, and 5 mortalities causally related to CREC operations. Due to recovery and increase in numbers of juvenile and subadult of Kemp's ridley sea turtles, the Biological Opinion was modified in 2002 to allow for a biennial take of 75 live takes, no limit on mortalities not attributed to CREC operations, and 3 mortalities causally related to CREC operations (NMFS 2002). Table 5-1 lists the numbers and species of sea turtles sighted or collected near the proposed LNP and CREC sites for comparative purposes. The following sections briefly describe the life history, habitat needs, status and distribution, and factors that contribute to population decline for each of the species, as well as their occurrence and status in the proposed project area.

Table 5-1. Sea Turtle Strandings and Sightings in the Area Around Levy and Citrus County, Florida

Species	Sea Turtle Stranding and Salvage Network 1998 – 2004 (Zone 6 and 7)[(a)]	Crystal River Energy Complex 1999 – 2005[(b)]	Cedar Key (Schmid) 1985 – 1996[(b)]
Loggerhead	81	8	20
Green	105	38	10
Leatherback	5	0	0
Hawksbill	9	1	0
Kemp's ridley	73	92	269
Unknown	10		

(a) Data from Sea Turtle Stranding and Salvage Network (2009) Zones 6 and 7 encompassing Franklin County to Pinellas County, Florida.
(b) Data from Eaton et al. 2008.

5.2.1 Loggerhead Sea Turtle

5.2.1.1 Life History

The loggerhead sea turtle is the most common and abundant turtle in the inshore coastal waters of the Gulf of Mexico (NMFS and FWS 1991). Adults along the southeast coast of Florida have a mean shell length of about 3 ft and weigh about 240 lb. The largest individuals may be 4 ft long and weigh 500 lb. The hatchlings are about 1.7 in. long and weigh about 0.7 oz. Loggerhead turtles have a wide distribution in temperate, subtropical, and tropical seas (Dodd 1988). They are encountered seasonally in continental shelf waters, bays, and estuaries of the Gulf of Mexico. In tropical and subtropical waters, such as the Gulf of Mexico, they may be abundant year round except where water temperature drops below about 15°C in winter. The largest concentration of nesting loggerheads in the Atlantic occurs along the east coast of Florida. However, loggerhead turtles also nest in the southwestern portion of Florida (NMFS and FWS 1991).

5.2.1.2 Habitat Requirements

Adult female loggerheads nest above the high-tide line and sometimes in vegetation at the top of sandy beaches. Approximately 90 percent of the loggerhead nesting activity in the United States is in Florida (Meylan et al. 1994). Loggerheads nesting in southeast Florida are genetically indistinguishable from those nesting along the coast of the Gulf of Mexico in southwest Florida (Bowen and Karl 2007). In south Florida, nesting may occur from late April (rare) to the beginning of September, with peak nesting activity in June and July (NMFS and FWS 1991). Newly emerged turtles immediately crawl toward the sea, probably orienting toward the reflected light of the moon (Dodd 1988). If the beaches where the newly

emerged turtles hatch have visible light sources on the landward side of the beach, the hatchlings may crawl in the wrong direction, normally resulting in predation or death. Those that reach the water swim rapidly offshore. The initial swimming frenzy may take them 13 to 17 mi offshore. They remain offshore for 3 to 5 years (NOAA 1989) and are about 1.5 ft long when they return to coastal waters to forage as subadults. Subadult and adult loggerheads are primarily bottom feeders, foraging in coastal waters for benthic mollusks and crustaceans (Plotkin et al. 1993).

5.2.1.3 Status and Distribution

In the Gulf of Mexico, loggerhead turtles appear to be concentrated along the southern west coast of Florida (NMFS and FWS 2008). They also are abundant particularly during the summer all around the coast of the U.S. Gulf of Mexico. Most sightings of loggerheads off the west coast of Florida are within 86 mi of land. Loggerhead turtles nest in relatively large numbers along the southwest and northwest coast of Florida (FFWCC 2009a). NMFS and FWS (2008) estimated that 1001 to 10,000 loggerhead turtle nests occur in southwest Florida. In northwest Florida, NMFS and FWS (2008) estimated that 101 to 1000 loggerhead turtle nests occurred. Recent counts indicate that nesting throughout Florida, including northwest and southwest Florida, is decreasing.

Loggerhead turtles occur all along the Gulf of Mexico coast in shallow coastal and estuarine waters, as well as along the outer continental shelf. The statistics on loggerhead turtle strandings and numbers killed in shrimp trawls indicate the distribution and abundance of loggerhead turtles in the Gulf of Mexico. Henwood et al. (1992) reported that less than 25 percent of loggerhead turtles in their survey killed in shrimp nets were captured in the eastern Gulf of Mexico. Between 1988 and 1993, from 189 to 308 loggerhead turtles were stranded each year along the shores of the Gulf of Mexico (Teas and Martinez 1992; Teas 1992, 1993, 1994a, b), with the largest number of strandings occurring in west Florida. From 1998 to 2004, 81 (28.6 percent) of the 283 sea turtles reported stranded along the Florida coast from Franklin County to Pinellas County were loggerhead turtles (Sea Turtle Stranding and Salvage Network 2009; see Table 2).

5.2.1.4 Factors Contributing to the Population Decline

Most sea turtle mortalities, including loggerheads, are caused by human activities, including incidental take in bottom trawls, longline, and gillnet fisheries; legal and illegal harvest; vessel strikes; beach armoring; beach erosion; marine debris ingestion; oil pollution; and light pollution (NMFS and FWS 2008).

5.2.1.5 Occurrence and Status in the Project Area

Loggerhead turtles are considered threatened throughout their entire range. Therefore, they are considered a threatened species for Levy and Citrus Counties. Based on reviews of several reports, including those of NMFS and FWS (2008) and the Turtle Expert Working Group (2000), the area around Levy and Citrus Counties appears to have lower instances of loggerhead turtles than other areas of Florida to the north and south. Data from the Sea Turtle Stranding and Salvage Network Zones 6 and 7 indicate the possibility that more loggerhead turtles might actually be in the area. However, when compared to other zones throughout Florida, the numbers are substantially smaller (Sea Turtle Stranding and Salvage Network 2009). Factors that may influence these low numbers include (1) a large portion of the Levy and Citrus Counties coastline is not easily accessible for survey, and (2) a Sea Turtle Recovery Team is not currently active in this zone of Florida, but teams are active in other zones (NMFS and FWS 2008). In-water survey data collected in the Levy and Citrus County areas seem to corroborate the lower instances of loggerheads in the area (see Table 5-1). PEF has routinely collected incidental occurence data from the intake canal for the CREC since 1999. For loggerhead turtles, 11 live takes, 4 non-CREC mortalities, and 1 CREC causal mortality were reported from the CREC intake canal between 1999 and 2009 (PEF 2001, 2003, 2004, 2005, 2006, 2007, 2008c, 2009e, 2010). The turtles ranged from juveniles to adults.

5.2.2 Green Sea Turtle

5.2.2.1 Life History

The green turtle is the largest of the hard-shelled sea turtles. The mean size of adult female green turtles nesting in Florida is 3.3-ft standard straight carapace length (SCL) with a weight of 300 lb. Green turtles have a circumglobal distribution in tropical and subtropical waters, particularly in shallow coastal seagrass and hard reef areas (NMFS and FWS 1991). Historically, the most important nesting area for green turtles in the Gulf of Mexico was on Dry Tortugas, west of the Florida Keys, but this population became extinct through human exploitation early in this century (Meylan et al. 1994). Currently, green turtles nest along the southwestern coastline of Florida to the Georgia border and in the northwestern portion of Florida along the panhandle. Nests in these areas seem to be gradually increasing every year (FFWCC 2009b).

5.2.2.2 Habitat Requirements

Green turtles occupy three habitat types at different stages in their life cycle. For nesting, females require the high-energy (wave active), sandy beaches of barrier islands and mainland shores above the high-water line. Upon emergence, hatchlings immediately seek out the shore and open water. The hatchling green turtles weigh about 0.8 oz and have a carapace length of less than 7.9 in. SCL. Hatchling green turtles tend to prefer to swim in open surface waters

where they subsist on zooplankton and sea weeds. Juvenile green turtles drift with the prevailing surface-water currents until they reach a size of 12 to 16 in., at 1 to 3 years, and then return to shallow coastal waters. Juvenile green turtles and adults spend most of their lives in shallow benthic feeding grounds. Foraging habitats for juvenile and adult green turtles are primarily pastures of seagrasses or macroalgae in less than 66 ft of water. A favorite seagrass food of green turtles throughout the Caribbean and south Florida is turtle grass (*Thalassia testudinum*). *Thalassia* is a highly productive seagrass and can support as many as 138 adult female green turtles per hectare. However, juvenile green turtles often are found over shallow hard-bottom habitats, such as coral and rocky reefs (NMFS and FWS 1991).

During feeding, subadult green turtles do not wander far, rather they remain within a small area of 0.4 mi^2 or less. A typical dive cycle during feeding in Florida lasts about 33 minutes, of which 1 minute is spent at the surface between dives and 30 minutes is spent on the bottom foraging on seagrass or algae. Thus, green turtles are hard to monitor in their feeding grounds because they spend more than 50 minutes of each hour submerged (Nelson 1994).

5.2.2.3 Status and Distribution

In the last century, heavy exploitation of green turtles by man, mainly for their high-quality meat and eggs, has resulted in a substantial decline in their populations throughout most of their historic range. This exploitation also has led to green turtles that nest in Florida being listed as endangered by NMFS and FWS. According to the Florida Fish and Wildlife Conservation Commission (FFWCC 2009b), 12,752 green turtle nests were noted in Florida in 2007, with 82 percent of the nests occurring in southeastern Florida. No nests were located in the area surrounding Levy and Citrus Counties. Stranding records produce useful information about the distribution of sea turtles. The stranding data indicate that green turtles are most abundant in the U.S. Gulf of Mexico off the west coast of Florida, followed by south Texas. From 1998 to 2004, 105 (37.1 percent) of the 283 sea turtles reported stranded along the Florida coast from Franklin County to Pinellas County were green turtles (Sea Turtle Stranding and Salvage Network 2009). This was the highest noted species in the area (see Table 5-1). Important feeding areas for green turtles located on the west coast of Florida include two locations within Citrus County (Homosassa and Crystal River) and one location within Levy County (Cedar Key) (NMFS and FWS 1991).

5.2.2.4 Factors Contributing to the Population Decline

Most sources of mortality for sea turtles in U.S. coastal waters, including green turtles, are human activities, such as incidental take in bottom trawls, particularly shrimp and summer flounder nets (Henwood et al. 1992); coastal gill net and pound net fisheries (Witzell and Cramer 1995); ingestion of marine debris (Witzell and Teas 1994); and channel dredging (NMFS and FWS 1991). Collisions with boats, particularly boat propellers, are also an important cause of the death of green turtles found stranded on the shore. Oil pollution from

spills and tank cleaning may kill some green turtles and other marine turtles through tarball ingestion or fouling of the body with oil from surface slicks. Loss of nesting habitat through coastal development may also be a factor (NMFS 1994).

5.2.2.5 Occurrence and Status in the Project Area

NMFS and FWS currently list the breeding populations of green turtles in Florida as endangered, while all other populations are considered threatened. Although nesting areas have not been found in Levy and Citrus Counties or the immediately surrounding counties, any green turtles noted in these areas are considered endangered. Data from Eaton et al. (2008) and the Sea Turtle Stranding and Salvage Network (2009; see Table 5-1) indicate that green turtles are more abundant in the Levy and Citrus County areas and around the CREC than some of the other turtle species. This is probably due to its proximity to three important feeding grounds that occur in the Levy and Citrus County areas. However, when compared to counties on the southwestern and eastern shores of Florida (from Sarasota to North Carolina), this area has considerably fewer green turtles. At CREC, most green turtle occurrences have been juveniles. For the green turtle, between 1999 and 2009, 47 live takes, 10 non-CREC-related mortalities, and 3 CREC-related mortalities have been reported from the CREC intake canal (PEF 2001 2003, 2004, 2005, 2006, 2007, 2008c, 2009e, 2010).

5.2.3 Hawksbill Sea Turtle

5.2.3.1 Life History

The hawksbill turtle is a medium-sized tropical and subtropical species that inhabits the warm waters of the Atlantic, Pacific, and Indian Oceans (NMFS and FWS 1993). It is the most tropical of the sea turtles and is restricted primarily to warmer waters more than the other four sea turtles found in the Gulf of Mexico. In U.S. territorial waters, hawksbills occur along the U.S. coast of south Texas and along the Gulf and Atlantic coasts of Florida. Adult nesting females have a carapace length of about 34 in. and weigh about 176 lb. The largest hawksbill on record weighed 276 lb. Hatchlings are about 1.7 in. long and weigh 0.5 to 0.7 oz (NMFS and FWS 1993). In the U.S. Caribbean and the Florida Keys, overexploitation severely depleted hawksbills during the 20th century. At present, since banning the sale of turtle shell products, they may no longer be in decline. However, data are not available to indicate that numbers are increasing (NMFS and FWS 1993; NMFS and FWS 2007). In the western tropical North Atlantic and Caribbean Sea, hawksbill nesting populations have continued to decline (Meylan 1989).

5.2.3.2 Habitat Requirements

Hawksbills are solitary nesters, making it difficult to gain insights into their population sizes in areas where they nest. Hawksbills show a high fidelity to their nesting beaches and return to the same or a nearby beach year after year (Bjorndal et al. 1985). There have only been a few

verified reports of hawksbill turtle nesting in south Florida, mostly on the east coast (NMFS and FWS 1993). Juveniles and subadults tend to remain and feed on coral reefs near their natal beaches. Like other species of sea turtles, hatchling hawksbills congregate in sargassum rafts to feed and grow for a year or more after emerging from the nest (NMFS and FWS 1993). While in the sargassum rafts, they consume pelagic fish eggs and larvae, small invertebrates associated with the floating algae, and the sargassum itself.

Subadults and adults are omnivorous scavengers. They seem to have a preference for benthic invertebrate prey, particularly sponges and biofouling organisms. Because of their food preferences, they tend to be most abundant in shallow coral and rocky reef habitats. These habitats are rare in the northern Gulf of Mexico, accounting in part for the rarity of hawksbill turtles in the U.S. Gulf of Mexico.

5.2.3.3 Status and Distribution

The hawksbill turtle is the rarest of the five sea turtles in the U.S. waters of the Gulf of Mexico. These tropical turtles undoubtedly are much more abundant in the warmer waters of the Mexican Gulf of Mexico. Strandings of hatchling and yearling hawksbill turtles are frequent in south Texas and occasionally in Louisiana. Northward coastal currents in the western Gulf undoubtedly carry young hawksbill turtles northward along the Texas coast from their natal beaches in Mexico. From 1998 to 2004, 9 (3.1 percent) of the 283 sea turtles reported stranded along the Florida coast from Franklin County to Pinellas County were hawksbill turtles (Sea Turtle Stranding and Salvage Network 2009).

5.2.3.4 Factors Contributing to the Population Decline

Hawksbill turtles are subjected to and share many of the natural and anthropogenic disturbances as the other sea turtles in Gulf of Mexico waters. However, their limited distribution in the U.S. Gulf of Mexico subjects them to less involvement with U.S. commercial and recreational fisheries. Strandings of hawksbills are restricted almost exclusively to Florida, Puerto Rico, and the U.S. Virgin Islands. Hawksbills appear to be unusually vulnerable to ingestion of marine debris, particularly plastics. Nearly 90 percent of the debris ingested by hawksbills is plastic bags, plastic and styrofoam particles, and tar (Witzell and Teas 1994). Six hawksbills that were stranded also were entangled in marine debris or fish nets. Juvenile hawksbills frequently are reported entangled in monofilament gill nets, fishing line, and synthetic rope. Because of the great value of the carapace of hawksbill turtles, called “tortoiseshell” or “bekko,” there is a large illegal trade in subadult and adult hawksbill turtles, particularly in Puerto Rico, the U.S. Virgin Islands, the wider Caribbean, and the Mexican Gulf of Mexico (NMFS and FWS 1993).

5.2.3.5 Occurrence and Status in the Project Area

Hawksbill turtles are endangered throughout their entire range, including the Florida coastal areas off of Levy and Citrus Counties. However, as noted in the data from the Sea Turtle Stranding and Salvage Network, the CREC study, and the Cedar Key study (see Table 2), hawksbill turtles are rarely found in the Florida coastal areas off of Levy and Citrus Counties. The low number of strandings is probably indicative of the rarity of hawksbill turtles in Florida waters of the Gulf of Mexico. Between 1999 and 2009, a single hawksbill turtle was recovered live from the CREC intake canal in 2000 (PEF 2001).

5.2.4 Leatherback Sea Turtle

5.2.4.1 Life History

Leatherback turtles are the largest and most distinctive of the living sea turtles. They reach a length of 78 in. SCL and weigh more than 2000 lb (NMFS 2009e). Large outstretched front flippers may span 106 in. in an adult. Lacking a keratinized shell, they are covered instead with a tough hide. Because they have physiological adaptations for heat conservation, leatherback turtles are more widely distributed as adults than other sea turtles in temperate and boreal waters throughout the world. However, all leatherbacks return to subtropical and tropical shores to nest.

5.2.4.2 Habitat Requirements

Leatherback turtles are a largely oceanic, pelagic species, but they also forage in coastal waters. Juveniles and adults feed throughout the water column to depths of at least 3900 ft (NMFS 2009e), consuming jellyfish and other gelatinous zooplankton, such as salps, ctenophores, and siphonophores (Limpus 1984). Most feeding dives average about 200 ft, but frequently extend from 985 to 1300 ft (Eckert et al. 1986). In the past, the leatherback's seasonal inshore movements off south Texas have been linked to inshore movements of their preferred jellyfish prey. Only a small fraction of the Gulf of Mexico and North Atlantic leatherback populations nest on beaches of the continental United States, mostly in Florida (Meylan et al. 1994) and the U.S. Virgin Islands (Boulon et al. 1994). Nesting occurs from April to July. Little is known about the behavior or distribution of hatchling and juvenile leatherback turtles.

5.2.4.3 Status and Distribution

Because leatherback turtles are a largely oceanic, pelagic species, estimates of their population status and trends have been difficult to obtain. In addition, nesting females do not have the nest-site fidelity exhibited by other turtles and tend to move to different beaches in different years (Tucker 1990). Therefore, it has been difficult to estimate temporal trends in population

size. Nesting trends on U.S. beaches have increased in recent years (NMFS 2009e). In Florida, the FFWCC found more than 1400 nests throughout the state in 2007 (FFWCC 2009c). Most were located along the eastern and southeastern coasts. Sarasota, Escambia, Okaloosa, Bay, Gulf, and Monroe Counties were the only southwestern and northwestern counties in Florida with identified nests. Turtle stranding data support the hypothesis that leatherback turtles are rare in coastal waters of the U.S. Gulf of Mexico. Individuals dying in offshore pelagic environments may never wash ashore. From 1998 to 2004, 5 (1.8 percent) of the 283 sea turtles reported stranded along the Florida coast from Franklin County to Pinellas County were leatherback turtles (Sea Turtle Stranding and Salvage Network 2009).

5.2.4.4 Factors Contributing to the Population Decline

Leatherbacks are especially susceptible to entanglement in fishing gear and plastic debris (Witzell and Teas 1994). Because they are adapted to a pelagic existence, they have trouble maneuvering in tight places, swimming backwards, and avoiding obstructions in shallow waters. The large front flippers of leatherbacks often bear cuts, chafing marks, or are severed altogether, possibly due to entanglement. Because of their preferred diet of gelatinous zooplankton, particularly jellyfish, leatherback turtles often ingest floating plastic debris, mistaking it for food (Wallace 1985).

5.2.4.5 Occurrence and Status in the Project Area

Leatherback turtles are considered endangered throughout their entire range, including Levy and Citrus Counties. However, as noted by FFWCC (2009c) and corroborated by data from the Sea Turtle Stranding and Salvage Network (2009), the CREC study, and the Cedar Key study (see Table 5-1), leatherback turtles are rarely found in the Florida coastal areas off of Levy and Citrus Counties. No leatherback turtles have been reported in the CREC intake canal since 1999 (PEF 2001, 2003, 2004, 2005, 2006, 2007, 2008c, 2009e, 2010).

5.2.5 Kemp's Ridley Sea Turtle

5.2.5.1 Life History

The Kemp's ridley is one of the smallest living sea turtles. Adult females have shell lengths of 24 to 28 in., and they weigh 77 to 99 lb (NMFS and FWS 1992). Pelagic-phase juvenile ridleys range in size from 2 to 8 in. SCL, subadults are 8 to 24 in. long, and mature adults generally are longer than 24 in. SCL (Marquez 1994). Kemp's ridley turtles are distributed throughout the Gulf of Mexico and into the Atlantic Ocean. The center of their distribution is in the Gulf of Mexico. The Kemp's ridley turtle is the most endangered sea turtle in the world (NMFS and FWS 1992) and is listed as endangered throughout its range. The number of females nesting at the only significant ridley nesting beach dropped from more than 40,000 to as low as 702 from 1947 to 1985 (FWS 2009). This is the most severe population decline documented for any

species of sea turtles. Since the mid-1980s, an increase has been noted with as many 3600 turtles producing more than 8000 nests during the 2003 season (NMFS 2009f). This is the most severe population decline documented for any species of sea turtles.

5.2.5.2 Habitat Requirements

Nearly all reproduction of Kemp's ridleys takes place along a single 9.3-mi stretch of beach near Rancho Nuevo, Tamaulipas, Mexico, about 200 mi south of Brownsville, Texas (Marquez 1994). A small number of nests have been found in Texas and along the Mexican coast of the Gulf of Mexico between Playa Lauro Villar, Tamaulipas, Mexico, and Isla Aguada, Campeche, Mexico, but nothing that reaches the level of nests at Rancho Nuevo. Nesting occurs in a highly synchronized manner with large numbers of females (called an arribada) coming ashore within a period of a few hours during daylight (Marquez 1994). Hatchlings migrate rapidly down the beach and out to sea where they spend a period of perhaps 2 years in the pelagic zone. They are about 8 in. long at the end of the pelagic period. Little is known about the feeding behavior and food preferences of hatchling Kemp's ridley turtles during their pelagic stage. During the pelagic period, they presumably feed on zooplankton and floating matter, including sargassum weed and the associated biotic community. Following a pelagic feeding stage shortly after hatching and lasting for several months, the juvenile ridleys move into shallow coastal waters to feed and grow. The young subadults often forage in water less than 3 ft deep, but they tend to move into deeper water as they grow. Juvenile to adult ridleys prey on crabs, particularly blue crabs; mollusks; and small fish. Because of their preference for crabs and other primarily shallow-water demersal prey, juvenile and adult ridley turtles concentrate in coastal waters less than 30 ft deep throughout their range. They make long dives to the bottom and may feed on the bottom for an hour or more at a time (Turtle Expert Working Group 2000).

5.2.5.3 Status and Distribution

Ridley turtles are found mainly in the Gulf of Mexico. Comparatively small numbers of juveniles are found along the U.S. Atlantic coast as far north as New England and the Canadian Maritime Provinces (Lazell 1980). The northern and northeastern Gulf of Mexico are prime foraging areas for juvenile, subadult, and post-nesting female ridleys (Marquez 1994). They often are observed associated with portunid crabs (*Callinectes* spp.), their favorite prey. Adults are restricted almost entirely to the Gulf of Mexico, where they range widely between northern (U.S.) and southern (Mexico) regions. The distribution of juveniles in the Gulf of Mexico is restricted primarily to U.S. waters of the northern Gulf of Mexico from Texas to Florida. From 1998 to 2004, 73 (25.8 percent) of the 283 sea turtles reported stranded along the Florida coast from Franklin County to Pinellas County were ridley turtles (Sea Turtle Stranding and Salvage Network 2009). Over the past decade, nesting has increased, indicating that the species may be in the early stages of recovery (NMFS 2009f).

5.2.5.4 Factors Contributing to the Population Decline

The major factors in the historic decline of ridley turtles is thought to have resulted from predation (animal and human) of eggs on the major nesting beach and incidental take in commercial fisheries in the U.S. and Mexican Gulf of Mexico and western North Atlantic (Marquez 1994). Current impacts include anthropogenic disturbance, entanglement in fishing gear (e.g., monofilament fishing line or discarded fishing nets), and marine debris ingestion (e.g., plastic bags and plastic particles). Under some circumstances, chemical pollution may be a threat to ridley turtles.

5.2.5.5 Occurrence and Status in the Project Area

As noted, Kemp's ridley turtles are considered endangered throughout their entire range, including the Florida coastal areas off of the coasts of Levy and Citrus Counties. According to the CREC and Cedar Key studies, ridley turtles are the most common turtle found in the Levy and Citrus County areas (Eaton et al. 2008; Carr and Caldwell 1956; Schmid 1998) while the Sea Turtle Stranding and Salvage Network data indicate that ridley turtles from juveniles up to adults are the third most-frequent species stranded in the area. For the Kemp's ridley turtle, since 1999, 99 live takes, 11 CREC non-causal mortalities, and 5 CREC causal mortalities have been reported in the CREC intake canal (PEF 2001, 2003, 2004, 2005, 2006, 2007, 2008c, 2009e, 2010). Based on these reports, Kemp's ridley turtles appear to be the most likely turtle species to be present in the LNP site area.

5.3 Smalltooth Sawfish

5.3.1 Life History

The smalltooth sawfish (*Pristis pectinata*) is a cartilaginous fish that inhabits coastal inland shallows with muddy or sandy substrate where it feeds on benthic fish and crustaceans. Smalltooth sawfish, like other cartilaginous fish, mature slowly with reproductive age estimated based on growth rates (NMFS 2009g). Reproduction is ovoviviparous, with females retaining developing embryos within a yolk-containing egg sac over 5 months and giving birth to hatched embryos. There is no clear information regarding litter sizes, although information from the largetooth sawfish is assumed to be comparable where females produce litters every other year. Diet includes small fish and crustaceans. The feeding behavior observed in smalltooth sawfish includes slashing sideways through schools of fish to injure or impale prey on rostral teeth (NMFS 2009g).

5.3.2 Habitat Requirements

Juvenile smalltooth sawfish stay close to shallow, coastal estuaries and river mouths with mangrove or mud bank habitats. They show high site fidelity and stay close to natal habitat.

Adults may move further offshore up to depths of 400 ft and can tolerate brackish water (Simpfendorfer and Wiley 2006).

5.3.3 Status and Distribution

Once prevalent in the western Atlantic from the Atlantic U.S. coast through the Gulf of Mexico to Texas, the Caribbean, and down the South American coast to Brazil, the smalltooth sawfish is currently found consistently only near the southern tip of Florida (Simpfendorfer and Wiley 2005). Still under review, critical habitat designation is proposed to protect this population from Charlotte Harbor to Florida Bay (73 FR 70290). In an effort to monitor distribution, migration, and future recovery efforts, the Florida Museum of Natural History maintains a smalltooth sawfish encounter database for public or commercial sightings or incidental catch of this species (FMNH 2010).

5.3.4 Factors Contributing to the Population Decline

The increase in commercial and recreational fishing increased the probability of sawfish entanglement. This species was reported commonly as bycatch. With slow reproduction rates and increases in fishing, the species has seen a rapid decline in abundance (Musick et al. 2000; Seitz and Poulakis 2002). Habitat alteration and degradation are also contributing factors to smalltooth sawfish population declines. In particular, juveniles are vulnerable to impacts associated with mangrove loss as protection from predators (NMFS 2009g).

5.3.5 Occurrence and Status in the Project Area

Observations of smalltooth sawfish north of Port Charlotte are rare. However, since 2000, four juvenile smalltooth sawfish have been either caught or sighted offshore of Citrus County; one at the mouth of the CFBC and another just outside the CREC discharge canal (FMNH 2009). No smalltooth sawfish were observed or collected during the sampling events described in EIS Section 2.4.2.1 for the CFBC, OWR, and CREC discharge area (CH2M Hill 2009b), and none have been reported in the CFBC near the proposed location for the cooling-water intake.

5.4 Gulf Sturgeon

5.4.1 Life History

The gulf sturgeon (*Acipenser oxyrinchus desotoi*) is an anadromous fish within the family Acipenseridae – one of the oldest and most primitive families of existing bony fishes. The gulf sturgeon is a relatively long-lived fish, and maturity in males is at 7 to 9 years while females take 8 to 12 years to attain spawning condition. Spawning migrations occur in early to late spring with a return to saltwater during early to late fall. In the Suwannee River, Florida, sturgeons migrate upriver when temperatures range between 17 to 22°C in mid-February to mid-April.

After the first spawning, females may only spawn at intervals of 2 or 3 years (Huff 1975). Water velocity influences the spawning habitat preference for sturgeon, with research suggesting that higher flows are environmental cues for successful spawning (Chapman and Carr 1995). Clumps of fertilized eggs become attached to rocks or other bottom structures in areas characterized as clean gravel-cobble mix over rock with strong, persistent laminar flows and eddies. Incubation times vary with river temperature, and fry disperse widely downstream of spawning habitats within the river, inhabiting open sandy areas away from shorelines and vegetation (Sulak and Clugston 1998). Juvenile (>1 year) and adult gulf sturgeon typically out-migrate to the marine environment, although some populations tend to hold over in brackish water for a period up to 2 months before moving into the open Gulf of Mexico (Carr et al. 1996). The adult gulf sturgeon is a bottom feeder and makes a diet of invertebrates such as brachiopods, insect larvae, mollusks, oligochaetes, polychaetes, crustaceans, and small fishes. Feeding is almost exclusively in marine waters, and adults eat little while in freshwater. Weight losses of 4 to 15 percent are often observed during the in-river period during late spring, summer, and early fall (Wooley and Crateau 1985).

5.4.2 Habitat Requirements

Historically, the range for this anadromous fish extended from Louisiana to south of Tampa Bay, Florida, where it feeds in the Gulf of Mexico and returns to freshwater for spawning. The current range is limited to the Mississippi River east to the Suwannee River, Florida, where the Suwanee River supports the largest subpopulation of gulf sturgeon (Carr et al. 1996). Critical habitat for Florida nearest to the proposed LNP site is designated for 182 mi of the Suwannee River; 12 mi of the Withlacoochee River, where it branches off to the north of the Suwannee River; and 211 mi^2 of estuarine/marine area of Suwannee Sound that is north of Cedar Key (68 FR 13370). Gulf sturgeon show a high homing fidelity (site-specific) spawning behavior based on gene flow between river drainages (Stabile et al. 1996).

5.4.3 Status and Distribution

Since 1991, the gulf sturgeon has been jointly managed and listed as a threatened species by NMFS and FWS (50 FR 49653), with NMFS managing nearshore and offshore habitat range and FWS managing inland from river mile zero. The gulf sturgeon is extant in major river basins from the Mississippi to Charlotte Harbor, but the only significant spawning populations occur in the Pearl River, Pascagoula River, Escambia River, Blackwater River, Yellow River, Choctawhatchee River, Apalachicola River, Ochlockonee River, and Suwannee River (FWS 1995; Berg 2004).

5.4.4 Factors Contributing to the Population Decline

Prized for their flesh and roe, gulf sturgeon were commercially fished in the late 1890s up to 1984 when the State of Florida banned commercial harvesting. Degradation of riverine habitat

with increases in pollution and installation of dams on many of the major rivers along the northern Gulf of Mexico also contributed to the decline in species abundance (Huff 1975; Wooley and Crateau 1985). A recovery plan was initiated in 1995 to prevent further reduction in sturgeon populations and monitor population recovery with habitat restoration efforts (FWS 1995). Critical habitat for Florida was established for the Suwannee River and immediate offshore habitat in the Gulf of Mexico. Gulf sturgeon critical habitat is designated for 182 mi of the Suwannee River, 12 mi of the northern Withlacoochee River where it branches off to the north of the Suwannee River, and 211 mi^2 of estuarine/marine area of Suwannee Sound that is north of Cedar Key (68 FR 13370).

5.4.5 Occurrence and Status in the Project Area

There are no known spawning populations associated in river systems south of the Suwannee River along the Florida coast, and estuarine/marine critical habitat for the gulf sturgeon does not occur south of Cedar Key. No gulf sturgeon were observed or collected during the sampling events described in EIS Section 2.4.2.1 for the CFBC, OWR, or CREC discharge area (CH2MHill 2009b). Adult gulf sturgeon have been caught south of the CFBC offshore of Pinellas County and within Tampa Bay, but these occurrences have been few since 1987 (Wakeford 2001). Although gulf sturgeon may occur in the offshore areas associated with the CFBC or CREC, they have not been documented, and they would likely avoid any anthropogenic activities and would not use the CFBC or OWR as spawning habitat given the unfavorable substrate and lack of downstream flow.

5.5 Corals

Both staghorn (*Acropora cervicornis*) and elkhorn (*Acropora palmata*) corals are Federally threatened reef-building corals found primarily along the Atlantic coast of Florida and the Caribbean. Designated critical habitat for these two species was established in November 2008, and areas off coastal Florida for Palm Beach, Broward, Miami-Dade, and Monroe Counties are listed. Because, there are no known occurrences of either staghorn or elkhorn coral in Florida Gulf of Mexico waters north of Sanibel Island (73 FR 72210), the review team concludes that construction and operation of LNP Units 1 and 2 would have no effect on any of the coral species, and these species will not be discussed further.

6.0 Effects of the Proposed Action on Aquatic Species

The effects of the proposed action on the sea turtles, smalltooth sawfish, and gulf sturgeon are described in the following sections.

6.1 Sea Turtles

Four of the five species of sea turtle are listed as Federally and State endangered, with the loggerhead sea turtle listed by both Federal and State levels as threatened. All sea turtles have certain life-history similarities in that females swim ashore to sandy beaches and deposit eggs in nesting pits that are covered to allow incubation. Neonates hatch, struggle out of the sandy nest, and make their way to their respective ocean habitats. Although there are no sandy coastline habitats in the area of the CFBC or the CREC discharge area, juvenile, subadult, and adult sea turtle life stages have been found offshore or in these vicinities. In particular, several sea turtle species found in the CREC intake canal have been stranded on the intake bar racks. PEF has an ongoing program to monitor the intake canal for the presence of sea turtles, to perform rescues for stranded individuals, to provide rehabilitation, and to release resources when possible. Trash-bar monitoring for LNP, as implemented at CREC for sea turtle rescue and handling, may assist sick sea turtles that are not able to avoid becoming lodged on the trash racks, and to remove and report mortalities.

PEF currently has an incidental take permit from NMFS for CREC that allows incidental live take of 75 sea turtles annually, 3 annual causal sea turtle mortalities, and a reporting requirement for non-causal related mortalities of 8 or more within a 12-month period (NMFS 2002). This most recent Biological Opinion concludes that operation of CREC Unit 3, “is not likely to jeopardize the continued existence of loggerhead, Kemp’s ridley, green, hawksbill and leatherback sea turtles” (NMFS 2002).

For each of the species described below (except for the leatherbacks that are rare north of Sarasota County), construction activities and barge traffic are not likely to affect sea turtles that may be in the vicinity of the CFBC or CREC discharge area because the turtles avoid any noise or disturbances. Due to the reduced intake flow associated with the closed-cycle cooling system proposed for LNP, and the limiting of the through screen velocity of the intake to 0.5 fps or less, the review team concludes that turtle strandings on the LNP intake trash bars is unlikely and would be limted to moribund or compromised turtles. Therefore, for the loggerhead, green, hawksbill, and Kemp’s ridley turtles, the review team concludes that construction and operation of LNP may affect, but is not likely to adversely affect these species. The review team concludes that construction and operation of LNP will have no effect on the leatherback turtle due to its apparent lack of distribution in the vicinity of the LNP site, and its lack of potential to become impinged on the LNP intake trash racks.

6.2 Smalltooth Sawfish

Observations of smalltooth sawfish north of Port Charlotte are rare, but two sightings in the coastal Florida panhandle region have been documented since August 2008 (FMNH 2009). Since 2000, four smalltooth sawfish juveniles have been either caught or sighted offshore of

Citrus County – one at the mouth of the CFBC and another just outside the CREC discharge canal (FMNH 2009). However, no smalltooth sawfish were observed or collected during the sampling events described in EIS Section 2.4.2.1 for the CFBC, OWR, and CREC discharge area (CH2M Hill 2009b). Although the critical habitat for smalltooth sawfish is located along the southwestern coast of Florida, occurrence records indicate that juvenile sawfish are present near the CREC discharge and CFBC areas. However, adverse impacts are unlikely because these fish would avoid activities occurring in these areas. The use of vertical trash bars across the intake screens and the through-screen velocity of 0.5 fps for intake operations should allow healthy smalltooth sawfish of any age to swim away and not become trapped against the intake screens, although distressed and moribund fish may become trapped on the trash bars. Therefore, the review team concludes that construction and operation of LNP may affect, but is not likely to adversely affect the smalltooth sawfish.

6.3 Gulf Sturgeon

Gulf sturgeon were not collected in sampling efforts and are not likely to be encountered during construction in the CFBC or CREC discharge canal because neither of these areas is critical habitat or a preferred spawning area. Adverse impacts are unlikely because juvenile or adult fish would avoid activities occurring in these areas. The use of vertical trash bars across the intake screens and the low-approach velocity of 0.25 fps for intake operations should allow healthy sturgeon of any age to swim away and not become trapped against the intake screens, although distressed and moribund fish may become trapped on the trash bars. Therefore, the review team concludes that construction and operation of LNP may affect, but is not likely to adversely affect the Gulf sturgeon.

7.0 Cumulative Effects

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could affect aquatic ecology. For this analysis, the geographic area of interest is considered to be the proposed LNP site, the entire CFBC, Lake Rousseau, the Inglis Lock bypass channel, OWR, the CREC intake and discharge, the Levy and Citrus County offshore areas of the Gulf of Mexico, and the proposed transmission-line corridors. Other watersheds (Wacassassa Basin) adjacent to these waterbodies are not affected by LNP and are excluded from this cumulative impacts analysis.

Other actions in the vicinity that have present and reasonably foreseeable future potential impacts on the CFBC and Gulf of Mexico offshore of the CREC include operation of the existing CREC, the proposed uprate of CREC Unit 3, continued operation of the Inglis Quarry, widening of the US-19 bridge across the CFBC, a proposed hydropower project on the Inglis Lock bypass

channel spillway, proposed Tarmac King Road Limestone Mine, decommissioning of CREC Units 1 and 2, development of a Port District along the CFBC, and natural environmental stressors (e.g., short- or long-term changes in precipitation or temperature and the resulting response of the aquatic community). The review team considered these potential sources of impacts in its evaluation of the cumulative aquatic ecology impacts presented in PEF's ER and in PEF's responses to the NRC staff's Requests for Additional Information.

Historically, the construction and operation of CREC Units 1 through 5 have had some impact on sea turtles in the Gulf of Mexico (described in Section 5.0 of this assessment), which PEF mitigates through guidance for sea turtle rescue and handling. The current CFBC was constructed starting in 1964, but it was never completed as a cross-Florida canal and was officially deauthorized in 1991 (Noll and Tegeder 2003). The western portion of the completed CFBC extends from the Gulf of Mexico to the Inglis Lock at Lake Rousseau and is typical of a tidal canal with marine and estuarine characteristics.

Cumulative impacts on threatened and endangered species within the CFBC are not likely due to activities or events that are distinct from the LNP site. Activities related to construction of the hydropower system on the Inglis Lock bypass channel could affect the downstream migration of fish from Lake Rousseau to the Withlacoochee River, but would not affect the CFBC or OWR. The US-19 bridge expansion will not include in-water construction, and impacts on the CFBC would likely be mitigated through BMPs to control erosion and stormwater runoff during bridge construction. The Inglis Quarry is located on the north side of the CFBC, and drainage ditches are separated from the CFBC by a containment berm (SDI 2008). Barge traffic within the CFBC is likely to be limited to LNP module transportation and should have minimal impact on aquatic resources as discussed in EIS Section 4.3.2. The proposed Tarmac King Road Limestone Mine expansion may affect groundwater discharge to the lower Withlachoochee River (see EIS Section 7.2.2). The CREC Unit 3 power uprate is not expected to have any construction-related impacts except those related to the construction of additional mechanical draft cooling towers on a portion of the CREC site that has been previously disturbed. Any potential onsite construction-related impacts would be mitigated through the use of BMPs. The contribution of LNP construction-related impacts to impacts related to other nearby activities is minor. Impacts from construction of LNP would be temporary, minor, largely mitigated, and mainly confined to the site. Therefore, the review team concludes that the overall contribution of construction to cumulative losses of protected aquatic organisms in the region would be minor, and additional mitigation would not be warranted.

For operational impacts, the review team considered the potential cumulative impacts on the Gulf of Mexico and CFBC related to impingement and entrainment of aquatic organisms and also thermal and chemical releases from both CREC and LNP. Water withdrawn for operation of proposed LNP Units 1 and 2 would require a net intake of 190 cfs (122 Mgd). The source of the 190 cfs, under low flow conditions, would be 50 cfs from leakage of Lake Rousseau water

through the Inglis Lock and freshwater springs, emanating in the CFBC in the vicinity of the intake structure; 70 cfs from the discharge of Lake Rousseau water at the Inglis Dam that would enter the CFBC via the OWR; and an inflow of 70 cfs that would come from the Gulf of Mexico.

Currently, CREC Units 1 through 5 withdraw over 15 times more water from the Gulf of Mexico for operations than the required 190 cfs for LNP Units 1 and 2. The proposed CREC Unit 3 uprate would not increase station water intake flow for CREC Units 1, 2, and 3 (PEF 2007). The additional waste heat generated as a result of the CREC Unit 3 power uprate would be dissipated to the atmosphere by the additional mechanical draft cooling tower planned for constrction at the CREC site.

The review team considered the potential incremental cumulative impacts of impingement and entrainment of aquatic organisms related to operation of LNP 1 and 2 along with continued operation of CREC Units 1 through 5. As discussed in Section 5.3.2, the proposed closed-cycle cooling system with mechanical draft cooling towers for proposed LNP Units 1 and 2 would not be expected to result in a discernable impact on populations of aquatic organisms inhabiting Crystal Bay and Withlacoochee Bay areas of the Gulf of Mexico as a result of impingement or entrainment.

The review team is aware that the possibility exists that CREC Units 1 and 2 (fossil-fuel plants) which contribute significantly to the overall impingement and entrainment of aquatic organisms at CREC, would be decommissioned once LNP Units 1 and 2 begin operation. This significant reduction in intake withdrawal volume (greater than 48 percent) at CREC would reduce the cumulative impact of impingement and entrainment related to operation of CREC on aquatic organisms in the Gulf of Mexico, and may result in a net positive impact on local fisheries.

The operation of the proposed Inglis hydropower project would involve the use of bar racks to prevent debris and organisms larger than 2 in. from traveling through the turbine (Inglis 2008). Any potential impacts from the Inglis hydropower project are isolated from the impacts on the CFBC because the Inglis Lock bypass channel and Withlacoochee River are not hydraulically connected to the CFBC. The construction and operation of the hydroelectric facility would have no effect on populations of aquatic organisms inhabiting the CFBC. Therefore, the Inglis hydroelectric project will have no detectable incremental cumulative impact on aquatic resources affected by the building and operation of LNP.

The review team also considered the potential cumulative impacts of thermal discharges on threatened and endangered species. The operation of all five units at CREC with the uprate of CREC Unit 3 and without the LNP Units 1 and 2 discharge would result in no thermal increase with the operation of a new south cooling tower to augment the current modular helper cooling towers (Golder Associates 2008). The review team is aware that the possibility exists that CREC Units 1 and 2 (fossil-fuel plants), which contribute to of the discharge flow, would be

decommissioned once LNP Units 1 and 2 begin operation. The review team conducted the following thermal analysis of two cases involving the discharge from CREC.

The first case evaluated the thermal discharge from all five units at CREC, the power uprate from CREC Unit 3 and the blowdown from LNP Units 1 and 2. A second analysis involved CREC Units 3 through 5, the Unit 3 power uprate, and blowdown from LNP 1 and 2. The thermal analyses for these two cases are presented in EIS Section 5.2.3.1. The first scenario concludes that resulting changes in discharges at CREC would be minimal for thermal and chemical impacts with a slight increase in discharge plume size. The addition of LNP Units 1 and 2 discharge would result in an increased discharge volume of 87.93 Mgd, but with no significant increase in thermal plume temperature or salinity over current conditions, as discussed in EIS Section 5.3.2.1.

The second scenario, with the assumed shutdown of CREC Units 1 and 2, would result in a discharge plume much decreased in size when compared to the first scenario. CREC Units 1 and 2 currently contribute 918 Mgd total discharge to the Gulf of Mexico during summer operations. This accounts for greater than 45 percent of the total discharge (PEF 2009c). The predicted thermal plume would decrease during both summer and winter conditions as a result from the decreased discharge plume. Salinity increases would occur under both summer and winter conditions due to increased cycles of concentration with CREC Units 1 and 2 non-operational, but are less than 1.0 psu. The overall impact on aquatic resources is expected to be minimal.

Both scenarios represent a noticeable temperature and salinity change in the immediate Gulf of Mexico waters compared to the same region prior to CREC operations from a cumulative point of view (as discussed in EIS Section 7.2.2.1). However, habitats and aquatic organisms in this area have adapted to the salinity and temperature changes so that the incremental impacts of LNP 1 and 2 discharge, CREC uprate of Unit 3, and decommissioning of CREC Units 1 and 2 would not be noticeable.

The review team considered the potential cumulative impacts on threatened and endangered species from chemical releases, including increases in total dissolved solids in the combined CREC and LNP discharge. CREC Units 1 through 5 are in compliance with the Clean Water Act Section 316(a) (thermal discharges) impacts from cooling-water systems. Chemical releases from the existing unit(s) currently comply with the FDEP NPDES permit requirements, and compliance with the Unit 3 uprate and decommissioning of CREC Units 1 and 2 are expected to continue and would be monitored in the future. Before approving a NPDES permit for the proposed unit(s), the FDEP would take cumulative chemical releases from the existing and proposed unit(s), as well as from other industrial sites discharging to the Gulf of Mexico, into consideration. Given the lack of other discharges into the immediate area of the CREC discharge, it is likely that the cumulative impacts from LNP discharge combined with the

discharge from CREC Units 1 through 5 with and without operation of CREC Units 1 and 2 would be minimal.

Anthropogenic activities, such as residential or industrial development near the vicinity of the nuclear facility, can present additional constraints on aquatic resources. Future activities may include shoreline development, such as the proposed Port District, for commercial, industrial, and residential waterfront development along the CFBC to the west of US-19 (Citrus County 2009); increased water needs; and increased discharge of effluents into the Gulf of Mexico or the CFBC.

In addition to direct anthropogenic activities, physical disturbance and climatic events may impose external stressors on aquatic communities (GCRP 2009). Aquatic ecosystem responses to these events are difficult to predict. The level of impact resulting from these activities or events would depend on the intensity of the perturbation and the recovery of the different threatened and endangered species populations.

Cumulative impacts on aquatic ecology resources are estimated based on the information provided by PEF and the review team's independent review. Based on the above analysis, the review team concludes that cumulative impacts on within the geographic area of interest from past, present, and reasonably foreseeable future actions, including the construction and operation of LNP, to Federally-protected threatened and endangered species under the jurisdiction of the NMFS to be minimal.

8.0 Determinations

Based on a review of the potential for impacts given in Section 6.0, including construction, the use of a closed-cycle cooling system, an intake with a design through-screen velocity of less than 0.5 fps, the chemical concentrations estimated by PEF, an existing discharge canal, and the maintenance procedures for the transmission line rights-of-way, threatened and endangered species' life-history data, and past takes at CREC, the review team concludes that the impacts on the CFBC, OWR, Crystal Bay area offshore of the CREC discharge, and the transmission-line rights-of-way from the operation of proposed LNP Units 1 and 2 would be minor, and mitigation beyond that proposed by PEF trackwould not be warranted.

Section 1 identifies five species of whales, five species of sea turtles, two species of fish, and two species of coral that are Federally endangered or threatened and are listed as occurring in Florida waters of the Gulf of Mexico. Of these, the loggerhead sea turtle, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, gulf sturgeon, and smalltooth sawfish were identified as possibly occurring near the proposed LNP site in the CFBC, OWR, and Crystal Bay area offshore of the CFBC and CREC discharge as described in Section 6.0 (Table 8-1). There

are no areas designated as critical habitat for threatened and endangered species in the vicinity of the LNP site or associated structures.

Based on this review, the review team concludes that the impacts on aquatic Federally listed threatened and endangered species from construction and operation of the proposed LNP site would be minor, and additional mitigation would not be warranted.

Table 8-1. Impacts on Federally Listed Threatened and Endangered Species from Construction and Operation of the Proposed LNP

Common Name	Scientific Name	Status[(a)]	Determination
Herpetofauna			
Loggerhead sea turtle	*Caretta caretta*	T	May affect, not likely to adversely affect
Green sea turtle	*Chelonia mydas*	E	May affect, not likely to adversely affect
Hawksbill sea turtle	*Eretmochelys imbricata*	E	May affect, not likely to adversely affect
Leatherback sea turtle	*Dermochelys coriacea*	E	No effect
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	May affect, not likely to adversely affect
Fishes			
Smalltooth sawfish	*Pristis pectinata*	E	May affect, not likely to adversely affect
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	May affect, not likely to adversely affect

(a) Federal status rankings determined by the NMFS under the ESA. E=endangered, T=threatened

9.0 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy,* Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

40 CFR Part 122. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 122, "EPA Administered Permit Programs: the National Pollutant Discharge Elimination System."

56 FR 49653. September 30, 1991. "Endangered and Threatened Wildlife and Plants; Threatened Status for the Gulf Sturgeon." *Federal Register*. U.S. Department of Commerce. U.S. Department of Interior.

65 FR 10120. February 25, 2000. "Florida Power Corporation, et al; Crystal River Unit 3; Environmental Assessment and Finding of No Significant Impact." *Federal Register*. U.S. Nuclear Regulatory Commission.

66 FR 65256. December 18, 2001. "National Pollutant Discharge Elimination System: 5 Regulations Addressing Cooling Water Intake Structures for New Facilities." *Federal Register*. 6 U.S. Environmental Protection Agency.

68 FR 13370. March 19, 2003. "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Gulf Sturgeon." *Federal Register*. U.S. Department of Interior.

72 FR 57416. October 9, 2007. "Limited Work Authorizations for Nuclear Power Plants." *Federal Register*. U.S. Nuclear Regulatory Commission.

73 FR 70290. November 20, 2008. "Endangered and Threatened Species; Critical Habitat for the Endangered Distinct Population Segment of Smalltooth Sawfish." *Federal Register*. U.S. Department of Commerce.

73 FR 72210. November 26, 2008. "Endangered and Threatened Species; Critical Habitat for Threatened Elkhorn and Staghorn Corals." *Federal Register.* U.S. Department of Commerce.

Berg, J.J. 2004. *Population Assessment of the Gulf of Mexico Sturgeon in the Yellow River, Florida*. Graduate Thesis, University of Florida, Gainesville, Florida.

Bjorndal, K.A., A. Carr, A.B. Meylan, and J.A. Mortimer. 1985. "Reproductive biology of the hawksbill *Eretmochelys imbricata* at Tortuguero, Costa Rica, with notes on the ecology of the species in the Caribbean." *Biological Conservation* 34:353-368.

Boulon, R.H., Jr., D.L. McDonald, and P.H. Dutton. 1994. "Leatherback turtle (*Dermochelys coriacea*) nesting biology, Sandy Point, St. Croix, U.S. Virgin Islands: 1981-1993." In *Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation*. K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, eds. NOAA Technical Memorandum NMFS-SEFC-351. National Marine Fisheries Service, Miami, Florida.

Bowen, B.W. and S.A. Karl. 2007. "Population genetics and phylogeography of sea turtles." *Molecular Ecology* 16:4886-4907.

Carr, A. and D.K. Caldwell. 1956. "The Ecology and Migrations of Sea Turtles. 1, Results of Field Work in Florida, 1955." *American Museum Novaitates*, No. 1793: 1-23.

Carr, S.H., F. Tatman, and F.A. Chapman. 1996. "Observations on the Natural History of the Gulf of Mexico Sturgeon (*Acipenser oxyrinchus de sotoi* Vladykov 1955) in the Suwannee River, Southeastern United States." *Ecology of Freshwater Fish* 1996(5):169-174.

CH2M Hill. 2009a. *Estimated Salinity Changes in the Cross Florida Barge Canal and Old Withlacoochee River Channels after Levy Nuclear Plant Intake Operation*. 338884-TMEM-079, Rev 1, Denver, Colorado. Accession No. ML091740472.

CH2M Hill Nuclear Business Group (CH2M Hill). 2009b. *Aquatic Ecology Sampling Report – Levy Nuclear Plant*. 338884-TMEM-087, Rev 1. Denver, Colorado. Accession No. ML091260523.

Chapman, F.A. and S.H. Carr. 1995. "Implications of early life stages in the natural history of the Gulf of Mexico sturgeon, *Acipenser oxyrinchus de sotoi." Environmental Biology of Fishes 43(4):407-415.* DOI:10.1007/BF00001178.

Clean Water Act. 33 USC 1251, et seq. (also referred to as the Federal Water Pollution Control Act [FWPCA]).

Citrus County. 2006. *Citrus County Florida Comprehensive Plan*. Accessed June 9, 2009 at http://www.citruscountyfl.org/devservices/commdev/comp_plan/comp_plan.htm.

Dodd, C.K., Jr. 1988. *Synopsis of the Biological Data on the Loggerhead Sea Turtle* Caretta caretta *(Linnaeus 1758)*. Biological Report 88(14). U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

Eaton, C., E. McMichael, B. Witherington, A. Foley, R. Hardy, and A. Meylan. 2008. *In-water Sea Turtle Monitoring and Research in Florida: Review and Recommendations.* NOAA Technical Memorandum NMFS-OPR-38, National Oceanic and Atmospheric Association, Silver Spring, Maryland.

Eckert, S.A., D.W. Nellis, K.L. Eckert, and G.L. Kooyman. 1986. "Diving patterns of two leatherback sea turtles (*Dermochelys coriacea*) during internesting intervals at Sandy Point, St. Croix, U.S. Virgin Islands." *Herpetologia* 42:381-388.

Endangered Species Act of 1973, as amended (ESA). 16 USC 1531 *et seq*.

Estevez, E.D, and M.A. Marshall. 1993. *1993 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Mote Marine Laboratory, Sarasota, Florida.

Estevez, E.D, and M.A. Marshall. 1994. *1994 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Mote Marine Laboratory, Sarasota, Florida.

Estevez, E.D, and M.A. Marshall. 1995. *1995 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Mote Marine Laboratory, Sarasota, Florida.

Fla. Admin. Code (FAC) 62-17. 2009. *Florida Administrative Code,* "Electrical Power Plant Siting."

Florida Department of Environmental Protection (FDEP). 2005. *Inglis Lock Review*. Report No. IA-03-21-2005-128, Office of Greenways and Trails, Tallahassee, Florida. Available at: http://www.dep.state.fl.us/ig/reports/files/IA_3_21_2005_128.pdf.

Florida Department of Environmental Protection (FDEP). 2008 *Conditions of Certification, Progress Energy Florida Crystal River Energy Complex Unit 3 Nuclear Power Plant Unit 4 and Unit 5 Fossil Plant.* Case Number PA 77-09A2, Tallahassee, Florida. Accession No. ML100980527.

Florida Department of Environmental Protection (FDEP). 2010. *Conditions of Certification, Plant and Associated Facilities and Transmission Lines*. Levy Nuclear Power Plant Units 1 & 2, Progress Energy Florida, PA08-51B, Tallahassee, Florida. Available at http://www.dep.state.fl.us/siting/files/certification/pa08_51_2010_B.pdf.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2009a. *Loggerhead Nesting in Florida.* Accessed February 11, 2009 at http://research.myfwc.com.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2009b. *Green Turtle Nesting in Florida.* Accessed February 10, 2009 at http://research.myfwc.com.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2009c. *Leatherback Nesting in Florida*. Accessed February 10, 2009 at http://research.myfwc.com.

Florida Museum of Natural History (FMNH). 2009. Email from Joana Carvalho, FMNH, to Ann Miracle, PNNL, dated April 14, 2009, regarding smalltooth sawfish database. Accession No. ML101950165.

Florida Museum of Natural History (FMNH). 2010. *Sawfish Implementation Team*. Accessed May 28, 2010 at http://www.flmnh.ufl.edu/fish/sharks/sawfish/srt/srt.htm

Golder Associates. 2008. *USACE Environmental Resource Permit Application for Transmission Corridors Associated with the Levy Nuclear Plant*. Report prepared for Progress Energy, St. Petersburg, Florida. Accession No. ML102040284.

Henwood, T., W. Stuntz, and N. Thompson. 1992. *Evaluation of U.S. Turtle Protective Measures Under Existing TED Regulations, Including Estimates of Shrimp Trawler Related*

Mortality in the Wider Caribbean. NOAA Technical Memorandum NMFS-SEFSC-303. National Marine Fisheries Service, Miami, Florida.

Huff, J.A. 1975. *Life History of Gulf of Mexico Sturgeon,* Acipenser oxyrhynchus desotoi*, in Suwannee River, Florida*. Number 16, Florida Department of Natural Resources, Marine Research Laboratory, St. Petersburg, Florida.

Inglis Hydropower, LLC. (Inglis). 2008. *Draft License Application for Hydropower License Application, FERC Project, No. 12783.* Draft License Application Inglis Bypass Channel Spillway, Inglis Hydropower Project, No 12783, Inglis, Florida. Inglis Hydropower, LLC., Dover, Florida.

Lazell, J.D. 1980. "New England waters: Critical habitat for marine turtles." *Copeia* 1980:290-295.

Limpus, C.J. 1984. "A benthic feeding record from neritic waters for the leathery turtle. (*Dermochelys coriacea*)." *Copeia* 1984:552-553.

Lindberg W.J. and M.J. Marshall. 1984. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Florida) – Stone Crab. FWS/OBS-82/11.21, TR EL-82-4. U.S. Fish and Wildlife Service, Slidell, Louisiana, and U.S. Army Corps of Engineers, Vicksburg, Mississippi.

Marquez, R. M. 1994. *Synopsis of Biological Data on the Kemp's Ridley Turtle,* Lepidochelys kempi *(Garman, 1880)*. NOAA Technical Memorandum NMFS-SEFSC-343. National Oceanic and Atmospheric Administration, Miami, Florida.

Marshall, M.J. 2002. *Seagrass Survey: November 2001 Resurvey at the Florida Power Crystal River Generating Facility*. Prepared for Florida Power – A Progress Energy Company by the Coastal Seas Consortium, Inc., Bradenton, Florida. Accession No. ML102040256.

Meylan, A. 1989. "Hawksbill turtle (*Eretmochelys imbricata*). Status report of the hawksbill turtle." In *Proceedings of the Second Western Atlantic Turtle Symposium*. NOAA Technical Memorandum NMFS-SEFC-226. Panama City, Florida.

Meylan, A., B. Schroeder, and A. Mosier. 1994. "Marine turtle nesting activity in the state of Florida, 1979-1992." In *Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation*. K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, eds. NOAA Technical Memorandum NMFS-SEFC-351. National Marine Fisheries Service, Miami, Florida.

Musick J.A., Harbin, M.M, Berkeley, S.A., Burgess, G.H., Eklund, A.M., Findley,L., Gilmore, R.G., Golden, J.T., Ha, D.S., Huntsman, G.R., McGovern, J.C., Parker, S.J., Poss, S.G., Sala, E., Schmidt, T.W., Sedberry, G.R., Weeks, H., Wright, S.G. 2000 "Marine, Estuarine, and Diadromous Fish Stocks at Risk of Extinction in North America (Exclusive of Pacific Salmonids) Fisheries." *Fisheries* 25(11):6-30.

National Environmental Policy Act of 1969, as amended (NEPA). 42 USC 4321, et seq.

National Marine Fisheries Service (NMFS). 1994. *Endangered Species Act Biennial Report to Congress, Status of Recovery Programs, January, 1992 - June, 1994*. National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service (NMFS). 1998. *Sei Whale* (Balaenoptera borealis*): Western North Atlantic Stock.* Accessed March 31, 2009 at http://www.nmfs.noaa.gov/pr/sars/species.htm#largewhales.

National Marine Fisheries Service (NMFS). 2002. *Endangered Species Act – Section 7 Consultation Biological Opinion. Cooling water intake system at the Crystal River Energy Complex (F/SER/2001/01080*). St. Petersburg, Florida.

National Marine Fisheries Service (NMFS). 2008. Letter from Robert Hoffman, NMFS, to T. Miney, NOAA, dated December 11, 2008, "Endangered and Threatened Species and Critical Habitats under the Jurisdiction of the NOAA Fisheries Service." Accession No. ML083510905.

National Marine Fisheries Service (NMFS). 2009a. *Fin Whale (*Balaenoptera physalus*)*. Accessed March 31, 2009 at http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/finwhale.htm

National Marine Fisheries Service (NMFS). 2009b. *Blue Whale (*Balaenoptera musculus*)*. Accessed March 31, 2009 at http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/bluewhale.htm

National Marine Fisheries Service (NMFS). 2009c. *Humpback Whale (*Megaptera novaeangliae*)*. Accessed March 31, 2009 at http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/humpbackwhale.htm

National Marine Fisheries Service (NMFS). 2009d. *Sperm Whale* (Physeter macrocephalus): North Atlantic Stock. Accessed May 21, 2010 at http://www.nmfs.noaa.gov/pr/sars/species.htm#largewhales.

National Marine Fisheries Service (NMFS). 2009e. *Leatherback Turtle* (Dermochelys coriacea). Accessed February 9, 2009 at http://www.nmfs.noaa.gov/pr/species/turtles/leatherback.htm.

National Marine Fisheries Service (NMFS). 2009f. *Kemp's Ridley Turtle* (Lepidochelys kempii). Accessed February 9, 2009 at http://www.nmfs.noaa.gov/pr/species/turtles/kempsridley.htm.

National Marine Fisheries Service (NMFS). 2009g. *Recovery Plan for Smalltooth Sawfish* (Pristis pectinata). Prepared by the Smalltooth Sawfish Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. Accession No. ML102040292.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and FWS). 1991. *Recovery Plan for U.S. Population of Atlantic Green Turtle* (Chelonia mydas). National Marine Fisheries Service, Washington, D.C. Accession No. ML102040289.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and FWS). 1992. *Recovery Plan for the Kemp's Ridley Sea Turtle* Lepidochelys kempii. National Marine Fisheries Service, St. Petersberg, Florida. Accession No. ML102040290.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and FWS). 1993. *Recovery Plan for Hawksbill Turtle* Eretmochelys imbricata *in the U.S. Caribbean Sea, Atlantic Ocean, and Gulf of Mexico*. National Marine Fisheries Service, St. Petersberg, Florida. Accession No. ML102040291.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and FWS). 2007. *Hawksbill Sea Turtle (*Eretmochelys imbricata*) 5-Year Review: Summary and Evaluation*. Silver Spring, Maryland. Available at http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and FWS). 2008. *Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*)*. Second Revision. National Marine Fisheries Service, Silver Spring, Maryland. Accession No. ML101930618.

National Oceanic and Atmospheric Administration (NOAA). 1989. *Proceedings of the Second Western Atlantic Turtle Symposium*. NOAA Technical Memorandum NMFS-SEFC-226. Panama City, Florida.

Nelson, D.A. 1994. "Preliminary assessment of juvenile green sea turtle behavior in the Trident Submarine Basin Patrick AFB, Florida.In *Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation*. K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, eds. NOAA Technical Memorandum NMFS-SEFC-351. National Marine Fisheries Service, Miami, Florida.

Noll, S. and M. David Tegeder. 2003. *From Exploitation to Conservation: A History of the Marjorie Harris Carr Cross Florida Greenway*. State of Florida Department of Environmental Protection, Office of Greenways and Trails, and the Department of Landscape Architecture, University of Florida, Tallahassee, Florida. Available at: http://www.dep.state.fl.us/gwt/cfg/pdf/History_Report.pdf.

Plotkin, P.T., M.K. Wicksten, and A.F. Amos. 1993. "Feeding ecology of the loggerhead sea turtle *Caretta caretta* in the Northwestern Gulf of Mexico." *Marine Biology* 115(1):1-5. DOI:10.1007/BF00349379.

Progress Energy Florida, Inc. (PEF). 2001. Letter from D.L. Rocerick, PEF, to NRC dated June 27, 2001. "Crystal River Unit 3 – Supplement to Biological Assessment of Impact to Endangered Sea Turtles." Accession No. ML011840181.

Progress Energy Florida, Inc. (PEF). 2003. Letter from J.A. Franke, PEF, to NRC dated February 11, 2003. "Crystal River Energy Complex – Environmental Protection Plan Report 2002 Annual Sea Turtle Report." Accession No. ML03520222.

Progress Energy Florida, Inc. (PEF). 2009. Crystal River Energy Complex – Environmental Protection Plan Report 2008 Annual Sea Turtle Report. Submitted by J.A. Franke to NRC February 26, 2009. Accession No. ML090610194.

Progress Energy Florida, Inc. (PEF). 2005. Letter from J.A. Franke, PEF, to NRC dated February 22, 2005, "Crystal River Energy Complex – Environmental Protection Plan Report 2004 Annual Sea Turtle Report." Accession No. ML050610687.

Progress Energy Florida, Inc. (PEF). 2006. Letter from J.A. Franke, PEF, to NRC dated February 24, 2006, "Crystal River Energy Complex – Environmental Protection Plan Report 2005 Annual Sea Turtle Report." Accession No. ML060670364.

Progress Energy Florida, Inc. (PEF). 2007. Letter from J.A. Franke, PEF, to NRC dated February 22, 2007, "Crystal River Energy Complex – Environmental Protection Plan Report 2006 Annual Sea Turtle Report." Accession No. ML07065405.

Progress Energy Florida, Inc. (PEF). 2008a. *Levy Nuclear Plant Units 1 and 2, Site Certification Application, Volumes 1 through 9*. St. Petersburg, Florida. Including Amendments and Supplemental Information. Available at http://www.dep.state.fl.us/siting/apps.htm#ppn1.

Progress Energy Florida, Inc. (PEF). 2008b. *Applicant's Environmental Report – Operating License Renewal Stage Crystal River Unit 3 Progress Energy*. Unit 3, Docket No. 50-302, License No. DPR-72, Revision 1, Raleigh, North Carolina. Accession No. ML090080054.

Progress Energy Florida, Inc. (PEF). 2008c. Letter from M.J. Annacone, PEF, to NRC, dated February 26, 2008, regarding Crystal River Energy Complex – Environmental Protection Plan Report 2007 Annual Sea Turtle Report. Accession No. ML080660181.

Progress Energy Florida, Inc. (PEF). 2009a. *Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage*. Revision 1, Raleigh, North Carolina. Accession No. ML092860995.

Progress Energy Florida, Inc. (PEF). 2009b. Letter from Garry Miller, PEF, to NRC, dated June 12, 2009, "Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review." Accession No. ML091740483.

Progress Energy Florida, Inc. (PEF). 2009c. Letter from from Garry Miller, PEF, to NRC, dated July 29, 2009, "Response to Supplemental Request for Additional Information Regarding the Environmental Review – Hydrology 5.3.2.1-2." Accession No. ML092150337.

Progress Energy Florida, Inc. (PEF). 2009d. Letter from Garry Miller, PEF, to NRC dated March 27, 2009, "Response to USACE Request for Additional Information Regarding the Environmental Review." Accession No. ML091320050.

Progress Energy Florida, Inc. (PEF). 2009e. Letter from James Holt, PEF, to NRC, dated February 26, 2009, "Crystal River Energy Complex – Environmental Protection Plan Report 2008 Sea Turtle Rescue and Recovery Summary Report*."* Accession No. ML090610194.

Progress Energy Florida, Inc. (PEF). 2010. Letter from James Holt, PEF, to NRC, dated February 24, 2010, "Crystal River Energy Complex – Environmental Protection Plan Report 2009 Sea Turtle Rescue and Recovery Summary Report." Accession No. ML050610687.

Pritchard, P.C.H. 1996. "Evolution, Phylogeny, and Current Status." Chapter 1 in *The Biology of Sea Turtles,* Volume 1. P.L. Lutz and J.A. Musick. CRC Press, New York, New York.

River and Harbors Appropriation Act of 1899, as amended. 33 USC 403.

Schmid, J.R. 1998. "Marine Turtle Populations on the West-central Coast of Florida: Results of Tagging Studies at the Cedar Keys, Florida, 1986-1995." *Fishery Bulletin* 96:589-602.

SDI Environmental Services, Inc. (SDI). 2008. *Inglis Quarry Work Plan Study and Groundwater Modeling.* Prepared for Cemex Construction Materials Florida, LLC. SDI Project No. CEF-010. SDI Environmental Services, Inc., Tampa, Florida. Accessed at http://publicfiles.dep.state.fl.us/DWRM/MineReclamation/Cemex%20Inglis%20Quarry/Inglis%20Quarry%20Work%20Plan%20Study%20and%20Ground%20Water%20Modeling_Nov08.pdf.

Sea Turtle Stranding and Salvage Network. 2009. *Sea Turtle Stranding and Salvage Network*. Southeast Fisheries Science Center. Accessed February 9, 2009 at http://www.sefsc.noaa.gov/STSSN/.

Seitz J.C. and G.R. Poulakis. 2002. "Recent Occurrence of Sawfishes (*Elasmobranchiomorphi: pristidae*) Along the Southwest Coast of Florida (USA)." *Florida Scientists* 65(4):256-266.

Simpfendorfer, C.A. and T.R. Wiley. 2006. *National Smalltooth Sawfish Encounter Database*. Technical Report 1134. Mote Marine Laboratory, Sarasota, Florida.

Stabile, J. J.R. Waldman, F. Parauka, and I. Wirgin. 1996. "Stock Structure and Homing Fidelity in Gulf of Mexico Sturgeon (*Acipenser oxyrinchus desotoi*) Based on Restriction Fragment Length Polymorphism and Sequence Analyses of Mitochondrial DNA." *Genetics Society of America* 144:767-775.

Stone and Webster Engineering Corporation (Stone and Webster). 1985. *Crystal River 316 Studies, Final Report*. Prepared for Florida Power Corporation. Stoughton, Massachusetts. Accession No. ML090750823.

Sulak, K.J. and J.P. Clugston. 1998. "Early Life History Stages of Gulf Sturgeon in the Suwannee River, Florida." *Transactions of the American Fisheries Society* 127:758-771.

Teas, W.G. 1992. *1991 Annual Report of the Sea Turtle Stranding and Salvage Network. Atlantic and Gulf Coasts of the United States. January - December 1991*. Contribution No. MIA-91/92-62. National Marine Fisheries Service, Miami, Florida.

Teas, W.G. 1993. *1992 Annual Report of the Sea Turtle Stranding and Salvage Network. Atlantic and Gulf Coasts of the United States. January - December 1992*. Contribution No. MIA-92/93-73. National Marine Fisheries Service, Miami, Florida.

Teas, W.G. 1994a. *1993 Annual Report of the Sea Turtle Stranding and Salvage Network. Atlantic and Gulf Coasts of the United States. January - December 1993.* Contribution No. MIA-94/95-12. National Marine Fisheries Service, Miami, Florida.

Teas, W.G. 1994b. "Marine turtle stranding trends, 1986 to 1993." In *Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation*. K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, eds. NOAA Technical Memorandum NMFS-SEFC-351. National Marine Fisheries Service, Miami, Florida.

Teas, W.G. and A. Martinez. 1992. *1989 Annual Report of the Sea Turtle Stranding and Salvage Network: Atlantic and Gulf Coasts of the United States. January - December 1989*. Contribution No. MIA-91/92-39. National Marine Fisheries Service, Miami, Florida.

Tucker, A.D. 1990. "A test of the scatter-nesting hypothesis at a seasonally stable leatherback rookery." In *Proceedings of the Tenth Annual Workshop on Sea Turtle Biology and Conservation*. T.H. Richardson, J.I Richardson, and M. Donnelly, Eds. NOAA Technical Memorandum NMFS-SEFC-278. National Marine Fisheries Service, Miami, Florida.

Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley and Loggerhead Sea Turtle Populations in the Western North Atlantic. U.S. Department of Commerce. National Marine Fisheries Service, Miami, Florida. NOAA Technical Memorandum NMFS-SEFSC-444.

U.S. Fish and Wildlife Service (FWS). 1995. *Gulf Sturgeon (*Acipenser oxyrhynchus desotoi*) Recovery/Management Plan.* Atlanta, Georgia. Available at: http://www.nmfs.noaa.gov/pr/pdfs/recovery/sturgeon_gulf.pdf.

U.S. Fish and Wildlife Service (FWS). 2009. *Kemp's Ridley Sea Turtle Recovery Plan* . Accessed February 9, 2009 from http://www.fws.gov/kempsridley/kempsfactsheet.html.

U. S. Global Change Research Program (GCRP). 2009. *Global Climate Change Impacts in the United States*. T.R. Karl, J.M. Melillo, and T.C. Peterson, eds. Cambridge University Press, New York. Available at http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts.

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Vols. 1 and 2, Washington, D.C.

Wakeford, A. 2001. *State of Florida Conservation Plan for Gulf Sturgeon* (Acipenser oxyrhynchus desotoi). FMRI Technical Report TR-8, Florida Marine Research Institute, Florida Fish and Wildlife Conservation Commission, St. Petersburg, Florida. Available at: http://aquacomm.fcla.edu/119/.

Wallace, N. 1985. "Debris entanglement in the marine environment: A review." In*Proceedings of the Workshop on the Fate and Impact of Marine Debris, 27-29 November, 1984, Honolulu, Hawaii*. Shomura R.S. and HO Yoshida, eds. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-54. National Marine Fisheries Service, Honolulu, Hawaii. Available at http://www.pifsc.noaa.gov/library/tmemos1980_1989.php.

Witzell, W.N. and W.G. Teas. 1994. *The Impacts of Anthropogenic Debris on Marine Turtles in the Western North Atlantic Ocean*. NOAA Technical Memorandum NMFS-SEFSC-355. National Marine Fisheries Service, Miami, Florida.

Witzell, W.N. and J. Cramer. 1995. *Estimates of Sea Turtle By-Catch by the U.S. Pelagic Longline Fleet in the Western North Atlantic Ocean*. NOAA Technical Memorandum NMFS-SEFSC-359. National Marine Fisheries Service, Miami, Florida.

Wooley, C.M. and E.J. Crateau. 1985. "Movement, Microhabitat, Exploitation, and Management of Gulf of Mexico Sturgeon, Apalachicola River, Florida." *American Fisheries Society* 5(4):590-605. DOI: 10.1577/1548-8659.

Biological Assessment

U.S. Fish and Wildlife Service

Levy Nuclear Plant Units 1 and 2
Combined License Application

U.S. Nuclear Regulatory Commission
Docket Nos. 52-029 and 52-030

Levy County, Florida

August 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Jacksonville District

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from Progress Energy Florida, Inc. (PEF), for NRC-authorized combined construction permits and operating licenses (COLs) to construct and operate two new nuclear reactors, Levy Nuclear Plant (LNP) Units 1 and 2, on a previously undeveloped site in Levy County, Florida. The U.S. Army Corps of Engineers (USACE) is reviewing an application from PEF for a Department of the Army (DA) Permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Federal Water Pollution Control Act (Clean Water Act) to perform site-preparation activities and build the two reactors and supporting facilities. The USACE is cooperating with the NRC to ensure that the information presented in a single environmental impact statement (EIS) prepared under the National Environmental Policy Act of 1969, as amended (NEPA), is adequate to fulfill the requirements of both agencies. The NRC and the USACE have prepared this biological assessment (BA) to support their joint consultation with the U.S. Fish and Wildlife Service (FWS) in accordance with the Endangered Species Act of 1973, as amended (ESA). Decisions by the NRC to issue the COLs and the USACE to issue a DA permit will be made following issuance of the final EIS.

The two proposed new reactor(s), LNP Units 1 and 2, would be located on a greenfield site. The LNP site is in Levy County, Florida, approximately 10 mi northeast of the Crystal River Energy Complex (CREC) and 30 mi due west of Ocala, Florida. Both power generation units would consist of Westinghouse Electric Company, LLC (Westinghouse) AP1000 pressurized water reactors.

The USACE and the NRC have prepared this BA to examine the potential impacts of construction and operation of the proposed LNP Units 1 and 2 on threatened and endangered species pursuant to ESA Section 7(c). This BA examines the potential effects of the proposed action on Federally threatened and endangered species known to occur on the LNP site and in the vicinity, including the proposed offsite transmission line corridors. In a letter dated November 5, 2008 (NRC 2008), the NRC requested that the FWS Ecological Services Field Office in Jacksonville, Florida provide information regarding Federally listed and proposed species and designated and proposed critical habitat at or in the vicinity of the proposed LNP site, in the offsite corridors, and along the associated transmission-line corridors. That information is presented below in Table 1-1.

The review team is aware of recent events in the Gulf of Mexico associated with the Deepwater Horizon oil spill. To date, information associated with aquatic and terrestrial resources is preliminary and inconclusive. Although not included in this BA, the review team will consider information associated with the oil spill for the LNP project as it becomes available.

Table 1-1. Federally Listed Terrestrial/Aquatic Species Occurring on and in the Vicinity of the LNP Site and in the LNP Offsite Corridors Including Transmission-Line Corridors.

Scientific Name	Common Name	Federal Status	County of Occurrence
Mammals			
Microtus pennsylvanicus dukecampbelli	Florida salt marsh vole	E	Levy
Puma concolor coryi	Florida panther	E	Polk
Trichechus manatus latirostris	Florida manatee	E	Levy, Citrus, Hernando, Hillsborough, Pinellas
Birds			
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	Polk
Aphelocoma coerulescens	Florida scrub jay	T	Levy, Citrus, Marion, Sumter, Lake, Hernando, Pinellas, Hillsborough, Polk
Charadrius melodus	Piping plover	T	Pinellas, Hillsborough
Mycteria americana	Wood stork	E	Levy, Citrus, Marion, Sumter, Lake, Hernando, Pinellas, Hillsborough, Polk
Picoides borealis	Red-cockaded woodpecker	E	Levy, Citrus, Marion, Sumter, Lake, Hernando, Pinellas, Hillsborough, Polk
Polyborus plancus audubonii	Audubon's crested caracara	T	Polk
Rostrhamus sociabilis plumbeus	Everglade snail kite	E	Marion, Sumter, Lake, Polk
Reptiles			
Alligator mississippiensis	American alligator	T	Levy, Citrus
Drymarchon corais couperi	Eastern indigo snake	T	Levy, Citrus, Marion, Sumter, Lake, Hernando, Pinellas, Hillsborough
Neoseps reynoldsi	Sand skink	T	Marion, Lake, Polk
Fishes			
Acipenser oxyrinchus desotoi	Gulf sturgeon	T	Levy
Plants			
Bonamia grandiflora	Florida bonamia	T	Marion, Lake, Polk
Campanula robinsiae	Brooksville bellflower	E	Hernando
Chionanthus pygmaeus	Pygmy fringe tree	E	Lake, Polk
Chrysopsis floridana	Florida golden aster	E	Pinellas, Hillsborough
Dicerandra cornutissima	Longspurred mint	E	Marion
Eriogonum longifolium var. *gnaphalifolium*	Scrub buckwheat	T	Marion, Lake, Polk
Justicia cooleyi	Cooley's water-willow	E	Hernando
Nolina brittoniana	Britton's beargrass	E	Lake, Hernando, Polk

Table 1-1. (contd)

Scientific Name	Common Name	Federal Status	County of Occurrence
Polygala lewtonii	Lewton's polygala	E	Marion, Lake, Polk
Polygonella myriophylla	Sandlace	E	Polk
Prunus geniculata	Scrub plum	E	Lake, Polk
Warea amplexifolia	Wide-leaf warea	E	Lake, Polk
Warea carteri	Carter's mustard	E	Polk

Source: FWS 2010a
E= Federally endangered and T= Federally threatened

2.0 Proposed Federal Actions

The proposed Federal actions are the issuance of COLs for the construction and operation of two proposed new nuclear reactors at the LNP site pursuant to Title 10 of the Code of Federal Register (CFR) Part 52, and a DA permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

In a final rule dated October 9, 2007 (72 FR 57416), the NRC limited the definition of "construction" to those activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to construct a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erection of support buildings and transmission lines, and other associated activities. Preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies including the USACE. The distinction between construction and preconstruction is not carried forward in this BA. Rather preconstruction and construction are being discussed jointly as construction activities for purposes of this joint consultation.

Prerequisites to construction activities include, but are not limited to, documentation of existing site conditions within the LNP site and acquisition of the necessary permits (e.g., COL, local building permits, a National Pollutant Discharge Elimination System (NPDES) permit, a DA permit, a General Stormwater permit). However, those activities that do not fall under the NRC's regulatory authority in 10 CFR 51.4 (i.e., that are preconstruction) could proceed prior to receipt of a COL. After construction, planned operation of the new reactors would proceed according to 10 CFR 50.57.

The construction and operation activities that could affect the protected terrestrial and freshwater species (Table 1-1) based on habitat affinities and life-history characteristics and the nature and spatial and temporal considerations of the activity are as follows:

- Terrestrial
  - Construction (including preconstruction)
    - Onsite clearing, grading, and other site preparation and construction activities including wetland removal and/or alteration
    - Clearing for expansion of existing transmission-line corridors
    - Clearing for new offsite corridors
    - Installation of new or upgraded transmission lines and towers
    - Installation of the barge slip, boat ramp, and the blowdown and intake pipelines.
  - Operation
    - Groundwater drawdown
    - Vegetation control in transmission-line corridors
    - Transmission line repairs or upgrades
    - Collision with structures
- Aquatic
  - Construction (including preconstruction)
    - New dredging and construction of a barge slip and boat ramp on the north shoreline of the Cross Florida Barge Canal (CFBC)
    - Installation of the cooling-water intake structure (CWIS) on the north CFBC shoreline
    - Installation of the cooling-water discharge pipeline, including dredging and placement of piping in the CFBC
    - Connection of discharge piping with the existing CREC discharge canal
    - Vessel movements associated with in-water work
    - New transmission-line corridors and towers.
  - Operation
    - Impingement, entrainment, and maintenance associated with the CWIS
    - Salinity changes in the CFBC and Old Withlachoochee River (OWR) downstream of the Inglis Dam on Lake Rousseau

- Discharge plume from the cooling-water system (thermal, chemical, and physical effects)
- Maintenance of transmission-line corridors.

3.0 Levy Site Description

The proposed LNP site is located in a primarily rural area in Levy County approximately 4 mi northeast from the town of Inglis and 8 mi east of the Gulf of Mexico (Figure 3-1). The LNP site is currently a greenfield site approximately 3105 ac in size. Goethe State Forest borders the northeastern part of the LNP site. A pine plantation is situated just east and south of the LNP site, and an exotic animal hunting ranch and U.S. Highway 19 (US-19) border the western edge of the LNP site.

The LNP footprint would occupy approximately 300 ac for two reactors and the associated power-production infrastructure near the center of the site (Figure 3-2). Two AP1000 reactors are proposed with an electrical output of 1000 MW(e) and 3415 MW(t) each. A closed-cycle cooling system would draw makeup water from the CFBC through a CWIS located on the north side of the canal. A portion of the makeup water would be returned to the environment via the discharge to the existing CREC discharge canal (Figure 3-3). The remaining portion of the water would be released into the atmosphere for evaporative cooling through mechanical draft cooling towers.

3.1 Terrestrial Habitats – Site and Vicinity

The LNP site and vicinity are located in the Gulf Coastal Flatwoods ecoregion of Florida and are characterized by broad, low-elevation flatlands interspersed with shallow depressions (Griffith and Omernik 2008). Pine flatwoods were the predominant vegetative community prior to the mid-20th century, but most have been converted from natural longleaf pine (*Pinus palustris*) and slash pine (*P. elliottii*) communities to managed forests stocked with slash and loblolly pine (*P. taeda*). The LNP site is undeveloped except for a network of limerock roads. Prior to being acquired by PEF, the site was in active forest management and leased for hunting and target practice. Vegetation, soils, and localized drainage patterns had been extensively altered through silviculture activities including clearing, logging, road development, ditching, grading, bedding, and replanting.

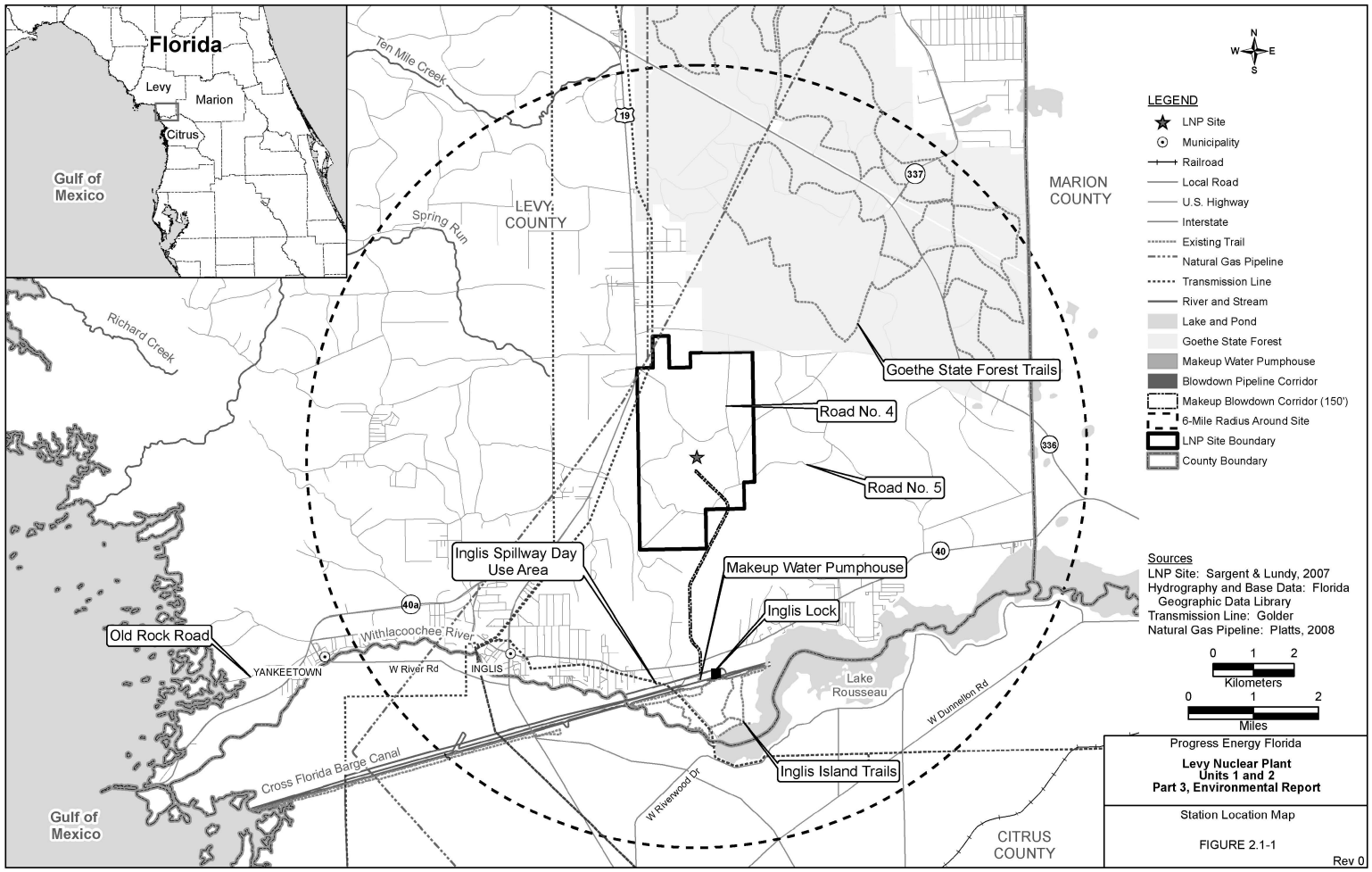

Figure 3-1. LNP Site and Vicinity (PEF 2009a)

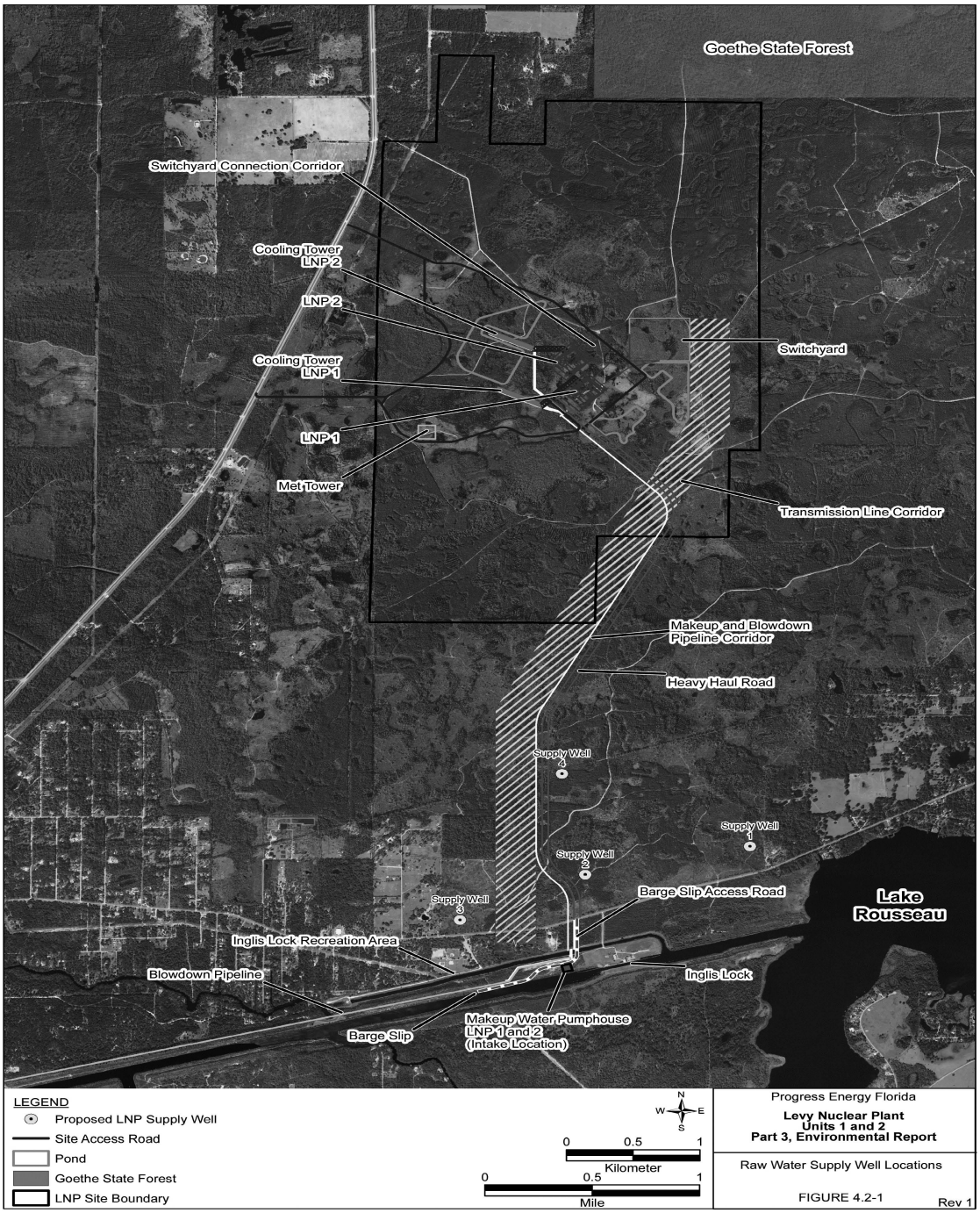

Figure 3-2. LNP Site Map (PEF 2009a)

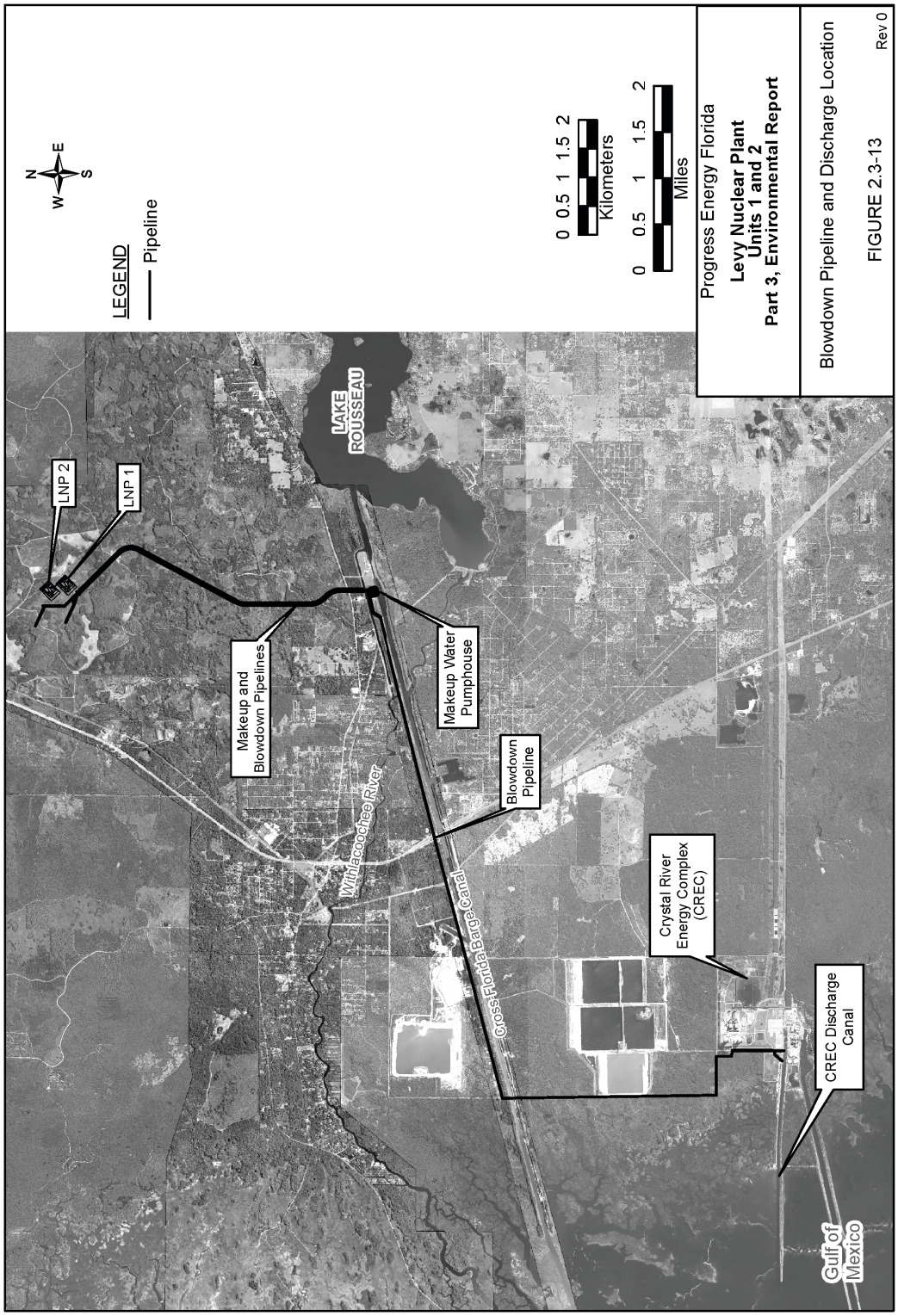

Figure 3-2. Blowdown Pipeline and Discharge Location (PEF 2009a)

Wetlands occur over about two-thirds (2002 ac) of the LNP site. The most common wetland community present consists of pine (mostly slash and loblolly) tree plantations established in seasonally or permanently saturated or shallowly inundated soils (termed wet planted pine), which constitutes about 41 percent of onsite wetlands. Most wetlands on the LNP site have been altered by years of intensive forest management that has included the conversion of native habitats to planted pine plantations, extensive soil disturbance, and modifications of localized drainage patterns. These tree plantations mostly occupy wetter portions of former pine flatwoods and drier portions of former wetlands that have been substantially altered for commercial pine production. Forested wetland swamps (cypress swamps, mixed wetland hardwood forests, and wetland forest mixed stands) constitute another 44 percent of onsite wetlands. Forested wetlands on the site have been logged to varying degrees and range in condition from relatively intact natural forest stands to remnant stands made up of only scattered trees interspersed with herbaceous or scrub vegetation or planted pine saplings. A feature termed treeless hydric savanna, representing about 14 percent of onsite wetlands, constitutes recently clearcut or heavily logged wetland forest stands not yet replanted. Freshwater marshes and wet prairies are less common on the LNP site.

Wildlife populations and habitat on the LNP site have been altered by years of intensive forest management that has converted native forests to planted pine plantations, especially in uplands and drier edges of wetlands. These actions have produced artificially simplified habitats lacking large mature trees, well-developed understory, and other habitat features (e.g., large snags, large woody debris) needed to support a wide assemblage of native wildlife. Nevertheless, the interspersion of wetlands, hardwoods, managed pine stands, and recent clear-cuts provides habitat for many common wildlife species, especially those adapted to early successional stages and frequent landscape disturbance. Wildlife that require mature forest conditions and large blocks of unfragmented habitat are expected to be uncommon. While most mammals, amphibians, and reptiles present are year-round residents, many of the bird species represent individuals that may seasonally migrate to or through this region, including neotropical migrants. A branch of the eastern Atlantic Flyway crosses the region (Birdnature.com 2009).

PEF completed pedestrian surveys on the LNP site between October 2006 and November 2008 to characterize onsite habitats and document the presence of wildlife (PEF 2009g). Direct observations of wildlife, as well as wildlife signs (e.g., scat, tracks), were recorded (PEF 2009a). The Florida Natural Areas Inventory (FNAI) and Florida Fish and Wildlife Conservation Commission (FFWCC) compile and maintain comprehensive databases of biological resources in Florida, including documented occurrences of Federally listed species. The FNAI Occurrence Report generated for the LNP site identified several protected species (e.g., eastern indigo snake and Florida scrub jay) known to occur in the vicinity of the LNP site (FNAI 2009). Although there were no documented occurrences of protected species on the LNP site, both reports identified the site as having the potential to provide habitat for several protected species.

Pedestrian surveys on the LNP site completed by PEF provided additional information about the presence of protected plants and animals and/or their habitats on the LNP site (PEF 2009a, h). No targeted surveys for Federally protected species were completed on the LNP site and critical habitat for threatened and endangered species was not identified; however, there are State sanctuaries, preserves and other lands in the vicinity that have priority protections. There are also jurisdictional wetlands on and in the vicinity of the LNP site.

A condition of certification by the FDEP (2010) would require protocol surveys for all State-listed species (excluding plants) that may occur on the LNP site and associated offsite facilities prior to land "clearing and construction". If listed species are identified during predevelopment surveys or are encountered during development, this condition of State certification by FDEP also requires PEF to consult with the FFWCC to determine the need for appropriate mitigation (FDEP 2010).

3.2 Aquatic Habitats – Site and Vicinity

As described in the following sections, site-related aquatic resources are found in the CFBC, OWR (a remnant arm of the Withlacoochee River), and Crystal Bay.

3.2.1 Cross Florida Barge Canal

In an effort to provide maritime navigation between the Atlantic Ocean and the Gulf of Mexico, construction of a 12-ft-deep by 150-ft-wide Florida cross-peninsular waterway began in the mid-1930s (Noll and Tegeder 2003). Originally intended to be a 171-nautical-mi canal, only 4 percent was complete by 1965 due to lack of funding and congressional support for several decades. Official deauthorization for the barge canal came in 1991, and the Cross-Florida Greenway State Recreation and Conservation Area took over the former barge canal properties. The section of the CFBC affiliated with the proposed action is the 7.4-mi stretch from Inglis Lock west to the Gulf of Mexico. It ranges from 8.6 to 18.2-ft deep and from 207 to 262-ft wide. The Inglis Dam was built in 1909 to impound the Withlacoochee River to form 3700-ac Lake Rousseau. An approximately 1.5-mi portion of the historical downstream segment of the Withlacoochee River below Inglis Dam still runs into the western CFBC below the Inglis Lock (Figure 3-4). A 1.7-mi channel was constructed upstream of the Inglis Lock to reconnect Lake Rousseau waters with the downstream,11-mi portion of the Withlacoochee River, which serves as a bypass around the CFBC. The western portion of the CFBC lies 8 mi to the south of the proposed LNP and is the preferred water source for providing cooling water (Figure 3-4).

The CFBC discharges into the Withlacoochee Bay estuary in the Gulf of Mexico and is influenced by tidal changes. Water-quality characteristics show a wedge of saltwater extending

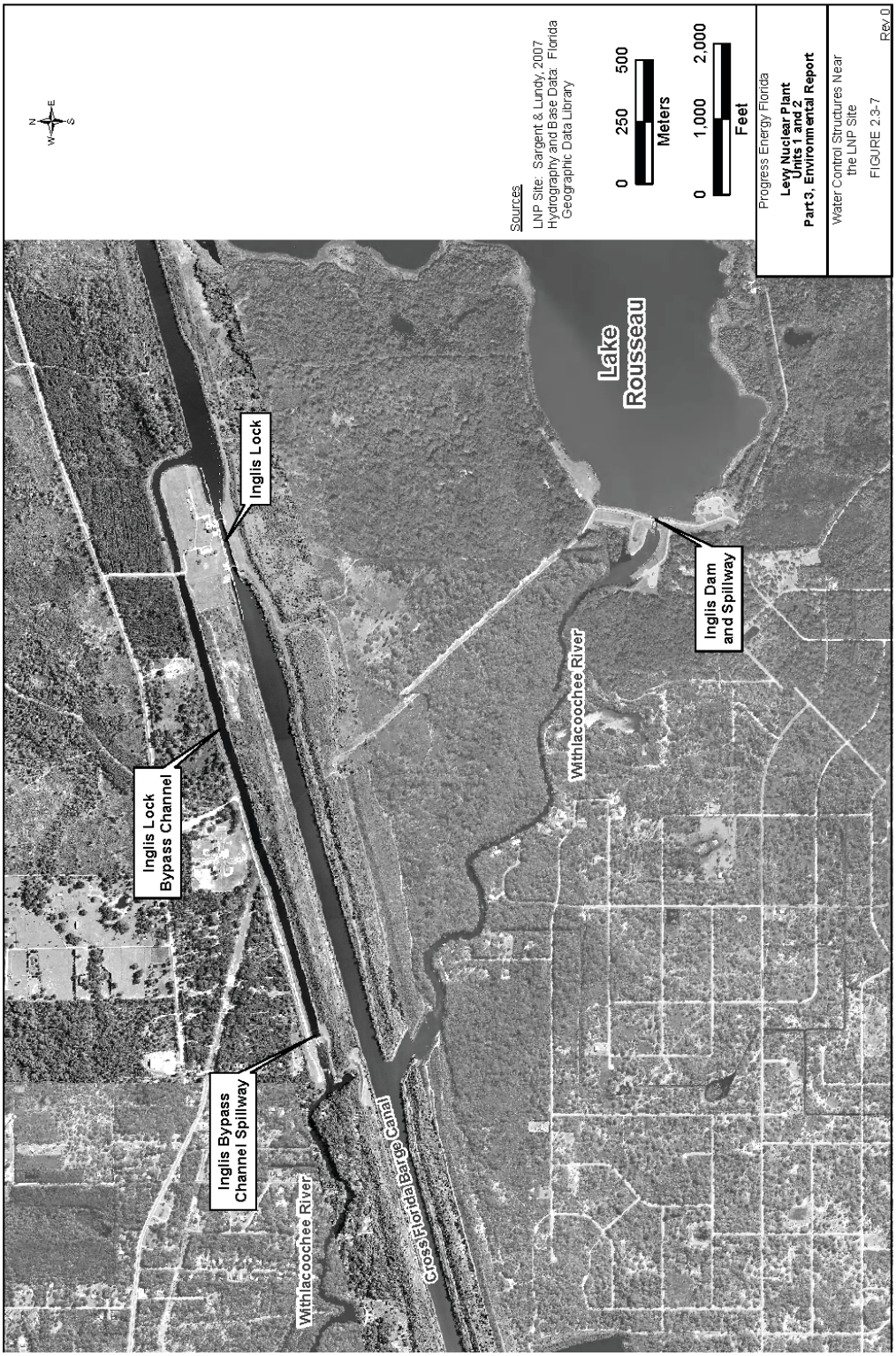

Figure 3-4. Water Control Structures Associated with Lake Rousseau (PEF 2009a)

from the surface waters where the CFBC meets the Gulf of Mexico toward the Inglis Lock. Characterization of the sediment, salinity, and CFBC biota was conducted over a year of sampling activities from October 2007 through September 2008, and is described further in EIS Section 2.4.2. Overall, fish, plankton, benthic, and macroinvertebrate sampling in the CFBC indicates a biologically diverse and dynamic aquatic community at the offshore and nearshore stations (see EIS Tables 2-9, 2-10, and 2-11). The proposed intake location on the CFBC has a less biodiverse community, but it still has appreciable numbers of sediment-dwelling invertebrates and collections of pelagic species that use the fresher water habitat on a seasonal basis (CH2M Hill 2009b).

3.2.2 Old Withlacoochee River

The OWR that flows into the CFBC is 1.3 mi long and originates from Lake Rousseau's Inglis Dam. Salinity profiles in the OWR range from 0.14 to 4.38 practical salinity units (psu) at the 3.2-ft depth where it joins with the CFBC. In June and August 2008, sampling was conducted at the junction of the OWR with the CFBC to downstream of the Inglis Dam within this portion of the OWR (Figure 3-4). Benthic macroinvertebrate sampling mirrored the fish-sampling results with euryhaline dipteran species predominant at the CFBC-OWR junction station, freshwater oligochaetes and amphipods at the Inglis Dam station, and a paucity of organisms and limited diversity at the midpoint station (CH2M Hill 2009a).

3.2.3 Crystal Bay (Gulf of Mexico)

Aquatic species and habitats associated with the discharge from CREC into Crystal Bay have been characterized using studies conducted during CREC operation (Stone and Webster 1985). Aquatic resources were recently sampled from April through November 2008. Beginning in the early 1990s, seagrass beds have been surveyed as a part of quantifying recovery of the CREC offshore Gulf of Mexico habitats following installation of helper cooling towers (Estevez and Marshall 1993, 1994, 1995). Previously affected seagrass areas were observed to recover with colonization by *Halodule wrightii*, a dominant, quick-growing seagrass. However, between 1995 and 2001, overall seagrass abundance declined, likely from more complex environmental influences (Marshall 2002).

Sampling at the CREC discharge point (Station 3) and immediate offshore Gulf of Mexico area (Station 4) was conducted at multiple time points from April to November 2008 (Figure 3-5). Fish, plankton, and macroinvertebrate sampling in the CREC discharge area of Crystal Bay (Figure 3-5) are indicative of coastal salt marsh and nearshore species and show biodiversity commensurate with similar habitat sampling at the mouth of the CFBC (EIS Tables 2-9, 2-10, and 2-11). However, the influence of CREC discharge may be affecting several of the top forage fish species that are notably absent (bay anchovy, scaled sardine, and silver perch) from the CREC discharge stations.

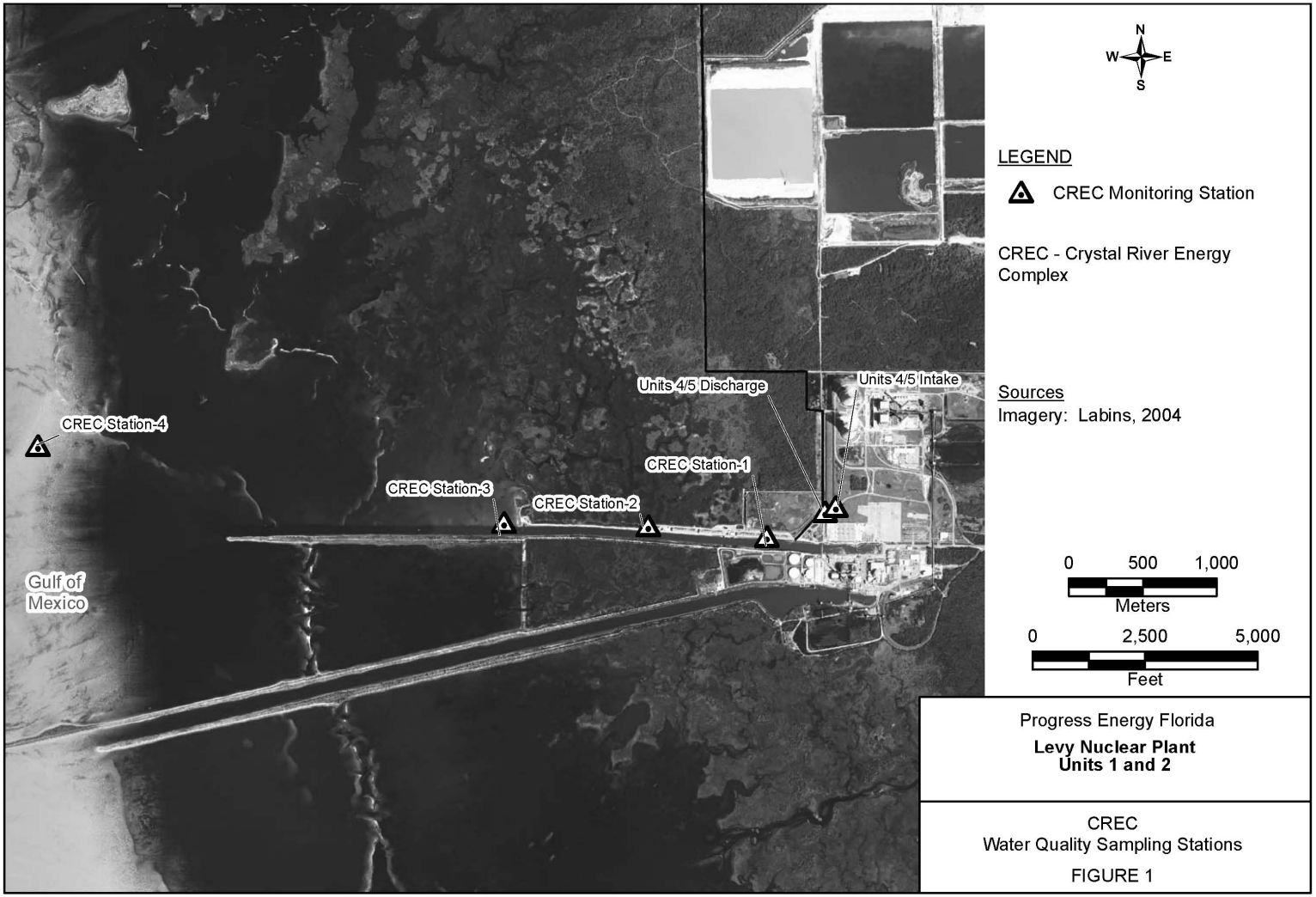

Figure 3-5. Aquatic Sampling Locations for CREC (CH2M Hill 2009b)

3.3 Terrestrial and Aquatic Habitats – Offsite Corridors Including Transmission Lines

Pursuant to the Florida Power Plant Siting Act (PPSA), PEF (2009a, 2008a) has identified corridors for the linear facilities associated with the LNP. The heavy-haul road, makeup-water pipeline, and a portion of the blowdown pipeline would be built in a new common 0.25-mi-wide by 2-mi-long corridor that would extend from the southern boundary of the LNP site to the CFBC (see Figure 3-3). The barge slip and CWIS would be built within this corridor as well. A pipeline for disposal of station blowdown would be built in a new 0.25-mi-wide by 11-mi-long corridor that would extend from the CFBC to the CREC (Figure 3-3). PEF petitioned the State of Florida on April 29, 2010 for a modification to the currently certified corridor for the heavy-haul road, cooling-water makeup pipelines and the blowdown pipelines to be constructed between the LNP site and the CREC (PEF 2010). The purpose of the modification is to provide more flexibility in minimizing impacts to wetlands and other natural resources, including Federally listed species, when siting these facilities, to reduce the use of State-owned lands along the CFBC, and to minimize disruption of recreational activities along the CFBC. Final rights-of-way widths for each facility to be located within the corridor would remain the same.

The delivery of power associated with LNP Units 1 and 2 would require upgrading existing transmission-line corridors and installing new corridors, transmission lines, and substations (Figure 3-6). PEF is responsible for identifying the proposed locations associated with new and upgraded transmission lines. The Florida PPSA provides for the certification of “corridors” within which linear facilities associated with an electrical power plant, such as proposed transmission lines, must be located. Once the final rights-of-way have been approved by the State and acquired, the boundaries of the corridors would be revised to those of the acquired rights-of-way. No on-the-ground surveys for threatened and endangered species were conducted in the associated offsite corridors (including transmission-line corridors). A condition of certification by the FDEP (2010) would require protocol surveys for all State-listed species (excluding plants) that may occur on the LNP site and associated offsite facilities prior to land “clearing and construction”. If listed species are identified during predevelopment surveys or are encountered during development, this condition of State certification by FDEP also requires PEF to consult with the FFWCC to determine the need for appropriate mitigation (FDEP 2010).

Systematic terrestrial and aquatic surveys are not included as part of the transmission-line site-selection process. In the absence of empirical data, reconnaissance-level information pertaining to species designated as Federally endangered or threatened associated with the counties in which the transmission lines would occur was derived from the FWS and other records.

Approximately 91 mi of the transmission lines would be four new 500-kV transmission lines that extend from the southern boundary of the proposed LNP site to the first substation for each line.

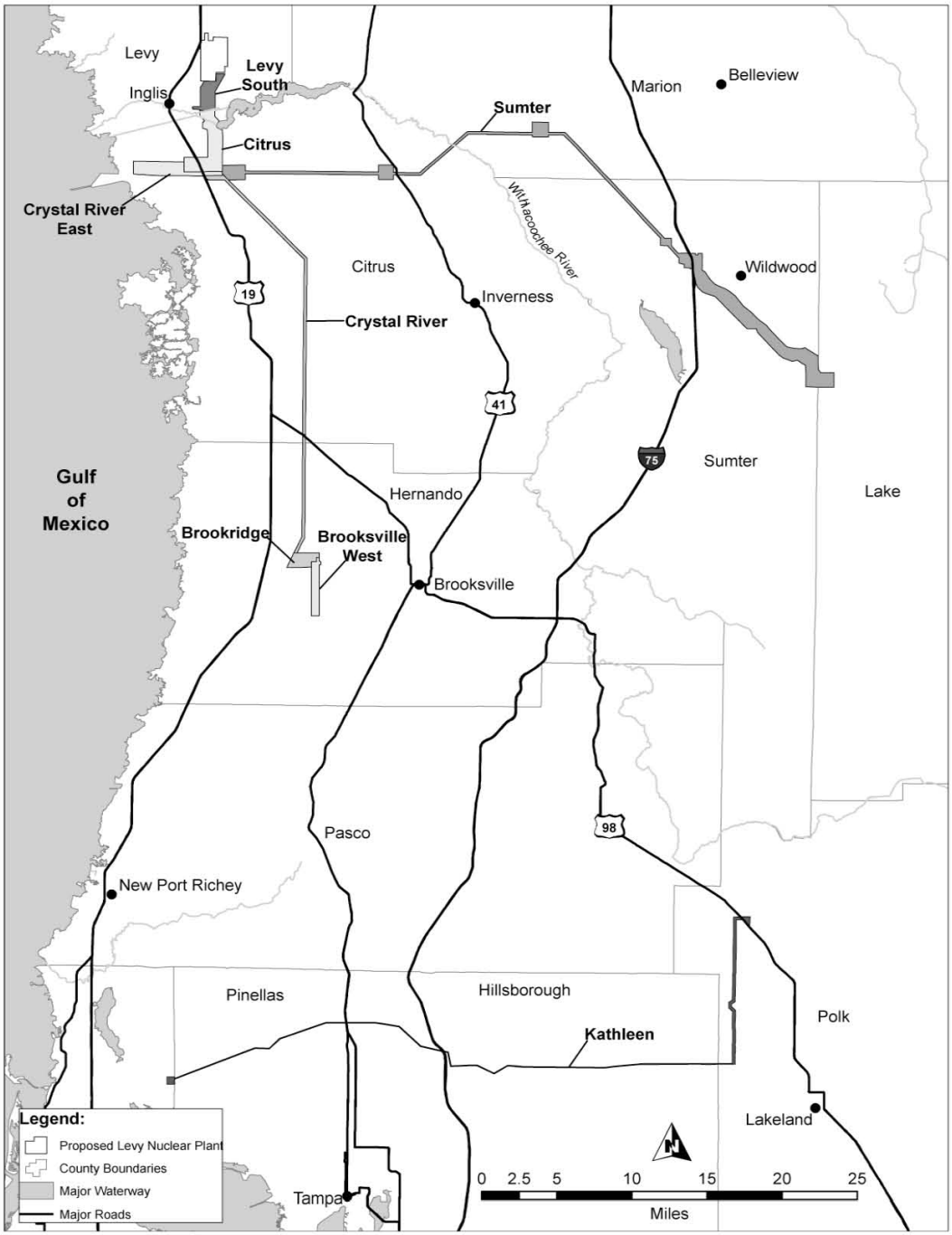

Figure 3-6. Locations of the Proposed Transmission-Line Corridors and Substations for the LNP Site (PEF 2009d)

Two of these 500-kV transmission lines would connect to the proposed Citrus substation, one to the proposed Central Florida South substation, and the last to the CREC 500-kV switchyard (PEF 2008a, 2009a; Golder Associates 2008). All four transmission lines would be collocated in a common corridor from the proposed LNP site to the Citrus substation area, which would require clearing within a 7-mi-long by 1-mi-wide common corridor to site the transmission lines. Most of the remaining 500-kV transmission line extending east to the proposed Central Florida South substation would be collocated with existing PEF transmission lines in a 1000-ft-wide corridor. However, new corridor clearing would be required to site the final 13.5 mi within a 1-mi-wide corridor near Interstate 75 and the Florida Turnpike. The connection of the 500-kV transmission line to the CREC switchyard would follow existing PEF transmission lines, within a 1-mi-wide corridor, for the remaining 6 mi west from the proposed Citrus substation area (PEF 2008a, 2009a; Golder Associates 2008). Connection from the proposed LNP site to the Citrus substation corridor would cross the Withlacoochee River bypass channel, CFBC, and the OWR. Connection of the CREC switchyard to the new Citrus substation would cross existing corridors over estuarine habitat within Crystal Bay.

Additional transmission lines (approximately 89 mi) extending beyond the first substations would be required to link to the electrical grid. Two 230-kV lines would extend from the proposed Citrus substation to the existing Crystal River East substation, a 230-kV line would extend from the CREC switchyard to the Brookridge substation, another 230-kV line would extend from the Brookridge substation to the Brooksville West substation, and the last 230-kV line would extend from the existing Kathleen substation to the Griffin substation then beyond to the Lake Tarpon substation (PEF 2008a, 2009a; Golder Associates 2008). This last corridor crosses the following Outstanding Florida Waters: Blackwater Creek, Trout Creek, the Hillsborough River, and Cypress Creek (PEF 2008a). Other waterbodies include Flint Creek, tributaries of Hollomans Branch, Brushy Creek, Rocky Creek, and numerous unnamed intermittent and perennial tributaries of the previously named waterbodies. Two additional 69-kV lines would be required to support construction at the proposed LNP site and would connect to existing 69-kV lines from the western and the southern boundaries of the LNP site (PEF 2008a, 2009a; Golder Associates 2008). Existing and new corridors extending to the proposed Central Florida South substation would cross the Withlacoochee River at the border of Citrus and Marion Counties and Two Mile Prairie Lake (PEF 2009a).

Corridor segments beyond the first substations include 38 mi, mostly collocated with existing PEF transmission lines from the CREC switchyard to the existing Brookridge substation (corridor width of 1000 ft widens to 1 mi at endpoints). Another 3 mi of corridor (0.5-mi wide) would be collocated with existing PEF transmission lines from the Brookridge substation to the Brooksville West substation. The transmission line extending 50 mi from the Kathleen substation to the Griffin substation, and west to the Lake Tarpon substation, would be collocated with existing PEF transmission lines in a corridor ranging from 300- to 1000-ft wide. Although a specific location for the proposed Citrus substation has not yet been finalized, connection to the

existing Crystal River East substation would require new transmission lines sited somewhere within a corridor less than 2.7 mi long and 1 mi wide (PEF 2008a; Golder Associates 2008).

Many areas within the corridors have been altered by prior land uses, such as residential development, forest management, agriculture, and utility development. Nevertheless, various upland, wetland, and aquatic habitats are present. The vegetation cover within corridors up to the first substation reflects the past level of human-induced change that has occurred across the landscape. Much of the historical vegetation on and around the corridors has been cleared or altered for land uses such as agriculture, residential development, forest management, utilities, and for roads and highways. The predominant upland cover types present include disturbed habitats such as cropland and pastureland, utilities, open land, low-density residential and coniferous plantations. However, substantial blocks of relatively undisturbed mixed hardwood-conifer forest are present, along with smaller stands of longleaf pine-xeric oak forest, pine flatwoods, and upland coniferous forest (PEF 2009a).

Almost 2800 ac of forested and herbaceous wetlands are present within corridors up to the first substation. Of these, freshwater marshes, streams and lake swamps, and mixed forested wetlands are the most prevalent. Wetlands range in quality from those exhibiting well-developed floristic and structural characteristics that provide valuable wildlife habitat, such as wetlands adjacent to the Withlacoochee River and Lake Rousseau, to freshwater marshes located within transmission-line corridors and pastures that have reduced functionality due to past and ongoing disturbance (e.g., tree canopy removal, drainage alteration, livestock grazing) (PEF 2008a). Other wetland habitats noted include cypress swamps, wet prairies, saltwater marshes, and intermittent ponds. Aquatic habitats present within corridors up to the first substation include the CFBC, the Withlacoochee River, small unnamed tributaries, reservoirs, small lakes, bays, and estuaries.

Cover types present within the corridors beyond the first substation also reflect a high level of past human-induced change, with much of the historical vegetation on and around the corridors cleared or altered for residential development, utilities, and agriculture. The predominant upland cover types present in the corridors include disturbed habitats such as low-density residential, utilities, open land, and cropland and pastureland, as well as relatively undisturbed longleaf pine-xeric oak forest. Other upland cover types noted include small areas of mixed hardwood conifer forest, coniferous plantations, shrub and brushlands, and pine flatwoods. Predominant wetland cover types present are freshwater marsh, cypress swamps, stream and lake swamps, and mixed wetland forest (PEF 2009a). Freshwater marshes located within transmission-line corridors and pastures have reduced functionality due to past and ongoing disturbance (e.g., tree canopy removal, drainage alteration, livestock grazing) (PEF 2008a). The existing and proposed transmission corridors do not cross any designated aquatic critical habitats.

A wide variety of wildlife common to west-central Florida is expected to occur within corridors supporting associated offsite facilities. Wildlife diversity is expected to be greatest within

corridors that support an interspersion of native upland, wetland, and aquatic habitats; and less in disturbed or developed lands. Habitats identified within corridors expected to provide higher value habitat for wildlife include mixed hardwood-conifer forest, longleaf pine-xeric oak forest, streams and lake swamps, mixed forested wetlands, salt marsh, wet prairie, pine flatwoods, cypress swamps, and upland conifer forests (Golder Assoicates 2008, PEF 2009a, FDEP 2010). Lower-quality wildlife habitat is represented by areas cleared for utilities, roads, agriculture and residential development; disturbed habitats such as pastureland, open land, other open land (rural) and coniferous plantations abundant along some corridors; and disturbed freshwater marshes located in utility corridors and on adjacent pastureland.

Limited surveys for wildlife have occurred within corridors supporting associated offsite facilities. Pedestrian and vehicular field reconnaissance of accessible areas was conducted to verify and update the distribution of cover types (PEF 2008a, 2009a, h; Golder Associates 2008). Information about wildlife and wildlife habitat was also collected during the surveys, with most effort directed toward important species. The corridor segment between the LNP site and the CFBC received the most investigation because much of this property has been purchased by PEF. The extent-of-ground reconnaissance was much lower for the long corridor segments that would support the transmission lines.

4.0 Terrestrial Construction Impacts

4.1 Site and Vicinity

Impacts on Federally listed threatened and endangered species from construction on the LNP site would include loss of habitat (temporary and permanent), presence of humans, heavy equipment operation, traffic, noise, avian collisions, outdoor lighting, and fugitive dust. These activities would likely displace or destroy wildlife that inhabits the development areas. Larger and more mobile animals would likely flee the area, while less mobile animals such as reptiles, amphibians, and small mammals would be at greater risk of incurring mortality. Although the surrounding forest and wetland habitat would be available for displaced animals, the movement of wildlife into surrounding areas would increase competition for available space and could result in increased predation and decreased fecundity for certain species. These conditions could lead to a temporary localized reduction in population size for particular species. When site-preparation and construction activities are completed, species that can adapt to disturbed or developed areas may readily re-colonize portions of the site where suitable habitat remains, is replanted, or restored.

Most impacts would occur near the center of the site where the two reactors and ancillary power production facilities would be built. Additional impacts would extend to the southeast corner of the site within a corridor supporting the heavy-haul road, the blowdown and makeup pipelines,

and four 500-kV transmission lines. Intensive commercial forest management over many decades has substantially altered terrestrial habitats throughout the site.

Development of LNP facilities would require permanent or temporary disturbance or removal of existing vegetation from approximately 777 ac (25 percent) of the LNP site. Impacts would result from clearing and grubbing, grading, excavation, and the placement of fill. Permanent losses would account for about 627 ac, with impacts on habitat that have been altered by commercial forest management accounting for the greatest losses. Approximately 278 ac of coniferous plantations and 135 ac of wet planted pine would be lost, as well as 74 ac of treeless hydric savanna and 31 ac of other open lands, rural recently clear-cut, but not yet replanted with trees. Permanent impacts on natural cover types (those not substantially influenced by commercial forest management) would be greatest for cypress swamps (54 ac), and wetland forested mixed (29 ac). Permanent impacts on the remaining natural cover types onsite would be minimal.

Temporary impacts would occur on about 150 ac of the site, primarily on cover types that have been altered by commercial forest management, including coniferous plantations (57 ac), wet planted pine (40 ac), treeless hydric savanna (19 ac), and other open lands (9 ac). Temporary impacts on natural cover types onsite would be greatest for cypress (14 ac) and wetland forested mixed (7 ac). Impacts on other natural cover types would be relatively minor. Temporarily disturbed areas would be regraded to pre-existing contours after site-development activities have ceased. Uplands would be seeded in accordance with project-developed sedimentation and erosion control plans, while wetlands would be allowed to regenerate naturally from the existing wetland seed bank (PEF 2009e, h).

Wetlands make up about 64.5 percent (2002 ac) of the 3105-ac LNP site. Approximately 319 ac of wetlands on the LNP site would be permanently filled, representing a permanent loss of approximately 16 percent of the total wetlands onsite. Impacts on wetlands from project development activities on the LNP site would include filling, erosion, sedimentation, alterations to hydrology, and the clearing of vegetation. Wetlands located within and adjacent to the areas where site-preparation activities occur may be subject to three general types of impacts: (1) permanent fill impacts converting wetlands to developed uplands, where all wetland functions are lost indefinitely; (2) temporary disturbance impacts where some or all wetland functions are restored after site development is completed; and (3) partial impacts from the clearing of trees along final transmission-line rights-of-way where nonforested wetland functions would be maintained. Wetlands subject to temporary impacts would be regraded to pre-existing contours after site development has ceased and allowed to regenerate naturally from the existing wetland seed bank (PEF 2009e, h). Review by the USACE and FDEP of wetland delineations performed by PEF's consultants is ongoing. Final approvals of the determination of the presence of jurisdictional waters, including the delineation of wetlands, are expected from the USACE and FDEP by the end of 2010.

Temporary, localized dewatering impacts on wetlands could occur during excavation of the powerblocks for proposed LNP Units 1 and 2. Dewatering of the 75-ft-deep foundation excavations would be required to build each proposed powerblock. Measures would be taken prior to excavation to isolate and seal the dewatering areas and minimize inflow into the excavations. An impervious reinforced diaphragm wall would be installed around the perimeter of each excavation, and the underlying bedrock would be sealed by drilling and pressure grouting (PEF 2009c). Over a roughly 2-year period, inflow and stormwater from within the excavations would be intermittently pumped for each nuclear island and discharged to an infiltration basin sized for the estimated flow rate (PEF 2008a, 2009e, h). These actions are expected to prevent significant drawdowns from occurring in the surficial aquifer system surrounding the excavations that supports hydrologically connected adjoining wetlands (PEF 2009e). No long-term changes to local groundwater levels would occur as a consequence of dewatering during construction (i.e., groundwater would return to pre-disturbance levels after dewatering ceases).

Temporary, localized dewatering of wetlands would also be necessary to install the blowdown and makeup pipelines and some other facilities (PEF 2009c). Dewatering of wetlands traversed by the pipeline excavations would occur in a segmented manner, with excavation, pipe installation, and backfill occurring in short duration. Pumped water would be discharged to infiltration basins sited between the excavation and adjacent wetlands to create a groundwater mound that would minimize impact on wetlands. Because of the short duration of dewatering, the shallow depth of the excavations, and the groundwater recharge achieved through groundwater mounding, no long-term impact on wetlands would be expected from pipeline installation. In deeper excavations, such as for the turbine building and the circulating-water system, pumped water would be discharged to infiltration basins to recharge adjacent wetlands. PEF has committed to monitoring of adjacent surface and groundwater levels to ensure the dewatering impacts are minimized. If any detrimental impact on water levels supporting adjacent wetlands were detected during monitoring, mitigative measures, such as drilling and grouting, sheeting, or re-design of the recharge basins, would be implemented (PEF 2009e)

Wetlands in the LNP vicinity are adapted to a range of seasonal and annual variability in groundwater levels, including periodic drought. No long-term adverse impacts on adjacent wetlands would be expected from dewatering during site development. PEF would be required to prepare a dewatering plan to be approved by the Florida Department of Environmental Protection (FDEP) and Southwest Florida Water Management District (SWFWMD). The plan would include details of the dewatering system, discharge quantities and location, a monitoring plan, and other details as appropriate to demonstrate that it meets the State of Florida Conditions of Certification (FDEP 2010) and complies with all applicable Environmental Resource Permit (ERP) dewatering requirements.

Authorization to affect wetlands on the LNP site would require a Clean Water Act Section 404 permit issued by the USACE and an ERP issued by the State of Florida. In Florida, the ERP application serves as a joint Federal/State permit application to affect wetlands. PEF submitted an ERP in June 2008 as part of the Site Certification Application, initiating the Section 404 and State permitting processes. PEF is required under the Federal and State permitting processes to avoid or minimize wetland impacts to the extent practicable and to mitigate for all unavoidable wetland impacts. The Section 404 permit would also require a Clean Water Act Section 401 Water Quality Certification issued by the FDEP to control the discharge of water caused by site-development activities.

Approximately 75 percent, or 2333 ac, of the LNP site would remain undeveloped, providing a vegetated buffer around the centrally located LNP facilities. Intensive commercial forest management would cease in much of these buffer areas, and pine plantations and other disturbed habitats would be rehabilitated and restored through a series of vegetative management and restorative processes to plant communities more functionally similar to native upland and wetland habitats likely present prior to logging (PEF 2010). PEF would manage most of these lands for wetland mitigation, wildlife habitat, and aesthetic enhancement using a combination of selective tree thinning, prescribed fire, and hydrologic restoration to achieve high ecological value.

4.1.1 Associated Offsite Facilities Including Transmission Lines

4.1.1.1 Associated Offsite Facilities

The development of the associated offsite facilities includes the heavy-haul road; barge slip and barge slip access road; makeup-water and blowdown-water pipelines; cooling-water intake; and transmission lines. For the purposes of this analysis, all impacts that lie within the zone of disturbance (i.e., the development footprint) are treated as permanent impacts. Temporary impacts are represented by a 50-foot buffer adjacent to the pipeline corridor and heavy-haul road between the LNP site and the CFBC. All impacts associated with the transmission lines are treated as permanent impacts.

The locations where associated facilities would be sited are known for all facilities except the transmission lines and their substations. PEF petitioned the State of Florida on April 29, 2010, for a modification to the currently certified corridor for the heavy-haul road, cooling-water makeup pipelines, and the blowdown pipelines to be constructed between the LNP site and the CREC (PEF 2010). The purpose of the modification is to provide more flexibility in minimizing impacts on wetlands and other natural resources when siting these facilities, to reduce the use of State-owned lands along the CFBC, and to minimize disruption of recreational activities along the CFBC. Final right-of-way widths for each facility to be located within the corridor would remain the same.

Development of the associated facilities would result in permanent and temporary impacts on vegetative communities, including wetlands. Impacts for associated facilities, including those listed above, would be the permanent loss of approximately 219 ac. Upland communities such as coniferous plantations, open land, and mixed hardwood/conifer forest would be the primary habitat types lost. Permanent wetland losses (all due to fill) would total approximately 32 ac of mostly cypress swamps and freshwater marsh habitats (PEF 2009a). This wetland loss acreage may change once wetland delineations have been completed in these areas and jurisdictional determinations are reached by the USACE and FDEP.

Temporary impacts for associated facilities would affect another approximately 30 ac of vegetation cover types within a 50-ft buffer adjacent to the heavy-haul road and makeup-water and blowdown pipelines (PEF 2009a). This 50-ft buffer may be affected by activities such as the temporary placement of materials and a roadway (PEF 2009c). Most temporary impacts would involve cover types previously altered by land-management activities, including coniferous plantations and other open lands (rural), which represent unclassified agricultural land. Temporary wetland impacts would total 6.0 ac, with small impacts occurring on cypress, freshwater marshes, and wetland forested mixed cover types. Temporarily disturbed sites would be regraded to pre-existing contours after development activities have ceased. Uplands would be seeded in accordance with project-developed sedimentation and erosion control plans, while wetlands would be allowed to regenerate naturally from the existing wetland seed bank (PEF 2009c, e).

4.1.1.2 Transmission Lines

In compliance with the PPSA, PEF has identified corridors (300 ft to 1 mi wide) within which the transmission lines and their substations would be sited (PEF 2008a, 2009a). More than 90 percent of the new transmission lines would be collocated with existing PEF transmission lines (PEF 2009i). PEF expects to acquire 220-ft-wide rights-of-way for the proposed 500-kV transmission lines and 100-ft-wide rights-of-way for the proposed 230-kV transmission lines (Golder Associates 2008). Once the final rights-of-way have been selected and approved by the State, FDEP would require PEF to complete on-the-ground terrestrial ecology surveys along the rights-of-way so that unavoidable impacts to threatened and endangered species from development of the transmission lines can be fully accounted for and mitigated (FDEP 2010).

The amount of impact on vegetation cover types and wetlands is roughly estimated to be 1510 ac for transmission lines up to the first substation and 279 ac for transmission lines beyond the first substation (PEF 2009a). These estimates were derived using preliminary rights-of-way locations for the proposed transmission lines within the identified corridors (PEF 2009c; Golder Associates 2008). For purposes of this analysis and to provide a conservative estimate of mitigation needs, all impacts associated with transmission-line development were assumed to be permanent (i.e., temporary impacts were treated as permanent impacts). Impacts on cover types and wetlands for transmission lines beyond the

first substation are much less than those estimated for transmission lines up to the first substation because most of these lines would be collocated within existing rights-of-way that already have been cleared (PEF 2009i).

Under the PPSA, the final impacts resulting from transmission-line development would be determined through a post-certification process after the final rights-of-way have been selected and approved by the State. To comply with USACE and FDEP regulatory requirements, PEF is obliged to minimize impacts on wetlands and waterbodies while siting final transmission-line rights-of-way and during development of the lines. Transmission-line activities generally would entail erosion control, corridor clearing and site preparation, placement of foundations, assembly and erection of structures, and installation of conductors. Clearing of vegetation from the selected rights-of-way would account for most of the terrestrial and wetland impacts. Because the selected rights-of-way would be narrow (100 to 220 ft wide) and collocated with existing transmission lines over about 90 percent of their distance (PEF 2009e; Golder Associates 2008), the required clearing would be greatly minimized. Wherever existing corridor widths are insufficient for the proposed transmission lines, additional clearing would be necessary. Based on cover type mapping for the identified transmission-line corridors, the most affected upland cover types would be hardwood conifer mixed, coniferous plantations, and longleaf pine-xeric oak forest. Cypress and freshwater marshes would be the most affected wetland cover types (PEF 2009a).

Clearing of vegetation for final transmission-line rights-of-way would be dependent upon pre-existing site conditions, environmental constraints, and line design requirements (PEF 2009a; Golder Assoicates 2008). Vegetation in uplands would be cleared to ground level, stumps would be treated and/or removed, and vegetation would be mulched onsite or burned in compliance with local fire regulations (PEF 2009a; Golder and Associates 2008). As stated by PEF (2009a) and Golder Associates (2008), wetland vegetation would be cleared by hand using chain saws or low-ground pressure shear or rotary machines to reduce soil compaction and minimize damage to retained vegetation. Trees and vegetative growth with a mature height greater than 12 ft would be removed from the final rights-of-way. Other wetland vegetation (outside of access road and structure pad areas) would be left in place. Removed trees would be cut as low as possible and treated with an approved herbicide. Debris would be removed from wetlands using either low-ground pressure equipment or temporary wetland construction mats and disposed of in upland areas.

Clearing for the final transmission-line rights-of-ways would constitute only a partial loss of wetland function because, although trees and tall vegetation would be removed, nonforested wetland functions would be maintained. However, some wetlands may have to be filled to install access roads and to site structure pads. PEF is obligated under USACE and FDEP regulatory requirements to site roads and pads in ways that avoid or minimize wetland impacts, to the extent practicable. Because transmission lines would be collocated with existing

transmission lines over about 90 percent of their distance, many opportunities exist to use existing access roads and pad sites. Pursuant to the PPSA, FDEP (2010) would require an accounting of any unavoidable impacts on wetlands under a post-certification process.

Wildlife present on and around the associated facilities would be subjected to many of the same impacts described for the LNP site. Some wildlife would perish or be displaced during clearing, and, as a consequence of habitat loss, fragmentation and competition for remaining resources could occur. Less mobile animals, such as reptiles, amphibians, and small mammals, would incur greater mortality than more mobile animals, such as birds, which would be displaced to adjacent communities. Land clearing done during the spring and/or early summer nesting period would be more detrimental to avian reproductive success than clearing conducted during non-nesting periods. Adjacent undisturbed habitats could support some displaced wildlife, but increased competition for available space and resources could depress population levels.

The collocation of the transmission lines with existing lines over about 90 percent of their distance would greatly reduce potential impacts on wildlife and their habitat. Based on cover type mapping, affected habitats would include upland and wetland forests that may provide high value habitat for wildlife; however, much of the affected habitats have lower wildlife value, including coniferous plantations and existing utility land, mostly existing transmission-line right-of-way. Actual losses of wildlife habitat would be determined upon final siting for the transmission-line rights-of-way, as a post-certification condition pursuant to the PPSA (FDEP 2010).

Creation of new transmission-line corridors could be beneficial for wildlife species, including threatened and endangered species, that occupy early successional habitats or benefit from increased habitat edge (i.e., forest/clearing interface environments). Raptors such as Audubon's crested caracara (*Polyborus plancus audubonii*), would likely hunt the corridors. Forested wetlands within the corridors would be converted to and maintained in an herbaceous or scrub-shrub condition. These wetlands may provide foraging habitat for wading birds. However, species dependent on forest habitats or those that are sensitive to forest fragmentation could decline or be displaced, such as the red-cockaded woodpecker (*Picoides borealis*).

Wildlife would also be affected by equipment noise and traffic, and birds could be injured if they collide with new transmission towers and conductors or the equipment used to install these components. Noise levels associated with installation of the transmission lines would be brief and intermittently spaced and would occur mostly during daylight hours (PEF 2008a). Installation of the transmission lines is expected to take only about 4 weeks per mile. Thus, the impact on wildlife from noise is expected to be temporary and minor. The potential for traffic related wildlife mortality is also expected to be low because relatively small crews (compared to LNP site development) would spend only a limited time in each area as they progress over large geographic areas. Avian mortality resulting from collisions with structures and equipment during

transmission-line installation would represent a small hazard for bird populations. As a Condition of Certification, the FDEP (2010) would require PEF to coordinate with the FFWCC in the development of an Avian Protection Plan for the transmission lines that would include measures to reduce potential collision impacts by birds.

4.2 Terrestrial Operation Impacts

4.2.1 Site and Vicinity

Most impacts on terrestrial habitats and species related to the operation of proposed LNP Units 1 and 2 are expected to result from cooling-system operations, groundwater pumping, and the operation and maintenance of the transmission lines. Surface-water withdrawals to support operation of the cooling system can result in local deposition of dissolved solids (commonly referred to as salt deposition); increased local fogging, precipitation, or icing; increased local noise levels; a risk of avian mortality caused by collision with tall structures; and hydrological changes to habitats adjoining the source waterbody. Increased traffic and night-time lighting associated with operation may affect wildlife.

The cooling system proposed for LNP Units 1 and 2 includes a series of mechanical draft cooling towers that would draw makeup water for cooling from the CFBC. It is anticipated that the makeup water would be seawater. This water would be mostly derived from shallow, nearshore waters of the Gulf of Mexico (PEF 2009a). The heat would be transferred to the atmosphere in the form of water vapor and drift. Typically, vapor plumes and drift, including salts and other solutes in the drift, may affect crops, ornamental vegetation, and native plants. Water withdrawals would increase salinity levels in the CFBC and alter shoreline habitat along the CFBC, including tidal marshes near the entrance of the CFBC to the Gulf of Mexico. In addition, bird collisions are possible with mechanical draft cooling towers and other tall structures, and wildlife could be affected by noise generated by operation of the cooling towers.

Groundwater withdrawals to support other plant operations (no groundwater would be withdrawn for the cooling system) may affect water levels in wetlands on and around the LNP site. The State of Florida would require PEF to be in compliance with conditions required by the site certification and this would fall under the regulatory authority of the SWFWMD. In accordance with SWFWMD's review criteria, groundwater withdrawal cannot cause unacceptable adverse impacts on wetlands or other surface waters, which includes "Habitat for threatened or endangered species shall not be altered to the extent that use by those species is impaired" (PEF 2009e).

Cooling-tower drift, fogging, and icing are expected to have little impact on habitats and should not affect listed species. Increased noise levels near the cooling towers, as well as increased human activity and traffic, may cause these wildlife species to avoid habitats immediately

adjacent to proposed LNP Units 1 and 2. However, some level of habituation to these disturbances would likely occur. Listed species that use wetland habitats on the LNP site could be affected by hydrological impacts on wetlands caused by groundwater withdrawal. Although the extent of potential impacts is uncertain, monitoring to identify adverse environmental impacts caused by groundwater withdrawal is stipulated under the State-imposed Conditions of Certification (FDEP 2010). PEF would be required to mitigate the adverse impacts or implement an approved alternative water-supply project that would not affect wetlands (FDEP 2010).

4.2.2 Associated Offsite Facilities Including Transmission Lines

Impacts from the operation and maintenance of the transmission system that may affect threatened and endangered species include bird collision mortality and electrocution, electromagnetic fields (EMFs), and the vegetation maintenance within transmission-line corridors, which includes vegetation control activities such as the application of herbicides and the clearing of woody vegetation. Transmission-line rights-of-way must be kept clear of woody growth through maintenance practices that prevent it from becoming a safety hazard or potentially interrupting service. The collocation of new transmission lines with existing PEF lines would minimize the area of new land that would need to be cleared of vegetation and subsequently maintained for the proposed LNP project. In areas where new corridors are required to accommodate the transmission lines, established maintenance procedures for power transmission systems would be followed to control vegetation, with a goal of maintaining a sustainable groundcover of low-growing, non-woody species (PEF 2009f). The vegetation management practices within rights-of-way owned by PEF are summarized from Golder Associates (2008) and the PEF Environmental Report (ER) (2009a, f). These management practices may differ on rights-of-way where PEF is granted an easement by the landowner.

Impacts on Federally and State-listed species from operation of the proposed LNP are expected to be relatively minor. The likelihood of avian collision with the mechanical draft cooling towers and other tall structures is expected to be minimal. If permanent displacement of listed wildlife into adjacent habitats occurred, competition for finite resources could result in small declines in the local populations. Expected improvements in water quality and biodiversity in the upper reach of the CFBC would likely be beneficial to State-listed wading birds that may forage there. Restoration and enhancement of several thousand acres of low-ecological-value pine plantations are proposed under the conceptual wetland mitigation plan for the LNP project (see EIS Section 4.3.1.7). Commercial forest management would cease over much of the site and most pine plantations and other disturbed habitats would be restored to plant communities functionally similar to native upland and wetland habitats that were present prior to logging. These actions are expected to be highly beneficial to most listed wildlife affected by the proposed LNP and could provide compensation for many potential impacts realized from

operation of the LNP and associated offsite facilities. Consequently, operational impacts on Federally and State-listed species are expected to be minor.

PEF would be required to comply with all applicable laws, regulations, and permitting requirements and would use good engineering practices to minimize potential impacts on listed species. If operational impacts on protected wildlife cannot be avoided, PEF would be required to coordinate with the FFWCC on the need for appropriate mitigation as stipulated under the FDEP (2010) Conditions of Certification.

4.3 Aquatic Construction Impacts

4.3.1 LNP Site

There are some permanent and temporal shallow ponds on the proposed LNP site that may support small freshwater fish. A few of these would be permanently filled as part of facilities construction, but other onsite ponds would be unaffected. Erosion- and runoff-control mitigation practices would be used to prevent siltation of preserved ponds onsite (PEF 2008b). Stormwater-management basins and cessation of forest plantation activities on the site would create improved freshwater aquatic habitat (PEF 2009a).

4.3.2 Cross Florida Barge Canal

The installation of the intake structure, connection of a barge slip and boat ramp to the CFBC, and placement of discharge piping would result in temporary disturbances to the aquatic habitat in portions of the CFBC. Until excavation is complete, preparation of the barge slip and boat ramp would occur on the northern shore of the CFBC in upland areas behind an earth bank that separates building activities from the CFBC. The intake structure would be installed 0.5 mi downstream of the Inglis Lock. Steel sheet piling would be installed at the barge slip and in a cofferdam for intake structure installation. Sheet piles would be installed from land using a pile hammer. Turbidity barriers and erosion-control measures would be installed in the canal during activities associated with sheet-pile installation to control impacts on water quality. Building activities are expected to commence with installation of permanent piling over a 60-week time frame for the barge slip and over a 13-week period for temporary piling at the intake structure. Removal of temporary piling at the intake structure is expected to occur following 6 months of installation activities proposed for an October–March time frame. Turbidity barriers and erosion-control measures are expected to be installed commensurate with piling installation activities and remain in place prior to operations (PEF 2008a). Use of best management practices (BMPs) and water-quality control measures should prevent impacts on the few species that inhabit the portion of the CFBC near the proposed intake. Fish and manatees may swim into this portion of the CFBC, but they would be able to swim away or likely would avoid the area due to vibratory noise.

Dredging would be necessary for construction of a trench for discharge piping. Prior to construction, sediments would be tested using Environmental Protection Agency (EPA) Method 1311 for toxicity characteristics to determine final disposition of dredged spoil materials. Nonhazardous sediments would be used to backfill pipeline trench, as fill material onsite, or disposed of in upland areas. Sediments deemed unsuitable for use would be disposed of appropriately in landfills approved for hazardous disposal (PEF 2009d). Residual water from dredging activities would be tested for compliance with NPDES and Florida surface water quality standards (Fla. Admin. Code 62-302). Discharge piping running from the proposed LNP site to the CREC discharge would run parallel along the CFBC berm, then enter and exit CFBC water supported by anchor piers along both CFBC berms (PEF 2009a). Initially proposed routing of the discharge pipeline south of the CFBC crosses several tidal creeks and would adversely impact approximately 5 ac of salt marsh habitat. The review team is aware that PEF has proposed to the FDEP an alternate route to avoid this important habitat. FDEP has not made a decision on the proposal. Impacts to habitat related to the discharge pipeline, irrespective of the final routing, would be primarily due to its excavation, placement, and burial associated with construction. Maintenance dredging for the barge unloading facility and CWIS within the CFBC is not proposed because the depth of the CFBC has not changed since construction in the 1960s and increased sediment load is not predicted under operation conditions (CH2M Hill 2009b).

Vessel use during the dredging or the installation of the in-water structures and transportation of large components for proposed LNP Units 1 and 2 may affect the aquatic resources of the CFBC, particularly the benthos. The main effects from using vessels would include turbulence from propellers (prop wash), anchor cable scraping across the canal bottom, and accidental spills of materials overboard. Vessels would be used during the installation of the cooling-water discharge pipeline and during the offloading of materials from barges. Vessel operation during construction may cause short-term, localized impacts on aquatic species in the CFBC, but impacts on water quality and habitat in the OWR are not anticipated. These impacts should not affect the general resources in the area of the site or the region along this coast of the Gulf of Mexico.

4.3.3 CREC Discharge Canal

The LNP discharge pipeline (two 54-in., high-density polyethylene pipes per conceptual design) would discharge directly into the CREC discharge canal just downstream of the culverts for Units 4 and 5. CREC Units 4 and 5 discharge into a concrete-lined, open channel. This 0.7-mi open channel drains directly into the CREC discharge canal approximately 1.1 mi from the Gulf of Mexico. A headwall structure would be necessary to join the LNP discharge piping to the CREC discharge canal (PEF 2009b). No construction would be conducted beyond the point of discharge into the Gulf of Mexico, so no aquatic impacts are expected to occur as a result of this activity.

4.3.4 Transmission-Line Corridors

PEF would locate the new 500-, 230-, and 65-kV transmission lines in accordance with the Florida PPSA, Chapter 403 of the Florida Statutes, and Florida Administrative Code Chapter 62-17. In addition, PEF would comply with all applicable laws, regulations, and permit requirements and would use good engineering and construction practices. In addition, PEF would comply with all applicable laws, regulations, and permit requirements and would use good engineering and construction practices (FDEP 2008), which include leaving a 25-ft buffer of existing vegetation along the banks with mature heights not exceeding 12 ft at locations where the rights-of-way cross a navigable waterway (PEF 2009a). Although several threatened or endangered species under the jurisdiction of the FWS are listed for Levy, Citrus, Hernando, Hillsborough, and Pinellas Counties, the activities associated with placement of new lines would not require in-water construction activities.

4.4 Aquatic Operation Impacts

4.4.1 Cooling-Water Intake Impacts

PEF stated in its ER that a closed-cycle, mechanical draft system would be used for proposed LNP Units 1 and 2 (PEF 2009a). Depending on the quality of the makeup water, closed-cycle recirculating cooling-water systems can reduce water use by 96 to 98 percent versus the amount a facility would use with a once-through cooling system (66 FR 65256) as is used at CREC. This significant reduction in water withdrawal rate results in a corresponding reduction in impingement and entrainment. For threatened and endangered aquatic species under the jurisdiction of the FWS, the primary concerns related to water intake and operation are related to the relative amount of water drawn from the cooling-water source (CFBC) and the potential for organisms to be impinged on the intake screens or entrained into the cooling-water system. Impingement occurs when organisms are trapped against the intake screens by the force of the water passing through the CWIS (66 FR 65256). Impingement can result in starvation, exhaustion, asphyxiation (water velocity forces may prevent proper gill movement or organisms may be removed from the water for prolonged periods of time), and descaling (66 FR 65256). Entrainment occurs when organisms are drawn through the CWIS into the proposed LNP Units 1 and 2 cooling system. Organisms that become entrained are normally relatively small benthic, planktonic, and nektonic (organisms in the water column) forms, including early life stages of fish and shellfish that often serve as prey for larger organisms (66 FR 65256). As entrained organisms pass through a plant's cooling system, they are subject to mechanical, thermal, and toxic stresses. No life stages of the aquatic species listed in Table 1-1 are subject to entrainment losses because of their larger size.

For the proposed LNP Units 1 and 2 CWIS, PEF assessed 316(b) impacts for withdrawal of cooling water from the CFBC. The approach velocity for the intake bays would be 0.25 fps at

the trash bar screens and a velocity of 0.5 fps for through-screen flow. To achieve these low velocities, the inlet area would be larger than 106.1 ft^2 (PEF 2008a). The zone of hydraulic influence would extend from the CWIS to 5 mi west of the CWIS in the CFBC (PEF 2008a) and use an offshore station in the Gulf of Mexico to estimate impingement and entrainment impacts. Sampling in the area of the proposed CWIS indicated a biologically depauperate environment with relatively poor water quality (PEF 2009a). The aquatic species listed in Table 1-1 do not use CFBC habitat for spawning or calving. Therefore, the potential for impingement and entrainment of aquatic organisms during operation of the CWIS, based on the percentage of water withdrawn, the planned low through-screen intake velocity, the closed-cycle cooling system design, and the distance away from preferred spawning and calving habitat in the Gulf of Mexico, the review team finds that the impacts on the Federally protected aquatic species from impingement and entrainment would be negligible.

Maintenance of CWIS structures includes the mechanical scraping of screen washes to prevent clogging or collection of debris and organisms on intake screens and bar racks, respectively. Bar racks would be removed and scraped once per quarter as currently performed at CREC (PEF 2009b). Trash and organisms caught on traveling intake screens would be removed by a high-pressure spray wash and deposited into a collection dumpster. Collected debris and organisms would be disposed of in a licensed landfill.

4.4.2 Discharge Impacts

The effluent discharge from the proposed LNP Units 1 and 2 would be directly into the CREC discharge canal. EIS Section 4.3.2 discusses the location and design of the discharge piping. The proposed LNP Units 1 and 2 discharge would be 4.4 percent of the total discharge from combining the LNP and CREC discharges. The potential impacts on the Gulf of Mexico from the operation of proposed LNP Units 1 and 2 would include the effects of heated effluents on aquatic resources, chemical impacts, and physical impacts from discharge. In addition, FDEP Conditions of Certification state that PEF would retire its two oldest, once-through coal-fired units at the CREC by December 31, 2020 if LNP Units 1 and 2 are licensed, built, and begin commercial operation. CREC Units 1 and 2 cessation of operations would significantly reduce the discharge flow from the CREC discharge canal even with the additional discharge flow from LNP Units 1 and 2 (Table 4-1).

4.4.2.1 Cold Shock

A factor related to thermal discharges that may affect aquatic biota is cold shock. Cold shock occurs when aquatic organisms that have been acclimated to warm water, such as fish in a power plant's discharge canal, are exposed to a sudden temperature decrease. This sometimes occurs when single-unit power plants shut down suddenly in winter. Cold shock mortalities at U.S. nuclear power plants are "relatively rare" and typically involve small numbers of fish (NRC 1996). Cold shock is less likely to occur at a multiple-unit plant because the

temperature decrease from shutting down one unit is moderated by the heated discharge from the units that continue to operate. The proposed LNP Units 1 and 2 discharge would be 4.4 percent of the total discharge from combining LNP and CREC discharges. Therefore, the review team finds that the impacts from cold shock would be minimal.

Table 4-1. Comparison of NPDES Discharge Volumes Under Different Operation Scenarios During Summer Conditions.

Operating Unit	CREC Current Combined Discharge (Mgd)	Percent of Total Discharge	Addition of LNP Units 1 & 2 to current CREC (Mgd)	Percent of Total Discharge	Addition of LNP Units 1 & 2 to current CREC (Mgd) with Decomissioning of CREC Units 1 & 2	Percent of Total Discharge
CREC 1	446	23.4	446	22.3	-	-
CREC 2	472	24.7	472	23.7	-	-
CREC 3	979	51.4	979	49.1	979	90.9
CREC 4 & 5	10.1	0.5	10.1	0.5	10.1	0.9
LNP 1 & 2	-	-	87.8	4.4	87.8	8.2

Source: PEF 2009c
Note: CREC discharge rates are given as current maximum NPDES-permitted volumes.

4.4.2.2 Heat Stress

The thermal tolerance for aquatic organisms is defined in different ways. Some definitions relate to the temperature that causes fish to avoid the thermal plume, others relate to the temperature that fish prefer for spawning, and others relate to the temperatures (upper and lower) that may kill individual fishes. Some of these tolerances are termed “preferred temperatures,” “upper avoidance temperatures,” and “lethal temperatures.”

In EIS Section 5.2.3, the review team describes its independent assessment of the incremental impacts of proposed LNP Units 1 and 2 on the water temperatures within the CREC discharge and the Gulf of Mexico using a three-dimensional coastal ocean model. During summer conditions at ebb tide, the surface-water temperatures near the CREC discharge channel would be slightly less under the proposed conditions when compared to the current conditions that include operation of CREC Units 1 through 5. The discharge volume of the plume would be increased with the addition of LNP Units 1 and 2, but only a slight increase in surface-water temperature (<0.1°C) would result compared to current conditions. Temperature increase at the entrance of CFBC channel would be between 0.05°C and ~0.1°C during the summer months at ebb tide (Figure 4-1). Similar trends in thermal plume temperatures would be observed during winter conditions with the addition of LNP discharge resulting in a slight temperature drop at the CREC discharge canal and a slight increase in surface-water temperature beyond the

immediate discharge area. Surface-water temperatures at the mouth of the CFBC are expected to increase by less than 0.5°C over the current conditions (Figure 4-2). The increased plume size is likely to have minimal impact on aquatic biota that forage near the CFBC under both extreme conditions. Habitat usage is therefore not expected to be affected under operating conditions.

4.4.2.3 Chemical Impacts

Intake structures, such as the pump suction housings and sensor tubes, would be coated with a copper-based anti-fouling substance to minimize fouling of these structures. In addition, ClamTrol (CT1300) would be injected every 21 days at a concentration not to exceed 4.5 ml/L, into the CWIS to prevent biofouling by marine invertebrates (PEF 2009b). The use of chemicals in the existing CREC discharge is regulated by an NPDES permit granted by FDEP. The chemical concentrations at the outfall for the existing units meet the NPDES limits (FDEP 2010). Table 4-2 (ER Table 5.3.2-1) lists the water-treatment chemicals, their use, and the concentrations that are anticipated to be discharged from proposed LNP Units 1 and 2 blowdown. The concentrations in the discharge are significantly lower than the LC50 (the concentration that is lethal to 50 percent of the sample population) obtained from the Material Safety Data Sheets. The CREC effluent discharge and water flow from the Gulf of Mexico would further dilute the concentration of these chemicals, so the impacts from the addition of LNP discharge to the Gulf of Mexico would be minimal.

In addition, the review team evaluated the potential for impact due to the increased salinity associated with the LNP Units 1 and 2 blowdown, which would have a total dissolved solids concentration of 1.5 times greater than seawater (PEF 2009b). This increase in total dissolved solids is due to evaporative loss of water through the cooling towers. Because the LNP discharge would be combined with CREC discharge prior to point of discharge into Crystal Bay and the CREC discharge accounts for the vast majority of the discharge volume (>95 percent), the increase in salinity would be slight (0 ppt and ~0.5 ppt) in the coastal region near the CREC discharge channel. The addition of LNP discharge with CREC discharge to the Gulf of Mexico would increase the salinity to between 0.4 ppt and ~0.45 ppt at the mouth of the CFBC (Figure 4-3).

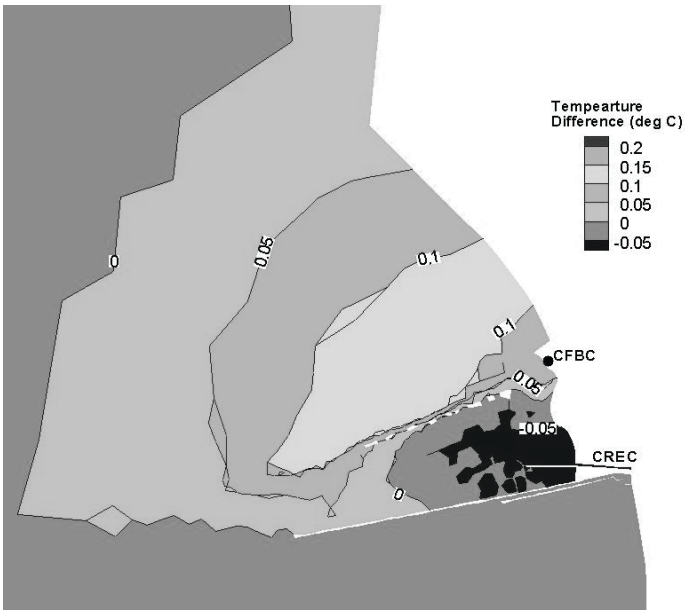

Figure 4-1. Thermal Plume Analysis Using FVCOM (Finite Volume Community Ocean Model) Showing the Temperature Difference Between Current and Proposed Thermal Discharge Under Summer Conditions at Ebb Tide

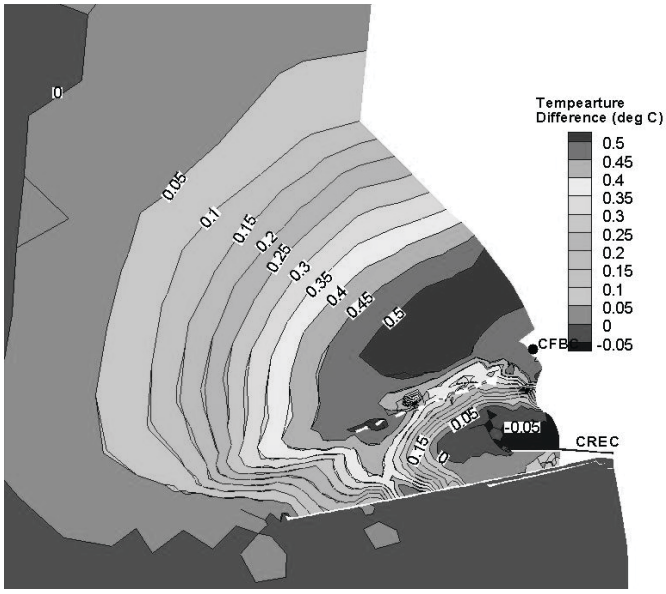

Figure 4-2. Thermal Plume Analysis Using FVCOM Showing the Temperature Difference Between Current and Proposed Thermal Discharge Under Winter Conditions at Ebb Tide

Table 4-2. Chemical Discharges to the Gulf of Mexico from Proposed LNP Units 1 and 2

Chemical	Use	Concentration at Discharge Point
Sodium hypochlorite	Biocide	0.2 ppm residual chlorine or 0.36 sodium hypochlorite
Ammonium chloride	Algaecide	0.2 ppm residual chlorine or 0.303 ppm ammonium chloride
Sulfuric acid	pH adjuster	2.237 ppm sulphuric acid
Orthopolyphosphate	Corrosion inhibitor	30 ppm orthopolyphosphate
Polyacrylate	Silt dispersant	150 ppm polyacrylate
Phosphonate	Antiscalant	20 ppm phosphonate

Source: PEF 2009a

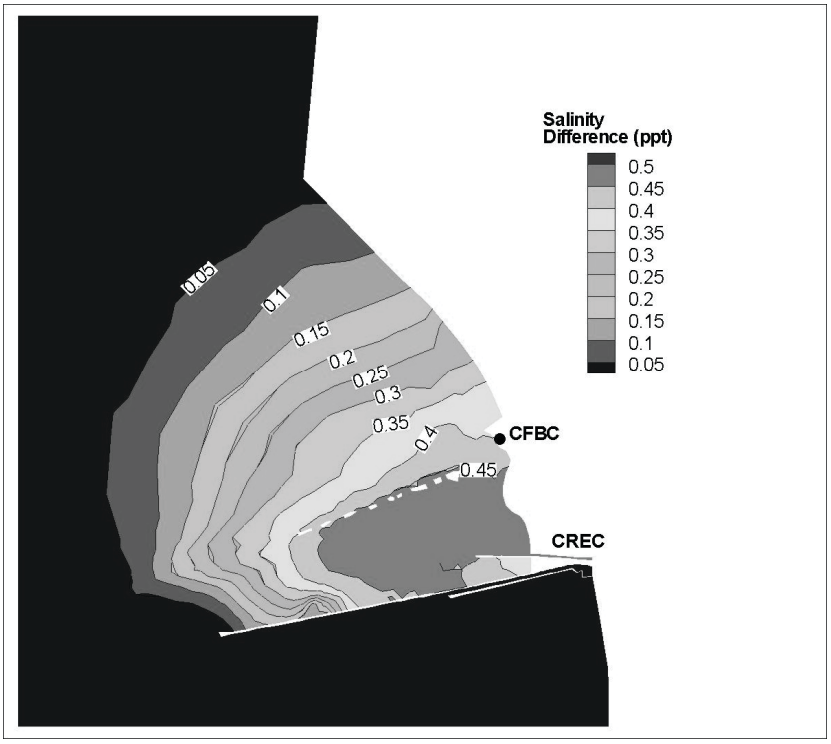

Figure 4-3. Salinity Difference Between the Current and Proposed Discharge Plume at Ebb Tide

4.4.2.4 Physical Impacts

The discharge volume of the LNP 1 and 2 blowdown would be 81.34 Mgd and would be combined with the CREC Units 1 through 5 discharge of 1651.8 Mgd in the CREC discharge canal, which opens into the Gulf of Mexico. The LNP discharge would account for only 4.4 percent of the total discharge flow and would have little physical scouring impact at the terminus of the discharge canal (PEF 2009a).

Transmission-Line Corridors

Maintenance activities along the four 500-kV, five 230-kV, and two 269-kV transmission lines could lead to periodic temporary impacts on the waterways being crossed. However, it is assumed the same vegetation-management practices currently used by PEF for the existing CREC facility transmission-line rights-of-way would be applied to the proposed existing and new transmission-line rights-of-way. PEF practices and procedures were developed to prevent impacts on surface waters and wetlands, so impacts on aquatic ecosystems from operation and maintenance of transmission lines would be minimal (PEF 2009a). Impacts on Federally protected aquatic species from maintenance of the transmission lines are not anticipated.

5.0 Protected Species Descriptions

This section describes the life history and habitat use for Federally listed terrestrial and aquatic species that may occur in or near the LNP site and LNP offsite facilities listed in Table 1-1.

The Florida salt marsh vole (*Microtis pennsylvanicus dukecampbelli*), listed as endangered under the ESA, is known from only one coastal marsh site on privately owned land in Waccasassa Bay, a separate bay from where the discharge pipe for the proposed LNP Units 1 and 2 would be located (FWS 1997a). This species inhabits salt marshes with dominant vegetation of smooth cordgrass (*Spartina alterniflora*), black rush (*Juncus roemeranus*), salt grass (*Distichlis spicata*), and glasswort (*Salicornia* spp.) (FWS 1997a). Loss of habitat due to climatic changes and resulting sea-level rise is thought to be the main contributor to the decline of the Florida salt marsh vole and only a few sites from the marshes along the Florida Gulf Coast sampled have appropriate habitat (FWS 1997a). In addition, there are no plans to impact salt marshes with this proposed project (FDEP 2010).

The Florida panther (*Puma concolor coryi*), listed as endangered under the ESA, is one of the most endangered large mammals in the world (FWS 1999). Historically this species had a range of six southern-tier states; Alabama, Arkansas, Florida, Georgia, Mississippi, and South Carolina (FWS 2008b; PEF 2008b). Currently, the Florida panther only occurs in 5 percent of its historical range and the only known reproducing population is in southern Florida (FWS 2008b). This species prefers native, upland forests of hardwood hammocks and pine flatwoods, but will also use wetlands and disturbed areas (FWS 1999). Home range size is influenced by the quality of available habitat; the best habitat (allowing for smaller home ranges) generally has a dense understory that enhances the opportunity for denning, resting, and feeding (FWS 1999). The only remaining breeding populations of Florida panther are found in counties South Florida, south of the Caloosahatchee River (FWS 2008b). All potential habitat patches identified by the FWS are located only in the southern portions of Polk County well

outside the proposed transmission line corridors for LNP Units 1 and 2 (FWS 2008b, PEF 2009a).

The Florida manatee (*Trichechus manatus latirostris*) is a large, slow-moving herbivore, and the only sirenian in North American waters (FWS 2007). It is listed as endangered under the ESA. There are two subspecies of manatees, the Antillean manatee (*Trichechus manatus manatus*) and the Florida manatee (*Trichechus manatus latirostris*) (FWS 2007). Although both subspecies are found in the Gulf of Mexico, interactions in Levy and Citrus Counties are more likely to be with the Florida manatee. Thus, the following discussion will concentrate on this subspecies. Adults average 10 ft in length and 800 to 12,000 lb in weight. The calving interval is 2 to 5 years, and individuals are believed to live as long as 60 years (FWS 2007, 2008a; USGS 2009). The Florida manatee is one of the most endangered marine mammals in the United States.

During summer, the Florida manatee is found primarily in the shallow fresh, brackish, and marine waters along both coasts of Florida. Individuals usually remain in 10- to 16-ft-deep waters, and rarely venture into water exceeding 20 ft. Historically, the distribution of manatees shifts south of central Florida in winter because of their intolerance of temperatures below 20°C (Irvine 1983). However, over the years, the winter distribution has shifted northward because of habitat loss and the construction of power plants/industrial sites that discharge warm-water effluent. According to the FWS (2007), approximately 12 percent of the Florida population now occurs in the northwestern portion of the state. Approximately half of those animals (around 280 manatees) have been found in Kings Bay at the head of the Crystal River just south of the CREC (FWS 2007).

A recent synoptic aerial survey conducted by the FFWCC's Fish and Wildlife Research Institute (FWRI) in January 2009 documented the presence of 3807 manatees throughout the Florida manatee's winter range, topping the previous high in 2001 by more than 500 animals (FFWCC 2009a). Of these, 1654 were sighted along Florida's west coast. However, such counts are considered approximate at best because estimating manatee abundance and trends is difficult (FFWCC 2009a).

Most human-caused manatee deaths are from collisions with watercraft. Flood gates, canal locks, and marine debris also cause manatee deaths, but not as often. A loss of natural springs due to increasing water demands and potential loss of warm water from power plants that are eventually shutting down could limit the available habitat for manatees (FWS 2008a). For non-adults in the northwestern region of Florida, perinatal mortality is the most common cause of death, with watercraft collisions ranked second. Most of the deaths associated with watercraft result from the impact not from propeller wounds (Table 5-1). It is unclear whether these deaths are due to violations of protective measures or a lack of adequate measures because collisions are rarely reported and carcasses drift with the currents in the area. No-wake zones, manatee

protection areas, and an extensive educational effort have been implemented by State and Federal agencies to mitigate these adverse human impacts

Table 5-1. FWRI Manatee Mortality Database for Citrus and Levy County Areas

Year	Watercraft	Flood Gate/ Canal Lock	Other Human	Perinatal	Cold Stress	Natural	Undetermined	Total
Citrus County								
1989	2	0	0	0	0	1	2	5
1990	1	0	0	1	0	2	0	4
1991	0	0	0	4	0	1	0	5
1992	3	0	0	3	0	2	1	9
1993	1	0	1	2	0	1	3	8
1994	2	0	0	0	0	3	0	5
1995	0	0	0	4	0	1	1	6
1996	2	0	0	3	0	0	1	6
1997	1	0	1	2	0	0	1	5
1998	2	0	0	1	0	0	1	4
1999	3	0	0	2	0	1	0	6
2000	1	0	1	2	0	0	2	6
2001	1	0	0	6	0	0	2	9
2002	3	0	1	4	0	1	0	9
2003	3	0	0	2	2	1	2	10
2004	1	0	0	1	2	1	2	7
2005	6	0	0	9	0	0	3	18
2006	2	0	1	2	1	1	3	10
2007	5	0	0	3	0	2	2	12
2008	8	0	0	6	0	5	3	22
Grand Total	47	0	5	57	5	23	29	166
Levy County								
1989	0	0	0	0	0	0	0	0
1990	1	0	0	2	0	0	0	3
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	1	0	0	1	2
1994	0	0	0	3	0	0	0	3
1995	0	0	0	0	0	0	0	0

Table 5-1. (contd)

Year	Watercraft	Flood Gate/Canal Lock	Other Human	Perinatal	Cold Stress	Natural	Undetermined	Total
1997	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0
1999	1	1	0	0	1	0	0	3
2000	1	0	1	0	0	0	1	3
2001	0	0	0	9	0	0	1	10
2002	0	0	0	3	0	0	0	3
2003	0	0	0	0	0	0	1	1
2004	0	0	0	1	0	0	0	1
2005	1	0	0	0	0	0	0	1
2006	0	0	0	0	0	0	2	2
2007	0	0	0	0	0	0	0	0
2008	0	0	0	1	0	0	3	4
Grand Total	4	1	1	20	1	0	9	36

Source: FFWCC 2009b

(FWS 2008a). These efforts appear to be successful in areas such as Citrus County in that, although the number of vessels using manatee habitat is high, the number of manatee mortalities in this area is quite low. Studies are currently underway to assess the effectiveness of manatee protection measures.

The State of Florida "designated the entire State as a 'refuge and sanctuary for manatees'" (FWS 2008a). Two Federal manatee protection areas, the Crystal River National Wildlife Refuge (NWR) and the Blue Waters Manatee Sanctuary, are south of the CREC. The Crystal River NWR is at the head of the Crystal River, and the Blue Waters Manatee Sanctuary is located toward the head of the Homosassa River near Homosassa Springs State Park. Both areas are inland from the coastline, so the activities of the CREC do not directly affect these areas. However, the mouth of the Crystal River is approximately 2.5 mi south of the Crystal River effluent canal, which is within an area that manatees from the NWR could frequent.

Manatees are considered endangered throughout their entire range including Levy and Citrus Counties. Based on reviews of several reports, including those by the FWS, United States Geological Survey (USGS), and FFWCC's FWRI, the area around Levy and Citrus Counties appears to have lower instances of manatees than other areas of Florida to the south. In fact, the FWS does not list Levy County as having manatees, only Citrus County (FWS 2009d). During aquatic sampling activities from October 2007 to November 2008, manatees were

observed in Levy County in the CFBC, OWR, and in the CREC discharge canal throughout the sampling period (CH2MHill 2009b).

The Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), listed as endangered under the ESA, is a resident sub-species endemic to dry prairies of central and south Florida and is dependent on a regular fire regime for survival (FWS 1999). This species requires large (greater than 124 ac) open grasslands dominated by saw palmetto (*Serenoa repens*) and dwarf oaks (*Quercus minima*) with groundcover species such as blue stem grasses (*Andropogon* spp.) and wiregrasses (*Aristida* spp.) along with St. John's wort (*Hypericum* spp.) (FWS 1999). Frequent fires are an important component of the Florida grasshopper sparrow habitats as they prevent trees from colonizing the prairies and maintain a percentage of bare ground required for foraging (FWS 1999). This species is listed as endangered in Polk County and could be found along transmission-line routes where suitable habitat exists (FWS 2010a).

The Florida scrub jay (*Aphelocoma coerulescens*), listed as threatened under the ESA, occupies fire-dominated, low-growing oak scrub habitat found on well-drained sandy soils and requires bare sandy patches for foraging habitat (FNAI 2009; PEF 2008b; FWS 1999). This habitat generally corresponds with FLUCFCS 413 (sand pine) and FLUCFCS 421 (xeric oak) neither of which have been mapped on the LNP site. Populations of this species may persist in areas with sparser oaks or overgrown scrub, but at lower densities. Although scrub jays have been documented in the vicinity (PEF 2008a; FNAI 2009), no scrub jays were observed on the LNP site during pedestrian surveys conducted over a 2-year period (PEF 2009a). The conversion of most upland habitats to pine plantations where oaks and other hardwoods are excluded has removed suitable habitat for this species and reduced its potential occurrence onsite. Florida scrub jays have, however, been documented in several of the counties crossed by the offsite facilities, and potentially suitable habitat is present within some corridors (PEF 2008b; FWS 1999). Because wildlife reconnaissance surveys within the offsite facilities corridors have been limited, it is possible that other scrub jay populations could occur on or near the associated offsite corridors.

The entire project, including the LNP site and associated offsite and transmission line corridors, is within the Florida scrub jay FWS consultation area (FFWCC 2008). This habitat-specific, territorial species is declining because of degradation, fragmentation, and loss of oak scrub habitats throughout Florida (FWS 1999).

The piping plover *(Charadrius melodus)* is a small shorebird whose Atlantic Coast population (which includes the Gulf coast) is listed as threatened under the ESA, and known to occur in Pinellas and Hillsborough Counties, both of which are crossed by the proposed transmission lines. Populations of this species are found in three regions in the United States: the Atlantic Coast, the Northern Great Plains, and the Great Lakes (FWS 2010b). Although this species does not breed in Florida, critical overwintering habitat has been identified in several counties including those crossed by the proposed transmission lines, such as Hillsborough and Pinellas

Counties (FWS 2001). Although the blowdown pipeline corridor extends into mudflats at the western edge of the CREC facility, piping plovers have not been observed on the CREC (PEF 2008b).

The wood stork (*Mycteria americana*), listed as endangered under the ESA, is a highly colonial species that usually nests and feeds in freshwater and brackish wetlands (FWS 1997b). Nesting occurs in a variety of inundated, forested wetlands, including cypress strands and domes, mixed hardwood swamps, sloughs, and mangroves (FNAI 2009). Nesting colonies in central and northern Florida generally form in February and March. The species forages in a wide variety of shallow-water wetland habitats, ranging from drainage ditches to marshes, ponds, and hardwood swamps. Wood storks are tactile rather than visual feeders, using their bills to probe shallow water for small fish, their primary prey. They feed preferentially in depressions where the prey can become concentrated during low-water periods.

Wood storks have been observed feeding in ditches and wetlands on the LNP site, but no nesting colonies have been detected (PEF 2009a). Primarily because of forest-management activities and a lack of suitable open water habitat, suitable rookery habitat is limited. The LNP site is not located within the 13-mi (North Florida) or 15-mi (Central Florida) core foraging area of any active wood stork rookery (FWS 2009b). However, wood storks could be found in suitable wetland habitats in or near the proposed offsite corridors, including transmission-line corridors.

The red-cockaded woodpecker (*Picoides borealis*), listed as endangered under the ESA, is endemic to open, mature, and old-growth pine ecosystems in the southeastern United States (FWS 2003a). The species requires open pine woodlands and savannahs with large, old pines for nesting and roosting. In northern and central Florida, it generally occupies mature longleaf pine flatwoods (FNAI 2009). This cooperative breeding species excavates nest cavities in large older pines from stands containing little to no hardwood in the midstory and overstory. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or no overstory hardwoods, and abundant native bunchgrass and forb groundcovers (FWS 2003a).

No red-cockaded woodpeckers have been observed on the proposed LNP site or on the nearby CREC property (PEF 2008b, 2009a). The heavily managed pine plantations that characterize the site do not provide suitable nesting habitat. A large population of red-cockaded woodpeckers does occur in the Goethe State Forest, which is directly north of the LNP site (FDA&CS 2009). This species is not known to nest on the LNP site and is considered unlikely to do so because of the absence of its preferred nesting habitat. However, there may be suitable habitat along the proposed offsite corridors, including the transmission-line corridors associated with the LNP site, because there have been recorded sightings in Citrus, Hernando, Hillsborough, Levy, Marion, Pinellas, Polk, and Sumter Counties (PEF 2009a; FWS 2009a).

The Audubon's crested caracara (*Polyborus plancus audubonii*), listed as threatened under the ESA, is a large, nonmigratory raptor that is found in dry or wet prairies with scattered cabbage palm (*Sabal palmetto*) surrounded by open habitats but can also be found in lightly wooded areas and improved pastures (FWS 1999). Loss of habitat due to agricultural and residential development has led to the decline of the Audubon's crested caracara. Although historically common in South-Central Florida, the current range is limited to several South Florida Counties and is most abundant in Glades, Desoto, Highlands, Okeechobee and Osceola counties. However, the FWS recognizes this species as threatened in Polk County (FWS 2010a). One of the proposed LNP transmission corridors crosses the northwestern corner of Polk County.

The Everglade snail kite (*Rostrhamus sociabilis plumbeus*), listed as endangered under the ESA, is a medium-sized raptor found in freshwater marshes in six freshwater systems in southern Florida with dominant emergent vegetation consisting of spike rush (*Eleocharis cellulosa*), maidencane (*Panicum hemitomon*), sawgrass (*Cladium jamaicense*), and/or cattails (*Typha* spp.) (FWS 1999). The historical range for this species was the entire peninsular Florida (FWS 1999). The main food source for the snail kite is the apple snail that inhabits the marshes. The hydrology and water quality of wetlands is crucial to the snail kite's survival due primarily to its restricted range and highly specific diet (FWS 1999). A portion of the Central Florida South and Kathleen transmission line corridors intersect the federal consultation area for the Everglades snail kite, so it is possible this species could be found in these areas where suitable habitat exists (FFWCC 2008, FWS 2003b).

The American alligator (*Alligator mississippiensis*) is classified as a Federally threatened species because of its similarity in appearance to the endangered American crocodile (*Crocodylus acutus*) (FNAI 2009, PEF 2008b). The range of the American crocodile, however, is limited to coastal estuarine marshes and tidal swamps at the southern end of the Florida peninsula and does not include the LNP site. The American alligator is a common inhabitant of most types of freshwater bodies in Florida, including marshes and swamps such as those found on the LNP site and in the proposed offsite corridors (including transmission-line corridors). One juvenile American alligator was observed on the LNP site during field surveys conducted by PEF, and they have been observed in swampy areas at the CREC (PEF 2009a, 2008b).

The Eastern indigo snake (*Drymarchon couperi*), listed as threatened under the ESA, occupies a broad range of habitats, varying from scrub and sandhill habitats to moister communities such as wet prairies and swamps (FNAI 2009). This species requires large tracts of habitat to survive. It often winters in gopher tortoise burrows, especially in northern Florida where temperatures are cooler. Although the eastern indigo snake was not identified during field surveys of the LNP site (PEF 2008b, 2009a), the species has been documented in the general site vicinity (PEF 2008b). There is potential for this species to occur on the LNP site

and in proposed offsite corridors, including transmission-line corridors where suitable habitat exists.

Sand skinks (*Neoseps reynoldsi*), listed as threatened under the ESA, occupy xeric upland habitats in sandy substrates between high pine and scrub habitats and are listed as threatened in Marion and Lake Counties (FWS 1999a, e; 2009e). This species requires loose sand in sparsely-covered scrub of various types (PEF 2008b). It is possible this species would be present in areas along the transmission-line corridors where suitable habitat is present. The sand skink is not identified as potentially occurring in Levy County (FWS 2009a; FNAI 2009), and the sandy scrub habitats it prefers do not occur on the LNP site. No sand skinks were observed on the LNP site during pedestrian surveys conducted over a 2-year period (PEF 2009a). Therefore, it is unlikely that sand skinks would be affected by activities on the LNP site. No sand skinks were observed during limited reconnaissance surveys conducted for wildlife within the corridors. However, preferred scrub habitats, although not prevalent, are present along portions of the corridors (PEF 2008a). Activities on the corridors therefore have the potential to affect the sand skink and its habitat.

The gulf sturgeon (*Acipenser oxyrinchus desotoi*), an anadromous fish within the family Acipenseridae, is one of the oldest and most primitive families of existing bony fishes. The gulf sturgeon is a long-lived fish, and maturity in males is 7 to 9 years while females take 8 to 12 years to attain spawning condition. Spawning migrations occur in early to late spring with a return to saltwater during early to late fall. In the Suwannee River, Florida, sturgeons migrate upriver when temperatures range between 17 and 22°C in mid-February to mid-April. After the first spawning, females may only spawn at intervals of 2 or 3 years (Huff 1975). Water velocity influences the spawning habitat preference for sturgeon, with research suggesting that higher flows are environmental cues for successful spawning (Chapman and Carr 1995). Clumps of fertilized eggs become attached to rocks or other bottom structures in areas characterized as clean gravel-cobble mix over rock with strong, persistent laminar flows and eddies. Incubation times vary with river temperature, and fry disperse widely downstream of spawning habitats within the river, inhabiting open sandy areas away from shorelines and vegetation (Sulak and Clugston 1998). Juvenile (>1 year) and adult gulf sturgeon typically outmigrate to the marine environment, although some populations tend to hold over in brackish water for a period of up to 2 months before moving into the open Gulf of Mexico (Carr et al. 1996). The adult gulf sturgeon is a bottom feeder that makes a diet of invertebrates such as brachiopods, insect larvae, mollusks, oligochaetes, polychaetes, crustaceans, and small fishes. Feeding is almost exclusively in marine waters, and adults eat little while in freshwater. Weight losses of 4 to 15 percent are often observed during the in-river period during late spring, summer, and early fall (Wooley and Crateau 1985).

Historically, the range for this anadromous fish extended from Louisiana to south of Tampa Bay, Florida, where it feeds in the Gulf of Mexico and returns to freshwater for spawning. The current

range is limited to the Mississippi River east to the Suwannee River, Florida, where the Suwannee River supports the largest subpopulation of gulf sturgeon (Carr et al. 1996). Critical habitat for Florida nearest to the LNP site is designated for 182 mi of the Suwannee River; 12 mi of the Withlacoochee River, where it branches off to the north of the Suwannee River; and 211 mi^2 of estuarine/marine area of Suwannee Sound, which occurs north of Cedar Key (68 FR 13370). Gulf sturgeon show a high homing fidelity (site-specific) spawning behavior based on gene flow between river drainages (Stabile et al. 1996).

The Gulf sturgeon was jointly managed and listed as a threatened species by the National Marine Fisheries Service (NMFS) and FWS in 1991 (56 FR 49653), with NMFS managing the nearshore and offshore habitat range and FWS managing inland from river kilometer (river mile) zero. The gulf sturgeon is extant in major river basins from the Mississippi River to Charlotte Harbor, but the only significant spawning populations occur in the Pearl River, Pascagoula River, Escambia River, Blackwater River, Yellow River, Choctawhatchee River, Apalachicola River, Ochlockonee River, and Suwannee River (FWS and GSMFC 1995; Berg 2004).

Prized for their flesh and roe, gulf sturgeon were commercially fished in the late 1890s up to 1984 when the State of Florida banned commercial harvesting. Degradation of riverine habitat also contributed to a decline in species abundance with increases in pollution, as did installation of dams on many of the major rivers along the northern Gulf of Mexico (Huff 1975; Wooley and Crateau 1985). A recovery plan was initiated in 1995 to prevent further reduction in sturgeon populations and monitor population recovery with habitat restoration efforts (FWS and GSMFC 1995).

There are no known spawning populations associated in river systems south of the Suwannee River along the Florida coast, and estuarine/marine critical habitat for the gulf sturgeon does not occur south of Cedar Key. No gulf sturgeon were observed or collected during the sampling events described in EIS Section 2.4.2.1 for the CFBC, OWR, or CREC discharge area (CH2MHill 2009b). Adult gulf sturgeon have been caught south of the CFBC offshore of Pinellas County and within Tampa Bay, but these occurrences have been few since 1987 (Wakeford 2001). Although gulf sturgeon may occur in the offshore areas associated with the CFBC or CREC, they will likely avoid any anthropogenic activities and will not use the CFBC or OWR as spawning habitat given the unfavorable substrate and lack of downstream flow.

Florida bonamia (*Bonamia grandiflora*), listed as threatened under the ESA, is a perennial vine that occurs in sunny openings in sand pine and oak scrub and is listed as threatened in Marion, Lake, and Polk Counties (FWS 2005b; PEF 2008b). This species is also found in disturbed sites such as along roadsides, rights-of-way, clear-cuts, and other areas free of trees and shrubs (FWS 2005b). Habitat destruction is the main threat to this species primarily due to agricultural and residential development (FWS 2005b). It is possible that this species could be found in areas along the proposed transmission-line corridor where suitable habitat exists.

Brooksville bellflower (*Campanula robinsiae*), listed as endangered under the ESA, is an annual herb that occurs on wet, grassy slopes and drying pond edges primarily on the Brooksville Ridge in north-central Hernando County; however, since 2006 it has been recorded at three sites at Hillsborough River State Park in Hillsborough County (PEF 2008b; FWS 2010a) 5-year Review of the Brooksville bellflower (*Campanula robinsiae*). Habitat destruction is the main threat to Brooksville bellflower as ponds and wet prairies are replaced with urban and agricultural development (FWS 2010a). It is possible that this species could be found in areas along the proposed transmission-line corridor in Hernando and Hillsborough Counties where suitable habitat exists.

Pygmy fringe tree *(Chionanthus pygmaeus),* listed as endangered under the ESA, is a shrub that primarily occupies scrub, high pineland and xeric hammocks in Central Florida and is listed as endangered in Lake and Polk Counties (FWS 1999). This species prefers excessively drained sandy soils and may form thickets at some sites (FWS 1999). Populations are known from west of Lake Apopka in Lake County and along the Lake Wales Ridge in Polk County (FWS 1999). It is possible that this species could be found in areas of sandy scrub along the proposed transmission-line corridor in Lake and Polk Counties.

Florida golden aster (*Chrysopsis floridana),* listed as endangered under the ESA, is a perennial herb that occurs in sand pine scrub, and areas of excessively well-drained fine sands along railroad and highway corridors (FWS 1999). This species is listed as endangered in Pinellas and Hillsborough Counties and prefers open, sunny areas (FWS 2010a). Because Florida golden aster is known to occur in transportation and/or utility rights-of-way, it can be affected by management practices including widening of these corridors. It is possible that this species could be found in areas along the proposed transmission-line corridor in Pinellas and Hillsborough Counties where suitable habitat exists.

Longspurred mint (*Dicerandra cornutissima*), listed as endangered under the ESA, is a short-lived perennial herb that occurs in open areas in sand pine and oak scrub and is listed as endangered in Marion County. Six of the 15 known occurrences are on the Cross Florida Greenway State Recreation and Conservation Area in Marion County (FWS 2009e). The primary cause of the decline of longspurred mint is habitat loss due to development (FWS 2009e). It is possible that this species could be found in areas along the proposed transmission-line corridor in Marion County where suitable habitat exists.

Scrub buckwheat (*Eriogonum longifolium*), listed as threatened under the ESA, is a perennial herb that occurs in turkey oak barrens and high pine habitats and is listed as threatened in Marion, Lake, and Polk Counties (FWS 2010a; FWS 1999). This species is known to occur with several other threatened or endangered species, including Lewton's polygala (*Polygala lewtonii*) in remnant high pine habitat in Lake County (FWS 1999). Loss of suitable habitat is the main cause of decline for scrub buckwheat and continued residential growth and agricultural practices are the primary threat (FWS 1999). It is possible that this

species could be found in areas along the proposed transmission-line corridor in Marion, Lake, and Polk Counties where suitable habitat exists.

Cooley's water willow *(Justicia cooleyi),* listed as threatened under the ESA, is a rhizomatous, perennial herb that occurs along streams or small gullies in mesic hardwood hammocks in the Brooksville Ridge, and is listed as endangered in Hernando County (FWS 2005a; Conservation Outdoors 2010). Residential and agricultural development is the main threat to this endemic species, but limestone mining also affects Cooley's water willow (FWS 2005a). Several populations have also been located on two sites in Sumter County on recently acquired land for Whithlacoochee State Forest (FWS 2005a). It is possible that this species could be found in areas along the proposed transmission-line corridor in Hernando and Sumter Counties where suitable habitat exists.

Britton's beargrass (*Nolina brittoniana*), listed as endangered under the ESA, is a long-lived perennial species that occurs in a variety of upland habitat types from open scrub, to sandhill, scrubby flatwoods, and xeric hammocks that are fire-dependant and fire-maintained (FWS 1999). This species is listed as endangered in Hernando, Lake, and Polk Counties, and the main cause of decline is habitat loss or modification due to development and agricultural practices (FWS 2010a). It is possible that this species could be found in areas along the proposed transmission-line corridor in Hernando, Lake, and Polk Counties where suitable habitat exists.

Lewton's polygala (*Polygala lewtonii*), listed as endangered under the ESA, is a relatively short-lived, fire-dependent perennial herb that occurs in oak scrub and high pine, most abundantly in the edges between the two community types (FWS 1999). This species is listed as endangered in Marion and Polk Counties and is often found along roadsides and other disturbed areas that are open and sunny (FWS 1999). The main threat to Lewton's polygala is conversion of oak scrub and high pine to agricultural fields and residential housing (FWS 1999). It is possible that this species could be found in areas along the proposed transmission-line corridor in Marion and Polk Counties where suitable habitat exists.

Sandlace or Small's jointweed (*Polygonella myriophylla*), listed as endangered under the ESA, is a low, lateral branching shrub endemic to central Florida's upland ridge that occurs in open, bare white or yellow sandy areas created by moderate disturbance (FWS 1999). Sandlace is believed to produce allelotoxins, which may provide a mechanism for the plant to maintain sufficient bare sand in order for the species to persist (FWS 1999). Sandlace is listed as endangered in Polk County and it is possible that it could be found in areas along the transmission-line corridor where suitable habitat exists.

Scrub plum (*Prunus geniculata*), listed as endangered under the ESA, is a small shrub endemic to the high pine and oak scrub communities of the Lake Wales Ridge and has adapted to both high frequency and low intensity, as well as low frequency and higher intensity fire

regimes respectively (FWS 1999). This species is listed as endangered in Polk County and prefers xeric, sunny sites with nutrient-poor soils (FWS 1999). It is possible that scrub plum could be found in areas along the transmission corridor in Polk County where suitable habitat exists.

Wide-leaf warea (*Warea amplexifolia*), listed as endangered under the ESA, is an annual herb with an extremely limited distribution along the northern portion of the Lake Wales Ridge and is listed as endangered in Polk County (FWS 1999, 2010a). This species is endemic to the sandhill (high pine) habitats and is found in open, dry woods with well-drained soils (FWS 1999). Loss of suitable habitat to agriculture, residential and commercial development, mining and alteration of the natural fire regime have all contributed to the decline of wide-leaf warea (FWS 1999). State maps indicate that this species may also occur in Lake County (FNAI 2009). It is possible that wide-leaf warea could be found in areas of open, dry woods with well-drained soils along the transmission-line corridor.

Carter's mustard (*Warea carteri*), listed as endangered under the ESA, is an annual herb that occurs in xeric sandhill, scrubby flatwoods, and scrub habitats on the Lake Wales Ridge and is listed as endangered in Polk County (FWS 1999, 2010a). This species is often found in disturbed areas such as roadsides and is threatened mainly by residential development and conversion of natural habitat to citrus groves and other agricultural activities (FWS 1999). It is possible that Carter's mustard could be found in areas of xeric sandhill, scrubby flatwoods, and scrub habitats along the transmission-line corridor.

6.0 Potential Environmental Effects of the Proposed Actions

This section describes the potential impacts from construction and operation of the proposed Units 1 and 2 on species listed in Table 1-1.

Florida salt marsh vole (*Microtis pennsylvanicus dukecampbelli*). Suitable habitat for the salt marsh vole does not exist onsite. The Florida salt marsh vole is not identified as potentially occurring in the counties through which the corridors would pass (FWS 2009a; FNAI 2009). However, salt marsh habitat preferred by this species is present within a portion of the blowdown pipeline corridor between the LNP site and the CREC. Considering the proximity to known locations for this species, it is possible (though unlikely considering the rarity of this species) that salt marsh habitat along the blowdown pipeline corridor route could support the salt marsh vole. If this species is present, development activities along this corridor could affect the Florida salt marsh vole and its habitat. FDEP could require protocol surveys for Florida salt marsh vole prior to "clearing and construction" of salt marshes in finalized rights-of-way (FDEP

2010). If salt marsh voles are detected and impacts cannot be avoided, PEF would be required to coordinate with the FFWCC to determine the need for appropriate mitigation. Therefore, the review team has determined that construction and operation activities on the LNP site and in the offsite corridors may affect, but would not likely adversely affect the Florida salt marsh vole.

PEF petitioned the State of Florida on April 29, 2010, for a modification to the currently certified corridor for the heavy-haul road, cooling-water makeup pipelines and the blowdown pipelines to be constructed between the LNP site and the CREC (PEF 2010a). This modification to the route would avoid all salt marsh habitat and would avoid impacts to the salt marsh vole.

Florida panther (*Puma concolor coryi*). The Florida panther is a currently restricted to a small population of less than 100 animals in southwest Florida (Land et al. 2008). Young transient males are occasionally documented outside of the known breeding range. Considering the distance from the LNP site to the current breeding range of this species (more than 175 mi), it is unlikely that Florida panther would be affected by activities on the LNP site.

The 230-kV Polk-Hillsborough-Pinellas transmission-line corridor would pass through the eastern perimeter of Polk County, which is identified as potentially supporting the Florida panther (FWS 2009a; FNAI 2009). Although outside of the known breeding range for the Florida panther, it is possible that young transient males could occasionally occur in Polk County. Therefore, project activities along the transmission-line corridor have the potential to affect the Florida panther. These impacts would likely be limited to temporary disturbance and displacement of individual animals that may at times travel north of the known breeding range. Because the final right-of-way for the Polk-Hillsborough-Pinellas transmission line would be narrow (about 100 ft wide) and mostly collocated with existing corridors, little clearing of habitat would occur. Consequently, the potential for fragmentation of suitable forest habitat that could support the Florida panther would be limited. Therefore, the review team has determined that the LNP project may affect, but would not likely adversely affect the Florida panther.

Even though the review team has concluded that the LNP project may affect, but would not likely adversely affect the Florida panther, the NRC and the USACE still plan to informally consult with the FWS regarding possible effects on the Florida panther. The USACE follows a Panther Key established by the FWS to determine whether it must consult regarding possible effects of pending DA permits on the Florida panther (Souza 2007). No part of the LNP project, including the transmission corridors, lies within the Panther Focus Area identified in the key. However, the key directs the user to consult with the FWS on projects outside of the Panther Focus Area that are greater than one acre and will cause a net increase or change in vehicle traffic patterns or are otherwise capable of causing other identifiable effects on panthers or their habitat. The LNP project could affect more than 2,500 acres of land and alter the traffic level of service on several roads near the LNP site (Kimley-Horn 2009). The FWS recognizes increased traffic, even in areas outside of the Panther Focus Area, as a significant threat to the Florida panthers, who commonly move long distances in search of prey and mates.

Florida manatee (*Trichechus manatus latirostris*). The Florida manatee northwest Florida population, which includes Citrus and Levy Counties, makes up approximately 12 percent of the total manatee population. Manatees migrate to warmer waters in the winter near the coast; are known to occur in the CREC discharge canal, particularly in the fall and winter (PEF 2008b), and have been sighted in the CFBC and OWR throughout the year (CH2MHill 2009b). FFWCC sets boating speed restrictions to limit the potential of boat and propeller strikes on manatees within the CFBC and the OWR (FFWCC 2002). To prevent impacts on manatees in the vicinity of construction activities, PEF would comply with the boating speed restrictions and Standard Manatee Conditions for In-Water Work (FDEP 2010) for construction activities in the CFBC. While boating activities are not allowed within the CREC, construction of discharge piping from LNP to the CREC may require in-canal activities.

PEF has a Manatee Protection Plan approved by FDEP for minimization of hazards to manatees while performing in-water work associated with the CREC, including avoidance of in-water work in the discharge canal from November 15 through March 31 when manatees use the warmer waters in this system as a refuge. PEF would likely expand the current Manatee Protection Plan to include the CFBC and OWR for approval by FDEP. As part of the existing plan, during construction activities, a biologist would be present to visually monitor for threatened and endangered species that may appear in the CREC or CFBC. Manatees might approach these areas, and their presence within 50 ft of the construction areas during activity would require a temporary halt to work until the manatees have cleared the 50-ft buffer zone (FDEP 2010). No impacts on Florida manatees are anticipated from installation of transmission-line corridors or structures because no in-water work would be necessary. PEF plans to use BMPs to prevent erosion and runoff into waterways spanned by transmission lines (PEF 2008a).

Manatees are known to occur in the CREC discharge canal, particularly in the fall and winter (PEF 2008b), and they have been sighted in the CFBC and OWR throughout the year (CH2MHill 2009b). Given the low approach velocity, intake operational impacts on manatees in the CFBC would not adversely affect this species. The approach velocity for the intake bays would be 0.25 fps at the bar screens and 0.5 fps for through-screen flow. Trash bar racks would prevent migration of manatees into forebay areas, and intake screens would be pressure washed when rotated out of service. A similar operational design is used at CREC for the intakes for Units 1, 2, and 3, but with intake velocities double (1.0 fps) the proposed velocity for LNP (AEC 1973), but distressed and moribund manatees may become trapped on the trash bars. Trash bar monitoring for LNP, as implemented at CREC for sea turtle rescue and handling, could be established to assist sick manatees that are not able to avoid becoming lodged on the trash racks, and to remove and report mortalities. No operational impacts are noted for manatees at the CREC intake or discharge. Operational impacts for the CREC discharge canal would not adversely affect manatees, because the LNP discharge would contribute less than 5 percent more of the current CREC discharge with no significant change in

thermal energy. PEF has submitted an application (PEF 2008c) to the USACE for a permit to construct a barge slip and boat ramp on the CFBC. The barge slip and boat ramp will be constructed on property that is now part of the Marjorie Harris Carr Cross-Florida Greenway and Conservation Area and presumably there would be public access to the boat ramp. The boat ramp would likely result in increased recreational boating and fishing in the CFBC and OWR. An increase in recreational boating and fishing could result in collisions with manatees in these two waterbodies. Additionally, the construction of the barge slip would result in increased barge traffic in the CFBC associated with the construction and operation of LNP, however the potential for adverse impacts to manatees due to the increase in barge traffic would be mitigated through the implementation of the PEF Manatee Protection Plan.

Maintenance activities along the transmission lines would be performed using PEF practices and procedures to prevent impacts on surface waters and wetlands (PEF 2009a). Therefore, the review team anticipates no impacts on manatees from maintenance of the transmission lines.

The review team has determined that construction and operation of the LNP may affect, but is not likely to adversely affect the Florida manatee. Manatees have been observed in the CFBC, OWR, and the CREC. Increases in recreational boating and fishing in the CFBC due to the new boat ramp and barge traffic related to the construction and operation of the LNP could result in collisions with manatees. However, the LNP is not located in an Important Manatee Area or an Area of Inadequate Protection, construction and operation of the facility is not expected to significantly alter submerged aquatic vegetation, the discharge of CREC is not expected to be changed such that alterations in manatee occurrence or habitat would occur, and PEF will implement a Manatee Protection Plan (FDEP 2010), approved by the FDEP, to minimize hazards to manatees. Therefore, the review team concludes that adverse impacts to manatees would be minimal. This conclusion is consistent with the application of the USACE effects determination key for the Florida manatee. The use of the key was approved by the FWS (Souza 2008) and is used by the USACE to determine whether it must conduct a Section 7 consultation for manatees with the FWS prior to issuing DA permits. According to the key, projects that involve the creation of new slips to accommodate docking of repeat use vessels result in a “may affect” determination and require consultation with the FWS.

Florida grasshopper sparrow (*Ammodramus savannarum floridanus*). The Florida grasshopper sparrow is not found in Levy County and will not be impacted by construction and operation at the LNP site. There are no known populations of grasshopper sparrows north of Avon Park Air Force Range in south Polk County (FWS 1999). The only proposed transmission line corridor that occurs in Polk County is the existing Kathleen line, which is in the far north western corner of Polk County (PEF 2009a). Therefore, the Florida grasshopper sparrow is not addressed in the EIS. However, because the project falls within the FWS consultation area for this species, it is addressed in this BA. The proposed project would not convert large

expansions of open grasslands, of which the grasshopper sparrow is dependent on, to other habitat types. Corridor maintenance activities would also help maintain grassland habitats, free of trees. The Florida grasshopper sparrow was not identified by the FFWCC as a species that would potentially be impacted by the proposed project in the 2008 Agency Report or in the conditions for certification modification for the proposed LNP site or any of the offsite corridors, including the transmission-line corridors (FFWCC 2008, FDEP 2010). Therefore, the review team has determined that construction and operation activities on the LNP site and in the offsite corridors would have no effect on the Florida grasshopper sparrow.

Florida scrub jay (*Aphelocoma coerulescens*). Although no Florida scrub jays were identified during field surveys conducted over a 2-year period on the proposed LNP site, the species has been documented in the general site vicinity (PEF 2008a 2009a; FWS 1999). Substantial blocks of xeric, well-drained scrub habitats preferred by scrub jays are lacking on the site. The conversion of most upland habitats to pine plantations where oaks and other hardwoods are excluded has removed suitable habitat for this species and reduced its potential occurrence onsite. It is therefore unlikely that Florida scrub jays would be affected by development activities on the LNP site.

The Florida scrub jay has been observed in the proposed transmission-line corridors where suitable habitat exists along the routes in Marion, Sumter, Lake, Hernando, Hillsborough, Pinellas, and Polk Counties (FWS 2010a). Based on cover type mapping, areas of potentially suitable habitat, although not prevalent, may occur within portions of the corridors (PEF 2008a). The entire project, including the site and associated onsite corridors, is within the Florida scrub jay Federal consultation areas. There are known occurrences of the scrub jay within 1000 meters of the proposed LNP site and within the proposed transmission corridor from the facility to the proposed Central Florida South substation (FFWCC 2008). Six scrub jays were observed in Marion County during reconnaissance surveys conducted along the 500-kV LNP-Central Florida South transmission-line corridor (PEF 2008a). In addition, populations are known to occur in the Halpata Tastanaki Preserve in Marion County, the southern perimeter of which is crossed by this corridor. FNAI records indicate the scrub jay also occurs along the blowdown pipeline and near the transmission corridor in Citrus County (PEF 2008a).

Even though there are known occurrences of the scrub jay near the LNP site, no suitable habitat has been mapped onsite. Therefore, the Florida scrub jay is not expected to be impacted during construction and operation activities onsite. Because wildlife reconnaissance surveys have been limited within the corridors and potentially suitable habitat is present in some places, it is possible that additional scrub jay populations could occur on or near the associated offsite corridors. Clearing the associated corridors has the potential to affect the Florida scrub jay and its habitat. Because most final rights-of-way would be narrow (100 to 220 ft wide) and mostly collocated with existing corridors, the actual extent of clearing would be limited, thereby reducing the potential for scrub jay impacts.

A Condition of Certification by the FDEP requires protocol surveys for the Florida scrub jay prior to “clearing and construction” for the LNP project, including the site and offsite corridors (FDEP 2010a). If impacts to scrub jays cannot be avoided, PEF would be required to coordinate with the FFWCC to determine the need for appropriate mitigation. Therefore, the review team has determined that clearing habitat in transmission line corridors may affect, and is likely to adversely affect the Florida scrub jay, but is not likely to jeopardize the continued existence of the Florida scrub jay.

Piping plover *(Charadrius melodus).* There were no piping plovers observed on the LNP site and suitable habitat is not present. FDEP did not identify the piping plover as occurring or potentially occurring onsite or in any of the offsite corridors (FDEP 2010). No piping plovers were observed during limited reconnaissance surveys conducted within the corridors. However, saltwater marsh is present within a small portion of the 230-kV CREC-to-Brookridge transmission-line corridor, as well as near the blowdown pipeline corridor adjacent to the western edge of the CREC facility (PEF 2008a, b). Consequently, it is possible, but unlikely that tidal mudflats used by piping plover may occur on portions of these corridors. Nevertheless, impacts on this species are expected to be inconsequential and limited, perhaps, to a very minor disturbance to loafing and foraging birds. Therefore, the review team has determined that building and operation activities within the offsite corridors may affect but would not likely adversely affect the piping plover.

Wood stork (*Mycteria americana*). Wood storks have been observed feeding in ditches and wetlands on the proposed LNP site, but no nesting colonies have been detected (PEF 2009a). Primarily because of forest-management activities and a lack of suitable open water habitat, suitable rookery habitat is limited. The LNP site is not located within the 13-mi (North Florida) or 15-mi (Central Florida) core foraging area of any active wood stork rookery (FWS 2009b). Wood storks have been observed roosting with other wading birds in forest stands 8 to 9 mi west of the LNP site (Entrix 2010). Long-term forest management on the LNP site and a lack of favored open water habitat limit suitable rookery habitat. Activities on the LNP site could remove or alter potential foraging habitat for the wood stork, and birds foraging onsite could be disturbed or displaced. Because wood storks are highly mobile and similar habitats are abundant in the project vicinity, it is unlikely that the species would be directly affected.

The wood stork is listed as potentially occurring in all counties through which associated corridors would pass (FWS 2009a, b). No wood stork rookeries were observed during limited reconnaissance surveys within these corridors; however, individuals were observed on the 230-kV Polk-Hillsborough-Pinellas transmission-line corridor, and areas of potentially suitable habitat (forested wetlands, shallow emergent wetlands, and ditches) occur throughout portions of all corridors (PEF 2008a). In addition, the proposed corridors pass within the 15-mi (Central Florida) and 18.6-mi (South Florida) core foraging area of a number of active wood stork rookeries (FWS 2009c). Development and maintenance activities in the associated corridors

have the potential to affect the foraging and nesting habitat of the wood stork. Because final rights-of-way would be narrow (100 to 220 ft wide) and collocated with existing corridors over most of their range, the actual extent of clearing required to site associated facilities is greatly limited, reducing the potential for impact on wood storks.

Even though FDEP does not identify the wood stork as potentially occurring in the project area, there are known occurrences of foraging individuals on the LNP site. Therefore, FDEP may require protocol surveys for the wood stork prior to "clearing and construction" (FDEP 2010). If wood storks are detected and impacts cannot be avoided, PEF would be required to coordinate with the FFWCC to determine the need for appropriate mitigation. The *Wetland Mitigation Plan for the Levy Nuclear Plant and Associated Transmission Lines* has identified several mitigation parcels (Figure 3-6) to mitigate for wetland alteration and loss from the proposed project that would be beneficial to the wood storks foraging on or near the site and in or near the associated offsite corridors including the transmission-line corridors (Entrix 2010). Therefore, the review team has determined that activities within the offsite corridors may affect, and are likely to adversely affect the wood stork, but it is not likely these activities would jeopardize the continued existence of this species.

This conclusion is consistent with a conservative application of a Wood Stork Key that the USACE uses to determine whether it must consult with the FWS regarding the wood stork prior to issuing DA permits (Souza 2010). According to the key, projects within 0.76 km of an active wood stork colony site or otherwise impacting more than 0.20 ha of suitable wood stork foraging habitat "may affect" the wood stork, and hence warrant FWS consultation. No part of the LNP project lies within 0.76 km of a known active wood stork colony, but building the LNP facilities would disturb several hundred acres of suitable wood stork foraging habitat. The key allows the USACE to decide upon a "not likely to adversely affect" determination, and thereby not consult with FWS, if a wetland mitigation plan meets several specific criteria regarding the provision of favorable wood stork habitat. The wetland mitigation plan submitted by PEF (Entrix 2010) would provide substantial areas of restored and enhanced habitat for wood storks, but the USACE has not yet reviewed the plan against the specific criteria in the key. For this reason, the review team concludes that the 'may affect' conclusion is appropriate because it is a conservative interpretation of the key.

Red-cockaded woodpecker (*Picoides borealis*). No red-cockaded woodpeckers were observed on the LNP site during pedestrian surveys conducted over a 2-year period, (PEF 2008a, 2009a). This species is not known to nest on the LNP site and is considered unlikely to do so because of the absence of its preferred nesting habitat. The young (<30-years-old), heavily managed pine plantations that occupy most uplands on the LNP site do not provide favorable habitat. The species does, however, occur on the Goethe State Forest, located immediately north of the LNP site. Several active clusters (an aggregation of cavity trees used by a family group of red-cockaded woodpeckers) lie between 1.5 and 2.5 mi from the LNP site

boundary (Petersen 2010). Considering the size of red cockaded woodpecker home ranges (100-400 ac; FWS 2003a), the distance of these active clusters from the LNP site and the lack of suitable habitat on site, no more than incidental use of LNP site would be expected by red cockaded woodpeckers. In addition, the PEF (2010) wetland mitigation plan for the LNP project has identified a mitigation parcel on the Goethe State Forest, adjacent to the LNP site, that has 32 active red-cockaded woodpecker trees (PEF 2010). Although the restoration efforts will be focused on wetlands, the red-cockaded woodpecker would benefit from those efforts. Consequently, it is unlikely red-cockaded woodpeckers would be affected by activities on the LNP site.

The red-cockaded woodpecker is listed as potentially occurring in all counties through which the corridors pass (FWS 2009a, b). The LNP site is within the Federal consultation area for the red-cockaded woodpecker and the proposed transmission line corridor from the LNP site to the Brookridge substation intersects known nesting locations (FFWCC 2008). The proposed transmission line from the LNP site to the proposed Central Florida South substation also intersects known nesting locations and is within 1000 meters of nesting locations within the Withlacoochee State Forest, the Halpata Tastanaki Preserve, the Lake Panasoffkee Management Area, and the Flat Island Preserve (FFWCC 2008). Clearing activities (i.e.,cavity tree removal, noise, increased habitat fragmentation) in the corridors where new rights-of-way are needed, therefore, have the potential to affect the red-cockaded woodpecker and its habitat. Because final rights-of-way would be narrow (100 to 220 ft wide) and mostly collocated within existing corridors, the actual extent of clearing would be greatly limited, thereby minimizing the potential for impact on red-cockaded woodpeckers. However, in areas where a new corridor is required, increased habitat fragmentation could negatively impact the red-cockaded woodpecker.

A Condition of Certification by the FDEP would likely require protocol surveys for red-cockaded woodpeckers prior to “clearing and construction” (FDEP 2010). If impacts cannot be avoided, PEF would be required to coordinate with the FFWCC to determine the need for appropriate mitigation. The impacts to the red-cockaded woodpecker would be localized and minimized by collocating corridors and using existing corridors, where possible. Therefore, the review team has determined that activities within the offsite corridors may affect, and are likely to adversely affect the red-cockaded woodpecker, but it is not likely these activities would jeopardize the continued existence of this species.

Audubon’s crested caracara (*Polyborus plancus audubonii*). Although the Audubon’s crested caracara is listed as threatened in Polk County, there is a low probability that this species would occur in the extreme northwest portion of Polk County where the transmission corridor would be located. Consequently, the Audubon’s crested caracara is not addressed in the EIS. Nevertheless, because the project falls within the FWS consultation area for this species, it is addressed in this BA (FFWCC 2008). The presence of Audubon’s crested

caracara in the vicinity of the proposed corridor would likely be limited to incidental occurrence. Should this species occur incidentally in this area, LNP project activities may affect but are not likely to adversely affect the Audubon's crested caracara.

Everglade snail kite (*Rostrhamus sociabilis plumbeus*). The current range for this raptor is limited to six large freshwater systems in the central and south part of Florida and includes: the Upper St. Johns drainage, Kissimmee Valley, Lake Okeechobee, Loxahatchee Slough, the Everglades, and the Big Cypress basin (FWS 1999). Although it is listed as endangered in Marion, Lake, Polk, and Sumter Counties, those portions of the proposed LNP transmission lines that occur within those counties do not lie within the watersheds inhabited by the snail kite. Consequently, the Everglade snail kite is not addressed in the EIS. However, because the project falls within the FWS consultation area for this species, it is addressed in this BA (FFWCC 2008). The presence of the Everglade snail kite in the vicinity of the proposed corridor would likely be limited to incidental occurrence. Should this species occur incidentally in this area, LNP project activities may affect but are not likely to adversely affect the Everglade snail kite.

American alligator (*Alligator mississippiensis*). The American alligator is a common inhabitant of most types of freshwater bodies in Florida, including marshes and swamps such as those found on the LNP site. One juvenile American alligator was observed on the LNP site during field surveys conducted by PEF, and they have been observed in swampy areas at the CREC (PEF 2008b, 2009a). Alligators may occasionally occur wherever permanent water is present. Habitat suitability for many onsite wetlands and swamps is low for the alligator because these wetlands are subject to seasonal drying. Nevertheless, potentially suitable wetlands and swamps would be filled, and activities in and around wetlands may temporarily disturb and displace alligators. Because alligators adapt easily to different aquatic and wetland habitats, individuals would likely relocate to adjacent areas with suitable habitat. Because the surrounding landscape is rural, movement of alligators into urban and suburban areas where they could pose a nuisance or danger is not likely.

None of the proposed transmission-line corridors are within the range of the endangered American crocodile (whose range in Florida is limited to South Florida). Some wetlands that may support alligators would be filled during development of offsite facilities, but most habitats affected by transmission lines would only experience overstory vegetation removal, retaining the open-water component required by alligators. Higher-quality lake and stream habitats would generally be spanned by transmission lines, avoiding any impact on alligator habitat. Activities in and around wetlands could temporarily disturb and displace alligators. Because alligators adapt easily to different aquatic and wetland habitats, individuals would likely relocate to adjoining natural areas with suitable habitat. Because the surrounding landscape is generally rural, movement of alligators into urban and suburban areas where they could pose a nuisance or danger is not likely to occur.

Although the American alligator is known to occur on the LNP site and is expected to occur in the vicinity of the offsite corridors, the LNP project lies outside of the range of the American crocodile. The review team has therefore reached a conclusion of no effect for the American alligator.

Eastern indigo snake (*Drymarchon couperi*). No eastern indigo snakes were observed on the LNP site during pedestrian surveys conducted over a 2-year period (PEF 2009a). However, the species has been documented in the site vicinity (PEF 2008b). Most of the upland habitat on the LNP site has been converted to pine plantation and provides poor-quality habitat for eastern indigo snakes. Potentially suitable, though highly fragmented, forested wetland habitat is scattered throughout the site. Gopher tortoise burrows are present in the southeastern portion of the site (PEF 2009a). These factors suggest a potential for eastern indigo snakes to occur on the LNP site. However, their presence is likely limited due to highly fragmented habitat conditions and the dominance of pine plantations across the landscape.

Proposed development activities on the LNP site have the potential to affect the eastern indigo snake and its habitat. Because this species is not readily observed, its presence and extent of site use cannot be confirmed. Although the potential for impact on this species is thought to be low, incidental mortality to eastern indigo snakes is a possibility. During site development, *Standard Protection Measures for the Eastern Indigo Snake* would be implemented to minimize impacts on this species (FWS 2004). Examples of protection measures would include educating site workers about the snake prior to work and avoiding snakes when observed during work (FWS 2004). Under mitigation plans proposed for the LNP site, intensive commercial forest management would cease on some remaining undisturbed lands, and some pine plantations and other disturbed habitats would be rehabilitated and restored to native plant communities. The restored communities would likely provide higher-quality habitat for eastern indigo snakes than the existing pine plantations and other vegetation altered by recent logging.

Eastern indigo snakes have been documented in the general vicinity of the LNP site and listed as potentially occurring in all counties through which the proposed corridors would pass; therefore, there is a potential for this species to occur in or around the offsite corridors, including transmission-line corridors, where suitable habitat exists (FWS 2009a, b). Potentially suitable habitats and areas with prevalent gopher tortoise burrows are present along portions of the corridors, and one eastern indigo snake was observed in Sumter County during limited reconnaissance surveys conducted in the corridors (PEF 2008a). Because this species cannot be readily observed, its presence and extent of use within corridors cannot be readily confirmed.

The FWS *Standard Protection Measures for the Eastern Indigo Snake* would be implemented during development of the LNP project to minimize impacts. These measures require that clearing activities temporarily cease when eastern indigo snakes are observed to provide time for them to escape. The likelihood that undetected individuals could escape disturbance is high, especially for offsite corridors where final rights-of-way would be narrow (100 to 220 ft wide) and

collocated with existing corridors over most of their range, limiting the actual extent of required clearing. A Condition of Certification by the FDEP would likely require surveys for and relocation of any gopher tortoises that could be harmed during "clearing and construction" of offsite facilities (FDEP 2010a). Any eastern indigo snakes recovered during gopher tortoise burrow excavations would be relocated in accordance with applicable guidelines. The species is a habitat generalist and the impacts would be localized within only a small part of the known range. Therefore, the review team has determined that building and operation activities on the LNP site and associated transmission-line corridors may affect, and are likely to adversely affect the eastern indigo snake. However, those impacts are not likely to jeopardize the continued existence of the eastern indigo snake.

This conclusion is consistent with a conservative application of the key that the USACE uses to determine whether it must consult with the FWS regarding the eastern indigo snake prior to issuing DA permits (Souza and Hankla 2010). According to the key, projects impacting areas containing gopher tortoise burrows, holes, cavities, or other potential eastern indigo snake refugia and impacting more than 25 ac of xeric habitat "may affect" the eastern indigo snake, and hence warrant FWS consultation, even if the FWS *Standard Protection Measures for the Eastern Indigo Snake* will be followed. Gopher tortoise burrows were observed on portions of the LNP site and the offsite corridors. Although most xeric habitats on the site have been substantially degraded by a history of intensive forest management, portions of the offsite corridors contain xeric habitats that have not been heavily degraded by commercial forestry. For these reasons, the review team concludes that the "may affect" conclusion is appropriate.

Sand skinks (*Neoseps reynoldsi*). Sand skinks are listed as threatened in Marion, Lake and Polk Counties (FWS 1999, 2010a). It is possible this species could be present in areas along the transmission-line corridors where suitable scrub habitat is present. Because final rights-of-way would be narrow (100 to 220 ft wide) and mostly collocated with existing corridors, the actual extent of clearing is greatly limited, thereby reducing the potential for impacts. In addition, FDEP did not identify the sand skink as occurring or potentially occurring onsite or in any of the offsite corridors (FDEP 2010). A Condition of Certification by the FDEP may require surveys for sand skink prior to clearing finalized rights-of-way if suitable habitat is present (FDEP 2010). If sand skinks were identified and impacts could not be avoided, PEF would be required to coordinate with the FFWCC to determine the need for appropriate mitigation. Therefore, the review team has determined that building activities within the associated offsite corridors may affect but would not likely adversely affect the sand skink.

Gulf sturgeon (*Acipenser oxyrinchus desotoi*). Gulf sturgeon were not collected during sampling efforts and are not likely to be encountered in the CFBC or CREC discharge canal because neither of these areas is critical habitat or a preferred spawning area. Adverse impacts are unlikely because straying juvenile or adult fish would avoid any construction activities occurring in these areas. No impacts on gulf sturgeon are anticipated from installation of

transmission-line corridors or structures because no in-water work would be necessary. PEF plans to use BMPs to prevent erosion and runoff into waterways spanned by transmission lines (PEF 2008a).

Gulf sturgeon were not collected in sampling efforts and are not likely to be encountered in the CFBC or CREC discharge canal because neither of these areas is critical habitat or a preferred spawning area. Adverse impacts are unlikely due to the use of vertical trash bars across the intake screens reduces the approach water velocity to 0.25 fps versus 0.5 fps at the screens for intake operations, as discussed in EIS Section 4.2.1. The low approach velocity of 0.25 fps for intake operations should allow healthy gulf sturgeon to swim away and not become trapped against the bar racks, although distressed and moribund fish may become trapped on the trash bars. Maintenance activities along the transmission lines would be performed using PEF practices and procedures to prevent impacts on surface waters and wetlands (PEF 2009a). No impacts on Gulf sturgeon are anticipated from maintenance of the transmission lines.

The review team has determined that construction and operation of the LNP may affect, but is not likely to adversely affect the Gulf Sturgeon because of the restrictive current range of the species, the use of close-cycle cooling, and the planned low through screen intake water velocities.

Vascular Plants

No Federally listed plant species are known to occur in Levy and Citrus Counties (FWS 2009a; FNAI 2009). Consequently, it is unlikely that such plants would be affected by development activities on the LNP site.

There are thirteen Federally listed plant species that are identified as potentially occurring within the counties crossed by the associated offsite corridors (Table 1-1). These plants would be potentially impacted primarily due to the clearing and development of new corridors and vegetation maintenance activities as discussed in EIS Sections 4.1.2 and 4.2.2. PEF uses chemical and mechanical control methods appropriate for the location, terrain, and vegetation or habitat present. Chemical methods include the use of nonrestricted-use herbicides (only herbicides registered by the EPA) to control any vegetation that may interfere with the transmission-line corridor. The consistent use of herbicides results in the growth of low-growing, non-woody vegetation such as grasses and other native plants. Mechanical methods of vegetation control include hand clearing, pruning, mowing, and felling (Golder Associates 2008; PEF 2009a, h).

None of the plants listed in Table 1-1 were observed during the limited reconnaissance surveys conducted within the corridors (PEF 2009a; Golder Associates 2008). There is, however, one documented occurrence for the longspurred mint (*Dicerandra cornutissima*) from the PEF (2008a) and FNAI (2009) databases. Potentially suitable habitat for these species may be

present within portions of the corridors. Eleven of these plant species are usually associated with well-drained, sandy, xeric upland habitats, such as sandhill and scrub, and several may also occur on scrubby flatwoods, which are found on moderately well-drained sandy flatland. These include the Florida bonamia, pygmy fringe tree, Florida goldenaster, longspurred mint, scrub wild buckwheat, Britton's beargrass, Lewton's polygala, Small's jointweed or Sandlace, scrub plum, wide-leaf warea, and Carter's mustard. Although not prevalent, sandhill and scrub habitats are present along corridors supporting the associated offsite facilities. Should these species occur in areas of the corridor to be cleared, development and operation activities may affect, and are likely to adversely affect these species and their habitats. The pygmy fringe tree, wide-leaf warea, and Carter's mustard are found in Central Florida, generally in the Lake Wales Ridge district, which is not in close proximity to the proposed transmission-line corridors in Lake and Polk Counties. Therefore, building and operation activities within the associated transmission line corridors may affect but are unlikely to adversely affect these species.

Two of the Federally listed plants are associated with wetlands may also occur on the offsite corridors: Brooksville bellflower, which is found on wet grassy slopes and drying pond edges in Hernando County, and Cooley's water-willow *(Justicia cooleyi*), which occurs in mesic hardwood hammocks of central Florida. These two plants and their habitats may also be affected by development activities. PEF has a wetland mitigation plan that has identified several mitigation sites in close proximity to the proposed transmission-line corridors (PEF 2010). These two wetland species could benefit from the proposed mitigation efforts.

Although suitable habitat may exist for the species listed above, targeted surveys for threatened and endangered plants have not been conducted on the LNP site or in any of the associated offsite corridors, including transmission lines. PEF has procedures in place that minimize adverse impacts on threatened and endangered species habitats such as floodplains and wetlands (Golder Associates 2008; PEF 2009a, h). Because most final rights-of-way for the transmission lines would be narrow (100 to 220 ft wide) and collocated with existing corridors over most of their range, the actual extent of clearing required is limited. This would greatly reduce the area over which these Federally listed plant species could be affected. Corridor-maintenance activities would be performed by PEF in compliance with applicable Federal, State, and local laws, regulations, and permit requirements. If any of the Federally listed plants occur within the offsite corridors, then construction and operation activities may affect and are likely to adversely affect these species.

7.0 Cumulative Effects

7.1 Terrestrial

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could affect threatened and endangered species and habitats. For this analysis, the geographic area of interest is considered to encompass the 20-mi radius around the LNP site, plus the corridors associated with the proposed transmission lines and other offsite linear features. Corridors range in width from approximately 300 ft to 1 mi. This area is expected to encompass the locations of possible development projects potentially capable of substantially influencing threatened and endangered species on and close to the LNP project. This geographical area of interest includes watersheds providing direct runoff from the LNP site to the Gulf of Mexico, as well as the lower watersheds of the Withlacoochee and Waccasassa River basins.

Terrestrial and wetland habitats in the geographic area of interest have been modified over time from urbanization (e.g., residences, commercial development, roads, and utility development), agricultural practices (including commercial forest management), mining, construction of the CFBC, and development of the CREC. Extensive areas of habitat have been altered for forest management, agriculture, mining, and low-density residential development. Development and operation of power plants at the CREC, which began in the 1960s, have contributed cumulatively to many of the same types of impacts on threatened and endangered species as those associated with the proposed LNP project. The cumulative impacts resulting from CREC operation would continue for the geographic area of interest. Habitat degradation in the geographic area of interest has already resulted from the conversion of natural landscapes to intensively managed forests, pastureland and other agricultural uses, rural residential development, and other developments causing fragmentation of the landscape. This cumulative loss, degradation, and fragmentation of habitat have already contributed to declines in wildlife populations and biodiversity within the area. In addition, decreased precipitation, sea-level rise, more frequent storm surges, increased intensity of coastal storms, and increased temperatures resulting from global climate change may already be contributing to wetland losses and exacerbating the ongoing trend (GCRP 2009).

Future actions or conditions within the geographic area of interest that would contribute to cumulative effects on threatened and endangered species and habitats would include the proposed Tarmac King Road Limestone Mine, the US-19 bridge expansion at the CFBC, renewal of the CREC operating license for an additional 20 years (beginning in 2017), the Inglis Lock Bypass Channel Spillway Hydropower Project, proposed expansion of the Florida Gas pipeline, the proposed Suncoast Toll Road, continued urbanization (e.g., commercial, industrial and residential expansion; creation and/or upgrading of transmission lines; new road

development and expansion), the operation and expansion of existing limestone quarries, future agricultural and forestry management activities, increased outdoor recreation, and future climate change. For example, at the proposed Tarmac King Road Limestone Mine that would be built about 2 mi west of the LNP site, approximately 2700 ac of wetlands and uplands would be mined, with an additional 1300 ac disturbed to site a quarry processing plant, roads and other infrastructure. Total wetland impacts are estimated at 1140 ac (BRA 2010). Tarmac America LCC (Tarmac) plans to mitigate for wetland impacts by conducting a variety of conservation measures on a 4500-ac site adjacent to the proposed mine that would be protected through a conservation easement. Other future actions or conditions that would contribute to cumulative impacts on threatened and endangered species and habitats would include building and/or upgrading of transmission lines and other utilities, other new road development and expansion, continued industrial and urban development throughout the geographic area of interest, increased outdoor recreation, nonpoint source runoff from activities such as agriculture, forestry and ranching, and global climate change.

Future urban, industrial and utility development, new transmission-line corridors, and the effects of future changes in climate may potentially affect threatened and endangered species that occur near the LNP project primarily by decreasing or degrading the available habitat for these species. Habitat loss may occur through loss of upland and wetland habitats for urban development, sea-level rise, increasing salinity of estuarine areas, and inundation or filling of wetland habitats. Sea-level rise resulting from climate change along the Gulf Coast of Florida could accelerate the loss of wetlands and estuaries, thereby eliminating breeding and foraging habitat for commercial, game, and threatened and endangered wildlife (Ning et al. 2003; GCRP 2009). Global climate change could also cause shifts in species ranges and migratory corridors as well as changes in ecological processes (GCRP 2009). Loss or alteration of habitats could affect the numerous Federally listed plant species that may occur near the LNP project (see Table 1-1).

Federally listed birds such as the piping plover use tidal marshes and estuaries along the Florida Gulf Coast in the area near the LNP project. Threats posed to this species include the loss or degradation of foraging habitat and the loss of breeding habitat as a result of sea-level rise and increased salinity caused by climate change. Numerous other Federally listed birds may occur within or adjacent to the predominantly inland areas near the LNP project (see Table 1-1). Wading birds such as the wood stork would be affected by activities that alter or destroy wetland and marsh habitats where birds forage, and by activities that affect or disturb rookeries where these birds breed. Removal of mature pine forest could degrade breeding and foraging habitat for red-cockaded woodpeckers, and clearing oak scrub habitats could affect Florida scrub jay.

Federally listed reptiles and amphibians could be affected by projects involving land clearing, habitat loss or fragmentation, wetland fill or degredation, and increased vehicle traffic on roads

and rights-of-ways. Species that may occur near the LNP project wherever suitable habitat is present include the sand skink and eastern indigo snake (Table 1-1). These species could be displaced and would likely suffer increased mortality. The American alligator, listed as threatened under the ESA (due to similarity of appearance to the American crocodile) is found in areas near the LNP project, but is considered to have fully recovered (52 FR 21059). Although trends and conditions, such as urbanization, industrialization, and global climate change, could affect the American alligator's habitat and local distribution, none of the identified present or future projects is expected to affect the recovered species.

Cumulative impacts on threatened and endangered species and habitats are estimated based on the information provided by PEF and the review team's independent evaluation. Past, present, and reasonably foreseeable future activities exist in the geographic area of interest that could affect Federally protected terrestrial ecological resources in ways similar to the proposed LNP project. Development and expansion of transmission-line corridors and infrastructure to support proposed future projects would likely affect wildlife and may be detrimental to wetland habitats. Loss of wildlife habitat, increased habitat fragmentation, impacts on Federally protected species, and increased loss of wetlands from continued development and as a consequence of climate change are unavoidable and would continue to occur. Detectable alteration of habitat, loss of habitat, and increased habitat fragmentation, and increased risk of avian collision and electrocution within a branch of the Eastern Atlantic Flyway that crosses central Florida would contribute to the cumulative impacts. Based on this analysis, the review team concludes that cumulative impacts from building and operating the proposed LNP units and from past, present, and reasonably foreseeable future actions on Federally protected species and their habitats would noticeably alter, but would not likely destabilize, those resources.

7.2 Aquatic

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could affect aquatic ecology. For this analysis, the geographic area of interest is considered to be the proposed LNP site, which encompasses all waterbodies associated with LNP activities, the entire CFBC, Lake Rousseau, the Inglis Lock bypass channel, OWR, the CREC intake and discharge, the Levy and Citrus County offshore areas of the Gulf of Mexico, and the proposed transmission-line corridors. Other watersheds (Wacassassa Basin) adjacent to these waterbodies are not affected by LNP and are excluded from this aquatic cumulative impacts analysis.

Other actions in the vicinity that have present and reasonably foreseeable future potential impacts on the CFBC and the Gulf of Mexico offshore of the CREC include operation of the existing CREC, the proposed uprate of CREC Unit 3, current operation of the Inglis Quarry,

widening of the US-19 bridge across the CFBC, a proposed hydropower project on the Inglis Lock bypass channel spillway, the proposed Tarmac King Road Limestone Mine, decommissioning of CREC Units 1 and 2, development of a Port District along the CFBC, and natural environmental stressors (e.g., short- or long-term changes in precipitation or temperature and the resulting response of the aquatic community). The review team considered these potential sources of impacts in its evaluation of the cumulative aquatic ecology impacts presented in PEF's ER and in PEF's responses to the NRC staff's Requests for Additional Information.

Historically, the construction and operation of CREC Units 1 through 5 have had some impact on fisheries in the Gulf of Mexico that PEF mitigates by hatchery supplementation. The current CFBC was constructed starting in 1964, but it was never completed as a cross-Florida canal and was officially deauthorized in 1991 (Noll and Tegeder 2003). The western portion of the completed CFBC extends from the Gulf of Mexico to the Inglis Lock at Lake Rousseau and is typical of a tidal canal with marine and estuarine characteristics.

Cumulative impacts on threatened and endangered aquatic species within the CFBC are likely due to activities or events that are distinct from the LNP site. Activities related to construction of the hydropower system on the Inglis Lock bypass channel could affect the downstream migration of fish from Lake Rousseau to the Withlacoochee River, but would not affect the CFBC or OWR. The US-19 bridge expansion will not include in-water construction, and impacts on the CFBC will likely be mitigated through the use of BMPs to control erosion and stormwater runoff. The Inglis Quarry is located on the north side of the CFBC, and drainage ditches are separated from the CFBC by a containment berm (SDI 2008). Construction of the barge slip and boat ramp and the intake structure would be land based and employ best management practices minimizing impacts to the CFBC. Barge traffic within the CFBC is likely to be limited LNP module transportation, and should have minimal impact on aquatic resources, as discussed in EIS Section 4.3.2. Recreational boating in the CFBC and the OWR would likely increase due to boat ramp. The proposed Tarmac King Road Limestone Mine expansion may affect groundwater discharge to the lower Withlacoochee River (see EIS Section 7.2.1.2). The CREC Unit 3 power uprate is not expected to have any construction-related impacts except for the construction of additional mechanical draft cooling towers on the CREC site that has been previously disturbed. Any onsite construction-related potential impacts would be mitigated through the use of BMPs. The contribution of LNP construction-related impacts to impacts related to other nearby construction activities would be minor. Impacts from the construction of LNP would be temporary, largely mitigated, and mainly confined to the site. Therefore, the review team concludes that the overall contribution of construction to cumulative losses of aquatic organisms in the region would be minor, and mitigation would not be warranted.

For operations, the review team considered the potential cumulative impacts on the Gulf of Mexico and CFBC related to impingement and entrainment of aquatic organisms and also

thermal and chemical releases from both CREC and LNP. Water withdrawn for operation of proposed LNP Units 1 and 2 would require a net intake of 190 cfs (122 Mgd). The source of the 190 cfs, under low flow conditions, would be 50 cfs from leakage of Lake Rousseau water through the Inglis Lock and freshwater springs emanating in the CFBC in the vicinity of the intake structure, 70 cfs from the discharge of Lake Rousseau water at the Inglis Dam that would enter the CFBC via the OWR, and an inflow of 70 cfs that would come from the Gulf of Mexico.

CREC Units 1 through 5 withdraw over 15 times more water from the Gulf of Mexico for operations than the required 190 cfs for LNP Units 1 and 2. The proposed CREC Unit 3 uprate would not require additional water-intake volume for CREC Units 1, 2, and 3 (Golder Associates 2008).

The review team considered the potential cumulative impacts of impingement and entrainment of aquatic organisms related to operation of LNP 1 and 2 and CREC. As discussed in EIS Section 5.3.2, the proposed closed-cycle cooling system with mechanical draft cooling towers for proposed LNP Units 1 and 2 would not be expected to result in discernable impacts on populations of aquatic organisms inhabiting the Crystal Bay and Withlacoochee Bay areas of the Gulf of Mexico. The review team is aware that the possibility exists that CREC Units 1 and 2 (fossil-fuel plants) which contribute significantly to the overall impingement and entrainment of aquatic organisms at CREC, would be decommissioned once LNP Units 1 and 2 begin operation. This significant reduction in intake withdrawal volume (greater than 48 percent) at CREC would reduce the cumulative impact on impingement and entrainment of aquatic organisms in the Gulf of Mexico, and may result in a net positive impact on local fisheries (see Table 4-1). Therefore, any cumulative impingement or entrainment impacts would be considered minor.

The review team also considered the potential cumulative impacts of thermal discharges on threatened and endangered species. The operation of all five units at CREC with the uprate of CREC Unit 3 and without the LNP Units 1 and 2 discharge would result in no thermal increase with the operation of a new south cooling tower to augment the current modular helper cooling towers (Golder Associates 2008). The review team is aware that the possibility exists that CREC Units 1 and 2 (fossil-fuel plants), which contribute to the discharge flow, would be decommissioned once LNP Units 1 and 2 begin operation. The review team conducted a thermal analysis of two cases involving the discharge from CREC.

The first case evaluated the thermal discharge from all five units at CREC, the power uprate from CREC Unit 3, and the blowdown from LNP 1 and 2. A second analysis involved CREC Units 3 through 5, the Unit 3 power uprate, and blowdown from LNP 1 and 2. The thermal analyses for these two cases are presented in EIS Section 7.2.2.1. The first scenario concludes that resulting changes in discharges at CREC would be minimal for thermal and chemical impacts with a slight increase in discharge plume size. The addition of LNP Units 1 and 2 discharge would result in an increased discharge volume of 87.93 Mgd, but with no significant

increase in thermal plume temperature or salinity over current conditions as discussed in EIS Section 5.3.2.1.

The second scenario, with the absence of CREC Units 1 and 2, would result in a discharge plume much decreased in size when compared to the first scenario. CREC Units 1 and 2 currently contribute 918 Mgd total discharge to the Gulf of Mexico during summer operations. This accounts for greater than 45 percent of the total discharge (PEF 2009a). The predicted thermal plume would decrease during both summer and winter conditions as a result from the decreased discharge plume. Salinity increases would occur under both summer and winter conditions due to increased cycles of concentration with CREC Units 1 and 2 non-operational, but are less than 1.0 psu. The overall impact on aquatic resources is expected to be minimal.

The review team considered the potential cumulative impacts on threatened and endangered aquatic species from chemical releases, including increases in total dissolved solids in the combined CREC and LNP discharge. CREC Units 1 through 5 are in compliance with the Clean Water Act Section 316(a) (thermal discharges) impacts from cooling-water systems. Chemical releases from the existing unit(s) currently comply with the FDEP NPDES permit requirements and comply with the Unit 3 uprate, and decommissioning of CREC Units 1 and 2 is expected to continue and would be monitored in the future. The FDEP would take cumulative chemical releases from the existing and proposed unit(s), as well as from other industrial sites discharging to the Gulf of Mexico, into consideration before approving a NPDES permit for the proposed unit(s). Given the lack of other discharges into the immediate area of the CREC discharge, it is likely that the cumulative impacts from LNP discharge combined with the discharge from CREC Units 1 through 5 with and without operation of CREC Units 1 and 2 would be minimal.

The review team also considered the cumulative impacts to Florida manatees due to increased recreational boating and fishing resulting from the construction of a boat ramp associated with the LNP barge slip. Increased recreational boating could results in collisions with manatees in the CFBC and OWR.

Anthropogenic activities, such as residential or industrial development near the vicinity of the nuclear facility, can present additional constraints on aquatic resources. Future activities may include shoreline development such as the proposed Port District, for commercial, industrial, and residential waterfront development along the CFBC to the west of US-19 (Citrus County 2009), increased water needs, and increased discharge of effluents into the Gulf of Mexico or the CFBC.

In addition to direct anthropogenic activities, physical disturbance and climatic events may impose external stressors on aquatic communities (GCRP 2009). Aquatic ecosystem responses to these events are difficult to predict. The level of impact resulting from these

activities or events would depend on the intensity of the perturbation and the recovery of the different threatened and endangered aquatic species populations.

Cumulative impacts on Federally listed threatened and endangered species are estimated based on the information provided by PEF and the review team's independent review. Based on the above analysis, the review team concludes that cumulative impacts on threatened and endangered aquatic species related to proposed LNP Units 1 and 2 would be minor.

8.0 Conclusions

The potential impacts to protected species from building and operating the proposed LNP Units 1 and 2 at the LNP site plus the associated offsite facilities and transmission lines on the species listed in Table 1-1 are listed in Table 8-1. The known distributions and records of these species, the potential ecological impacts of the construction and operation to the species, their habitat, and their prey have been considered in making a determination of likely impacts in this BA.

Table 8-1. Species Potentially Affected by Construction and Operation of Proposed LNP Units 1 and 2

Common Name	Scientific Name	Status	Determination
Mammals			
Florida salt marsh vole	*Microtis pennsylvanicus dukecampbelli*	E	May affect, not likely to adversely affect
Florida panther	*Felis concolor*	E	May affect, not likely to adversely affect
Florida manatee	*Trichechus manatus latirostris*	E	May affect, not likely to adversely affect
Birds			
Florida grasshopper sparrow	*Ammodramus savannarum floridanus*	E	No effect
Audubon's crested caracara	*Polyborus plancus audubonii*	T	May affect, not likely to adversely affect
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	May affect, not likely to adversely affect
Piping plover	*Charadrius melodus*	T	May affect, not likely to adversely affect
Red-cockaded woodpecker	*Picoides borealis*	E	May affect, likely to adversely affect
Florida scrub jay	*Aphelocoma coerulescens*	T	May affect, likely to adversely affect

Table 8-1. (contd)

Common Name	Scientific Name	Status	Determination
			adversely impact.
Wood Stork	*Mycteria Americana*	E	May affect, likely to adversely impact
Reptiles			
American alligator	*Alligator mississippiensis*	T	No effect
Eastern indigo snake	*Drymarchon couperi*	T	May affect, likely to adversely affect
Sand skink	*Neoseps reynoldsi*	T	May affect, not likely to adversely affect
Fishes			
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	May affect, not likely to adversely affect
Plants			
Florida bonamia	*Bonamia grandiflora*	T	May affect, likely to adversely affect
Brooksville bellflower	*Campanula robinsiae*	E	May affect, likely to adversely affect
Pygmy fringe tree	*Chionanthus pygmaeus*	E	May affect, not likely to adversely affect
Florida goldenaster	*Chrysopsis floridana*	E	May affect, likely to adversely affect
Longspurred mint	*Dicerandra cornutissima*	E	May affect, likely to adversely affect
Scrub buckwheat	*Eriogonum longifolium* var. *gnaphalifolium*	T	May affect, likely to adversely affect
Cooley's water-willow	*Justicia cooleyi*	E	May affect, likely to adversely affect
Britton's beargrass	*Nolina brittoniana*	E	May affect, likely to adversely affect
Lewton's polygala	*Polygala lewtonii*	E	May affect, likely to adversely affect
Sandlace or Small's jointweed	*Polygonella myriophylla*	E	May affect, likely to adversely affect
Scrub plum	*Prunus geniculata*	E	May affect, likely to adversely affect
Wideleaf warea	*Warea amplexifolia*	E	May affect, not likely to adversely affect
Carter's mustard	*Warea carteri*	E	May affect, not likely to adversely affect

E= Endangered, T=Threatened

9.0 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

56 FR 49653. September 30, 1991. “Endangered and Threatened Wildlife and Plants; Threatened Status for the Gulf Sturgeon.” *Federal Register*. U.S. Department of Commerce. U.S. Department of the Interior.

52 FR 21059. June 4, 1987. "Reclassification of American Alligator to Threatened Status Due to Similarity of Appearance Throughout the Remainder of Its Range." *Federal Register*. U. S. Department of the Interior.

66 FR 65256. December 18, 2001. "National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities." *Federal Register*. U.S. Environmental Protection Agency.

68 FR 13370. March 19, 2003. “Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Gulf Sturgeon.” *Federal Register*. U.S. Department of Interior.

72 FR 57416. October 7, 2007. "Limited Work Authorizations for Nuclear Power Plants." *Federal Register*. U.S. Nuclear Regulatory Commission.

Atomic Energy Commission (AEC). 1973. Final Environmental Statement related to the Proposed Crystal River Unit 3. Docket No. 50-302.

Berg, J.J. 2004. “Population Assessment of the Gulf of Mexico Sturgeon in the Yellow River, Florida.” Graduate Thesis, University of Florida, Gainesville, Florida.

Biological Research Associates (BRA). 2010. *Tarmac King Road Limestone Mine Estimated USACE Wetland Impacts Levy County, FL.* Accessed February 27, 2010 at http://www.kingroadeis.com/COEImpacts.pdf.

Birdnature.com. 2009. *North American Migration Flyways*. Accessed March 9, 2009 at http://www.birdnature.com/flyways.html.

Carr, S.H., F. Tatman, and F.A. Chapman. 1996. "Observations on the Natural History of the Gulf of Mexico Sturgeon (*Acipenser oxyrinchus de sotoi* Vladykov 1955) in the Suwannee River, Southeastern United States." *Ecology of Freshwater Fish* 1996(5):169-174.

CH2M Hill Nuclear Business Group (CH2M Hill). 2009a. *Estimated Salinity Changes in the Cross Florida Barge Canal and Old Withlacoochee River Channels after Levy Nuclear Plant Intake Operation*. TMEM-079, Rev 1, Denver, Colorado. Accession No. ML091740472.

CH2M Hill Nuclear Business Group (CH2M Hill). 2009b. *Aquatic Ecology Sampling Report – Levy Nuclear Plant*. 338884-TMEM-087, Rev 1, Denver, Colorado. Accession No. ML091260523.

Chapman, F.A. and S.H. Carr. 1995. "Implications of early life stages in the natural history of the Gulf of Mexico sturgeon, *Acipenser oxyrinchus de sotoi." Environmental Biology of Fishes 43(4):407-415.* DOI 10.1007/BF00001178.

Citrus County. 2009. *Commission Sends Port District Category for Review*. Board of County Commissioners press release. Accessed February 9, 2010 at http://www.citruscountyfl.org/press_release_results.jsp?PRESSKEY=482.

Clean Water Act. 33 USC 1251, et seq. (also referred to as the Federal Water Pollution Control Act [FWPCA]).

Conservation Outdoors. 2010. *Cooley's Water Willow* (*Justicia cooleyi*). Accessed May 21, 2010 at http://www.conservationoutdoors.org/species/justicia-cooleyi.htm.

Endangered Species Act of 1973, as amended (ESA). 16 USC 1531 et seq.

Entrix. 2010. Progress Energy Florida – Levy Nuclear Plant and Associated Transmission Lines Wetland Mitigation Plan. PA08-51B. April 23, 2010.

Estevez, E.D, and M.A. Marshall. 1993. *1993 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Prepared under FPC Contract S01100 for Florida Power Corporation by Mote Marine Laboratory, Sarasota, Florida.

Estevez, E.D, and M.A. Marshall. 1994. *1994 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Prepared under FPC Contract S01100 for Florida Power Corporation by Mote Marine Laboratory, Sarasota, Florida.

Estevez, E.D, and M.A. Marshall. 1995. *1995 Summary Report for: Crystal River 3 Year NPDES Monitoring Project*. Prepared under FPC Contract S01100 for Florida Power Corporation by Mote Marine Laboratory, Sarasota, Florida.

Florida Administrative Code (Fla. Admin. Code 62-17). 2009. Chapter 62-17, "Electrical Power Plant Siting." *Florida Administrative Code Annotated*.

Florida Administrative Code (Fla. Admin. Code 62-302). 2009. Chapter 62-302, "Surface Water Quality Standards." *Florida Administrative Code Annotated.*

Florida Department of Agriculture and Consumer Services (FDA&CS). 2009. *Goethe State Forest*. Accessed April 24, 2009 at http://www.fl-dof.com/state_forests/goethe.html.

Florida Department of Environmental Protection (FDEP). 2005. *Inglis Lock Review*. Report No. IA-03-21-2005-128, Office of Greenways and Trails, Tallahassee, Florida.

Florida Department of Environmental Protection (FDEP). 2010. *Levy Nuclear Power Plant Units 1 & 2, Progress Energy, Florida, PA08-51B, Conditions of Certification, Plant and Associated Facilities and Transmission Lines*. Modified February 23, 2010. Accessed at http://www.dep.state.fl.us/siting/files/certification/pa08_51_2010_B.pdf.

Florida Electrical Power Plant Siting Act (PPSA). 2010. 29 *Fla. Stat.* 403.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2002. "Citrus County Manatee Protection Zones." 68C – 22.011, F.A.C., November 2002." Office of Environmental Services, Bureau of Protected Species Management, Tallahassee, Florida.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2008. *FWC's Agency Report and Recommendations for Conditions to be included in the State Certification, Progress Energy Florida Levy Nuclear Plant Powerline Transmission Corridor, Levy County, Florida.* Office of Policy and Stakeholder Coordination, Tallahassee, Florida. Accession No. ML090150548.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2009a. *FWC Records High Counts During Statewide Manatee Survey*. Fish and Wildlife Research Institute, Press Release, January 28, 2009. Accessed at http://research.myfwc.com/news/view_article.asp?id=31685.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2009b. *Manatee Mortality Database Search for Citrus and Levy County Monthly and Yearly Counts*. Accessed on April 22, 2009 at http://research.myfwc.com/manatees and http://research.myfwc.com/manatees/search_summary.asp.

Florida Natural Areas Inventory (FNAI). 2009. *Field Guide to the Rare Plants and Animals of Florida Online*. Accessed various dates at http://www.fnai.org/FieldGuide/index.cfm.

Golder Associates. 2008. *USACE Environmental Resource Permit Application for Transmission Corridors Associated with the Levy Nuclear Plant*. St. Petersburg, Florida. Accession No. ML102040284.

Griffith, G.E. and J.M. Omernik. 2008. "Ecoregions of Florida (EPA)." In *Encyclopedia of Earth*. eds. C.J. Cleveland. Environmental Information Coalition, National Council for Science and the Environment, Washington, D.C. Accessed May 24, 2010 at http://www.eoearth.org/article/Ecoregions_of_Florida_(EPA).

Huff, J.A. 1975. *Life History of Gulf of Mexico Sturgeon,* Acipenser oxyrhynchus desotoi*, in Suwannee River, Florida*. Number 16, Florida Department of Natural Resources, Marine Research Laboratory, St. Petersburg, Florida.

Irvine, A.B. 1983. "Manatee metabolism and its influence on distribution in Florida." *Biological Conservation* 25(4):315-334.

Kimley-Horn and Associates, Inc. (Kimley-Horn). 2009. *Traffic Study: Levy County Advanced Reactor Site, Levy County, Florida*. Tampa, Florida. Accession No. ML091260548.

Land E.D., D.B. Shindle, R.J. Kawula, J.F. Benson, M.A. Lotz, and D.P. Onorato. 2008. "Florida Panther Habitat Selection Analysis of Concurrent GPS and VHF Telemetry Data." *Journal of Wildlife Management* 72(3):633–639.

Marshall, M.J. 2002. *Seagrass Survey: November 2001 Resurvey at the Florida Power Crystal River Generating Facility*. Prepared for Florida Power – A Progress Energy Company by the Coastal Seas Consortium, Inc., Bradenton, Florida. Accession No. ML102040256.

National Environmental Policy Act of 1969, as amended (NEPA). 42 USC 4321, et seq.

Ning, Z.H., R.E. Turner, T. Doyle, and K. Abdollahi. 2003. *Preparing for a Changing Climate: Potential Consequences of Climate Variability and Change – Gulf Coast Region.* GCRCC and LSU Graphic Services, Baton Rouge, Louisiana.

Noll, S. and M.D. Tegeder. 2003. *From Exploitation to Conservation" A History of the Marjorie Harris Carr Cross Florida Greenway*. Florida Department of Environmental Protection, Tallahassee, Florida. Available at: http://www.dep.state.fl.us/gwt/cfg/pdf/History_Report.pdf.

Petersen. C. 2010. Personal communication between D.W. Baber, ICF International, and C. Petersen, Goethe State Forest Wildlife Biologist, dated April 9, 2010. Accession No. ML101930606.

Progress Energy Florida, Inc. (PEF). 2008a. *Levy Nuclear Plant Units 1 and 2, Site Certification Application, Volumes 1 through 9*. St. Petersburg, Florida. Including Amendments and Supplemental Information. Available at http://www.dep.state.fl.us/siting/apps.htm#ppn1.

Progress Energy Florida, Inc. (PEF). 2008b. *Applicant's Environmental Report – Operating License Renewal Stage Crystal River Unit 3 Progress Energy*. Unit 3, Docket No. 50-302, License No. DPR-72, Revision 1, St. Petersburg, Florida.

Progress Energy Florida, Inc. (PEF). 2008c. *Levy Nuclear Plant Units 1 and 2 Responses to RAI Comments on Cross Florida Barge Canal Recreational Access Permit*. September 2008. Accession No. ML102030019.

Progress Energy Florida, Inc. (PEF). 2009a. *Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage*. Revision 1, St. Petersburg, Florida. Accession No. ML092860995.

Progress Energy Florida, Inc. (PEF). 2009b. Letter from Garry Miller, PEF, to NRC, dated June 12, 2009, regarding Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review. Package Accession No. ML091740487.

Progress Energy Florida, Inc. (PEF). 2009c. Letter from Garry Miller, PEF, to NRC, dated July 29, 2009, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review – Hydrology 5.3.2.1-2. Accession No. ML092150337.

Progress Energy Florida, Inc. (PEF). 2009d. Letter from Garry Miller, PEF, to NRC, dated March 27, 2009, regarding Response to USACE Request for Additional Information Regarding the Environmental Review. Accession No. ML091320050.

Progress Energy Florida, Inc. (PEF). 2009e. Letter from Garry Miller, PEF, to NRC, dated September 3, 2009, regarding Supplement 5 to Response to Request for Additional Information Regarding the Environmental Review. Accession No. ML092570293.

Progress Energy Florida, Inc. (PEF). 2009f. Letter from Garry Miller, PEF, to NRC, dated August 31, 2009, regarding Supplement 4 to Response to Request for Additional Information Regarding the Environmental Review. Accession No. ML092460206.

Progress Energy Florida, Inc. (PEF). 2009g. Letter from Garry Miller, PEF, to NRC, dated June 12, 2009, regarding Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review. Accession No. ML091740483.

Progress Energy Florida, Inc. (PEF). 2009h. Letter from Garry Miller, PEF, to NRC, dated August 31, 2009, regarding Supplement Information Related to Environmental Review – Future Native Files and CREC 1993/1994 Annual Salt Drift Report. Accession No. ML092470542.

Progress Energy Florida, Inc. (PEF). 2009i. Letter from Garry Miller, PEF, to NRC, dated October 9, 2009, regarding Response to Supplemental Request for Additional Information Regarding the Environmental Review – Hydrology 4.1.1.-1. Accession No. ML092920466.

Progress Energy Florida, Inc. (PEF). 2010. Letter from Robert Kitchen, PEF, to NRC, dated April 29.2010, regarding Notification of Modification Submitted for LNP SCA. Accession No. ML101230331.

Rivers and Harbors Appropriation Act of 1899, as amended. 33 USC 403.

SDI Environmental Services, Inc. (SDI). 2008. *Inglis Quarry Work Plan Study and Groundwater Modeling.* Prepared for Cemex Construction Materials Florida, LLC. SDI Project No. CEF-010. SDI Environmental Services, Inc., Tampa, Florida. Accessed at http://publicfiles.dep.state.fl.us/DWRM/MineReclamation/Cemex%20Inglis%20Quarry/Inglis%20Quarry%20Work%20Plan%20Study%20and%20Ground%20Water%20Modeling_Nov08.pdf.

Souza, P. 2007. Letter from Paul Souza, FWS, South Florida Ecological Services Office, to David S. Hobbie, Corps, dated February 19, 2007, regarding the revised Panther Key. Accessed at: http://www.saj.usace.army.mil/Divisions/Regulatory/DOCS/endangered/pantherKey_Letter2007FEB19.pdf.

Souza, P. 2008. Letter from Paul Souza, FWS, to Osvaldo Collazo, USACE, dated October 23, 2008, regarding the Manatee Key. Accessed at: http://www.saj.usace.army.mil/Divisions/Regulatory/DOCS/endangered/20081023_ManateeKey_FINAL.pdf.

Souza, P. 2010. Letter from Paul Souza, FWS, to Osvaldo Collazo, USACE, dated January 25, 2010, regarding the Wood Stork Key. Accessed at:. http://www.saj.usace.army.mil/Divisions/Regulatory/DOCS/endangered/20100125_SFL-ProgrammaticConcurrence-Key.pdf.

Souza, P. and D. L. Hankla. 2010. Letter from Paul Souza, FWS, and David L. Hanka, FWS, to David S. Hobbie, USACE, dated January 25, 2010 regarding the Indigo Snake Key. Accessed at: http://www.saj.usace.army.mil/Divisions/Regulatory/DOCS/endangered/20100125_EasternIndigoSnakeProgrammaticEffectDeterminationKey.pdf.

Stabile, J. J.R. Waldman, F. Parauka, and I. Wirgin. 1996. "Stock Structure and Homing Fidelity in Gulf of Mexico Sturgeon (*Acipenser oxyrinchus desotoi*) Based on Restriction Fragment Length Polymorphism and Sequence Analyses of Mitochondrial DNA." *Genetics Society of America* 144:767-775.

Stone and Webster Engineering Corporation. 1985. *Crystal River 316 Studies, Final Report*. Prepared for Florida Power Corporation. Stoughton, Massachusetts. Accession No. ML090750823.

Sulak, K.J. and J.P. Clugston. 1998. "Early Life History Stages of Gulf Sturgeon in the Suwannee River, Florida." *Transactions of the American Fisheries Society* 127:758-771.

U.S Fish and Wildlife Service (FWS). 1997a. *Recovery Plan for the Florida Salt Marsh Vole.* Atlanta, Georgia. Available at: http://www.fws.gov/ecos/ajax/docs/recovery_plan/970930d.pdf.

U.S. Fish and Wildlife Service (FWS). 1997b. *Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork*. Atlanta, Georgia.

U.S Fish and Wildlife Service (FWS). 1999. *Multi-Species Recovery Plan for South Florida; Florida Grasshopper Sparrow.* Atlanta, Georgia. Available at www.fws.gov/verobeach/images/pdflibrary/fgsp.pdf.

U.S. Fish and Wildlife Service (FWS). 2001. *Critical Habitat for the Piping Plover.* Accessed on May 19, 2010 at http://www.fws.gov/plover/.

U.S. Fish and Wildlife Service (FWS). 2003a. *Recovery Plan for the Red-Cockaded Woodpecker (Picoides borealis)*. Second Revision, Atlanta, Georgia. Accessible at: http://www.fws.gov/rcwrecovery/recovery_plan.html.

U.S. Fish and Wildlife Service (FWS). 2003b. Snail Kite Consultation Area Map Accessed on July 7, 2010 at http://www.fws.gov/verobeach/images/pdflibrary/Snail_Kite_Consultation_Area.pdf.

U.S. Fish and Wildlife Service (FWS). 2004. *Standard Protection Measures for the Eastern Indigo Snake*. Accessed August 5, 2009 at http://www.fws.gov/northflorida/IndigoSnakes/20040212_gd_EIS_Standard_Protection_Measures.pdf. Accession No. ML101960348.

U.S. Fish and Wildlife Service (FWS). 2005a. *Cooley's Water Willow* (*Justicia cooleyi*). Accessed on 5/21/10 at http://www.fws.gov/northflorida/Species-Accounts/Bellflower-Waterwillow-2005.htm.

U.S. Fish and Wildlife Service (FWS). 2005b. *Florida Bonamia, Bonamia grandiflora*. Accessed on May 25, 2010 at http://www.fws.gov/northflorida/Species-Accounts/Fla-Bonamia-2005.htm.

U.S. Fish and Wildlife Service (FWS). 2007. *West Indian Manatee (Trichechus manatus), 5-Year Review: Summary and Evaluation*. Jacksonville, Florida and Boqueron, Puerto Rico.

Available at: http://www.fws.gov/northflorida/Manatee/2007%205-yr%20Review/2007-Manatee-5-Year-Review-Final-color-signed.pdf.

U.S. Fish and Wildlife Service (FWS). 2008a. *West Indian Manatee Trichechus manatus. Fact Sheet, February 2008*. Available at http://www.fws.gov/Endangered/factsheets/manatee.pdf.

U.S. Fish and Wildlife Service (FWS). 2008b. Florida Panther Recovery Plan (*Puma concolor coryi*), Third Revision. U.S. Fish and Wildlife Service. Atlanta, Georgia. 217pp. Available at: http://www.fws.gov/verobeach/images/pdflibrary/20081022%20Florida%20Panther%20Recovery%20Plan%20-%203rd%20Revision.pdf.

U.S. Fish and Wildlife Service (FWS). 2009a. *Florida County Index of Listed Species – North Florida Ecological Services Office*. Levy, Citrus, Marion, Sumter, Lake, Hernando, Pinellas, and Hillsborough Counties. Accessed January 22, 2009 at http://www.fws.gov/northflorida/gotocty.htm.

U.S. Fish and Wildlife Service (FWS). 2009b. *Federally Listed & Candidate Species in Polk County, Florida – South Florida Ecological Field Office*. Accessed January 22, 2009 at http://www.fws.gov/verobeach/images/pdflibrary/Polk%20County2.pdf.

U.S. Fish and Wildlife Service (FWS). 2009c. *Florida Wood Stork Colonies Core Foraging Areas*. Accessed January 22, 2009 at http://www.fws.gov/northflorida/WoodStorks/Documents/110107-WOST-Nest-Colonies-Forag-Areas.pdf.

U.S. Fish and Wildlife Service (FWS). 2009d. *U.S. Counties In Which the West Indian Manatee, Is Known to Occur*. Accessed April 27, 2009. http://ecos.fws.gov/speciesProfile/profile/countiesBySpecies.action?spcode=A007&entityId=7.

U.S. Fish and Wildlife Service (FWS). 2009e. *Species Account for Longspurred Mint (Dicerandra comutissima).* Accessed on May 21, 2010 at http://www.fws.gov/northflorida/Species-Accounts/Longspurred-Mint-2005.htm.

U.S. Fish and Wildlife Service (FWS). 2010a. *North Florida Federally-Listed Species* (and South Florida). Accessed on various dates at http://www.fws.gov/northflorida/Species-Accounts/North_Florida_Fed_TE_Species_Info.htm.

U.S. Fish and Wildlife Service (FWS). 2010b. *Species Profile for the Piping Plover* (*Charadius melodus*). Accessed on May 27, 2010 at http://www.fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=B079.

U.S. Fish and Wildlife Service and Gulf States Marine Fisheries Commission (FWS and GSMFC). 1995. *Gulf Sturgeon Recovery/Management Plan*. Atlanta, Georgia. Available at: http://www.nmfs.noaa.gov/pr/pdfs/recovery/sturgeon_gulf.pdf.

U.S. Geological Survey (USGS). 2009. *Manatee Facts*. U.S. Department of the Interior, U.S. Geological Survey. Available at http://fl.biology.usgs.gov/manateefactsheet.pdf.

U. S. Global Change Research Program (GCRP). 2009. *Global Climate Change Impacts in the United States*. T.R. Karl, J.M. Melillo, and T.C. Peterson, eds. Cambridge University Press, New York. Available at http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts.

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Vols. 1 and 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2008. Letter from NRC, to Mr. Jay Harrington, FWS Jacksonville Field Office, dated November 5, 2008, regarding Request for Participation in the Environmental Scoping Process and a List of Protected Species Within the Area Under Evaluation for the Levy Nuclear Plant, Units 1 and 2. Accession No. ML082750418.

Wakeford, A. 2001. *State of Florida Conservation Plan for Gulf Sturgeon* (Acipenser oxyrinchus desotoi). Technical Report TR-8, Florida Marine Research Institute, Florida Fish and Wildlife Conservation Commission, St. Petersburg, Florida. Available at: http://aquacomm.fcla.edu/119/.

Wooley, C.M. and E.J. Crateau. 1985. "Movement, Microhabitat, Exploitation, and Management of Gulf of Mexico Sturgeon, Apalachicola River, Florida." *American Fisheries Society* (Online Journals) 5(4):590-605.

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:

FWS Log. No. 41910-2010-F-0444

December 1, 2011

Chief, Rulemaking and Directives Branch
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Biological Opinion for Levy Nuclear Power Plant Units 1 and 2, Application for Combined Licenses (COLs) for Construction Permits and Operating Licenses, (NUREG-1941)

This document is the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed Levy Nuclear Plant (LNP) Units 1 and 2 and associated offsite facilities including a heavy-haul road, barge slip, barge slip access road, water pipelines, cooling-water intake structure, and about 180-miles of existing and new transmission lines spanning nine Florida counties and its effects on the federally threatened and endangered species per section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This biological opinion is based on information provided in the Nuclear Regulatory Commission's (NRC) and Army Corps of Engineers (Corps) Draft Environmental Impact Statement (DEIS), Biological Assessment (BA), and supplemental information provided by the license/permit applicant, Progress Energy Florida (PEF). PEF has conducted habitat assessment and appropriate species-specific surveys for federally listed species, including plants, to clarify NRC's determinations in their BA. Since construction of the project will be delayed until all necessary permits are obtained, additional habitat assessments and surveys will need to be conducted within 2 years of any construction activities and consultation on this project will need to be reinitiated and our biological opinion revised to reflect any new information at that time.

Based on the information submitted to the Service, we have provided a summary (Table 1) of the Service's concurrence on NRC's determinations made in the BA for the following federal threatened and endangered species potentially found within the action area.

Table 1. Summary of Federally threatened or endangered species and the Service's concurrence.

Species	Federal Status	Location in Action Area	NRC Determination based on DEIS (BA)	USFWS Determination
Florida manatee (*Trichechus manatus latirostris*)	Endangered	Barge slip, cooling-water intake structure	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Florida salt marsh vole(*Microtis pennsylvanicus dukecampbelli*)	Endangered	Power Plant site	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Florida panther (*Felis concolor*)	Endangered	Power Plant site, Transmission lines	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Florida grasshopper sparrow (*Ammodramus savannarum floridanus*)	Endangered	Power Plant site, Transmission Lines	No effect	No effect
Audubon's crested caracara (*Polyborus plancus audubonii*)	Threatened	Power Plant site, Transmission Lines	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Everglade snail kite (*Rostrhamus socialbilis plumbeus*)	Endangered	Power Plant site, Transmission lines	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Piping plover (*Charadrius melodus*)	Threatened	Power Plant site	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Red-cockaded woodpecker (*Picoides borealis*)	Endangered	Mitigation site (Goethe State Forest)	May affect, likely to adversely affect	May affect, not likely to adversely affect
Florida scrub-jay (*Aphelocoma coeruluscens)*	Endangered	Transmission Lines	May affect, likely to adversely affect	May affect, likely to adversely affect

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Wood stork (*Mycteria Americana*)	Endangered	Transmission Lines, Mitigation sites	May affect, likely to adversely affect	May affect, not likely to adversely affect
Eastern Indigo snake (*Drymarchon couperi*)	Threatened	Power Plant site, transmission line, mitigation sites	May affect, likely to adversely affect	May affect, not likely to adversely affect
Sand skinks (*Neoseps reynoldsi*)	Threatened	Transmission line	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	Threatened	Barge slip, cooling water intake structure	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Britton's beargrass	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Florida bonamia (*Bonamia grandiflora*)	Threatened	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Brooksville bellflower (*Campanula robinisae*)	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Florida goldenaster (*Chrysopsis floridana*)	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Longspurred mint (*Dicerandra cornutissima*)	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Scrub buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*)	Enandgered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect

Cooley's water-willow (*Justicia cooleyi*)	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Lewton's polygala (*Polygala lewtonii*)	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Sandlace or Small's jointweed (*Polygonella myriophylla*)	Endangered	Transmission lines	May affect, likely to adversely affect	May affect, not likely to adversely affect
Pygmy fringe tree (*Chionanthus pygmaeus*)	Endangered	Transmission lines	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Wideleaf warea (*Warea amplexifolia*)	Endangered	Transmission lines	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Carter's mustard (*Warea carteri*)	Endangered	Transmission lines	May affect, not likely to adversely affect	May affect, not likely to adversely affect

Most of the listed species included in the BA had potentially suitable habitat located within the action area. However, detailed habitat assessments and species-specific surveys indicated that the wood stork, red-cockaded woodpecker, eastern indigo snake, Florida manatee, Florida scrub-jay, longspurred mint, and Britton's beargrass were the only species documented within the action area.

For the wood stork, a may affect, not likely to adversely affect determination for the wood stork was based on the PEF conducting a Wood Stork Foraging Habitat Assessment Procedure based on the Effect Determination Key for Wood Storks in Central and North Peninsular Florida. A total of ±145 acres of core foraging area (CFA) are proposed to be affected throughout the entire action area. No active wood stork colonies will be impacted. We recommend the Corps to work with our agency to ensure that the final wetland mitigation plan will compensate for expected impacts to suitable wood stork foraging habitat. Accordingly, the wood stork will not be discussed further in this biological opinion.

For the red-cockaded woodpecker (RCW), our determination is based on information that this species may benefit from any work proposed by this project. The RCWs are located within this proposed project are at Goethe State Forest (GSF). PEF plans on using a portion of the GSF as a wetland mitigation site and any work conducted at this site will benefit the

RCW. All active clusters located within the restoration areas should be avoided and any restoration activities should be conducted outside of the nesting season (May-July). Accordingly, the RCW will not be discussed further in this biological opinion.

For the eastern indigo snake, the Service's determination is based on the implementation of the Eastern Indigo Standard Protection Measures that will be used prior and during any land clearing or construction activities for this proposed project. Although eastern indigo snakes were observed within the action areas, mainly along the right-of-ways of the proposed Levy to Central Florida South transmission line corridor, the Service concludes that large tracts of land that surround these corridors will continue to provide suitable habitat and corridors for movement. Also, any loss of habitat or habitat fragmentation to eastern indigo snakes at the LNP site will be offset by the restoration of the ±1,548.7 acres of upland and wetland habitat. Accordingly, the eastern indigo snake will not be discussed further in this biological opinion.

For the Florida manatee, the Service concurs with NRC's may affect, not likely to adversely affect determination. Appropriate special manatee conditions as called for in the 2011 Manatee Effects Determination Key and Programmatic Biological Opinion will be followed. Accordingly, the Florida manatee will not be discussed further in this biological opinion.

For sand skinks, although a portion of their range occurs within the proposed project site, no suitable habitat was located during on the ground habitat assessments of these areas, and we therefor concur with the NRC's not likely to adversely affect determination. However, due to the delay in implementing this project, the habitat should be reassessed within 2 years prior to any land clearing or construction of this project to determine if any suitable habitat is present, and if so surveys should be conducted. Accordingly, the sand skink will not be discussed further in this biological opinion.

For the Florida scrub-jay, the Service concurs with the determination by NRC that the proposed action may affect the threatened Florida scrub-jay. Species specific surveys were conducted by PEF, and observed this species within the proposed transmission line corridors. The Service has provided further information on the Florida scrub-jay in the following sections of this Biological Opinion. Further explanation of our determination for the Florida scrub-jay is provided below. The Service either concurred or determined that the proposed project may affect, but is not likely to adversely affect other species found in the above table based on the habitat assessments or surveys conducted.

Specific federally listed plant surveys were conducted in 2010 and 2011for the Brooksville bellflower, Cooley's water-willow, Florida bonamia, Florida golden aster, longspurred mint, and Britton's beargrass. The remaining listed plants mentioned in the BA were found to have ranges outside of the action area and were not surveyed. These surveys were conducted in areas located within the action area to have suitable habitat for the specific species. The surveys were conducted during the time of year when the species is the most distinctive (e.g., flowering). The only species found within the proposed project was

Britton's beargrass and longspurred mint as mentioned above. These species where located along the transmission corridors and will be avoided or the plants may be relocated within the same area so that any impacts by the proposed project will not result in "take". However, due to the delay in implementing this project in areas where suitable habitat occurs, additional surveys for all these species should be conducted within 2 years prior to any land clearing or construction. Any plants found within the action area should be avoided or relocated if possible. Accordingly, all listed plants will not be discussed further in this biological opinion.

Consultation History

In January 2008, PEF's consultant requested from the FWC a species list for the LNP site and associated onsite and offsite facilities and transmission lines.

In December 2008, Service staff visits the LNP site with NRC and Corps staff.

On 16 March 2009, Corps published their Public Notice (PN) for the LNP project from the applicant, PEF.

On 9 February 2009, the Service sent letter to NRC regarding our species list and recommending that species surveys be conducted if suitable habitat is found within the proposed project. This information was to be used in the BA for LNP.

On 5 August 2010, NRC request comments for BA.

On 13 August 2010, Corps issues another PN for NRC's BA for LNP. This PN updates the March 16, 2009 PN with new information from the BA.

On 24 September 2010, Service staff attends another on-site meeting on LNP with NRC and Corps.

On 26 October 2010, Department of Interior (DOI) (Service comments were included) provides a letter addressing our comments to NRC on BA.

On 4 January 2011, Service staff meets with NRC and Corps to discuss our comments on the BA.

In February 2011, Service received supplemental information from PEF for LNP project.

On 14 February 2011, NRC sent a letter to DOI in response to Service comments on BA.

On 28 February 2011, Service staff met with NRC and Corps to discuss potential listed species issues within the proposed project and any other Service concerns.

On 6 April 2011, Service staff met with PEF and their consultant to discuss specific listed

species surveys.

On 31 May and 14 September 2011, PEF provided Service information that included spring/summer plant survey results and other information on wood stork foraging assessments that we had requested.

On 30 September 2011, Service provided NRC and Corps a draft BO for LNP.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The proposed LNP involves building two pressurized water nuclear reactors and associated facilities at a site approximately 4 miles northeast of the town of Inglis, FL, and 8 miles east of the Gulf of Mexico. The reactors would draw cooling water from the Cross Florida Barge Canal (CFBC), south of the project site. The reactors and associated on-site facilities would occupy about 777 acres of a 3,105-acre site in Levy County, Florida, that is presently used for commercial forestry. Approximately 2,333 acres (75 percent) of the LNP site will remain undeveloped and provide a vegetative buffer around the facility. Other associated offsite facilities associated with the LNP include a heavy-haul road, barge slip, barge slip access road, water pipelines, cooling-water intake structures, and about 180 miles of new transmission lines will span nine Florida counties (Citrus, Hernando, Hillsborough, Lake, Levy, Marion, Pinellas, Polk, and Sumter), mostly (>90 percent) collocated with existing transmission lines.

The current condition of the site for the proposed LNP is a managed pine plantation with predominately slash pine (*Pinus elliottii*) and loblolly pine (*P. taeda*). There is no other infrastructure other than a network of limestone roads. Vegetation, soil, and drainage patterns have all been extensively altered through silviculture activities including logging, road development, ditching, grading, bedding, and replanting. Approximately 777 acres will be impacted by this project of which 627 acres will be permanent. Approximately 509 acres of the affected area consists of a managed pine plantation. Approximately 150 acres of disturbed lands will be temporarily impacted since these areas will be restored to natural vegetation once construction is completed.

Based on wetland delineation conducted in 2008 and a jurisdictional determination issued by the Corps in 2011, wetlands were found on ±2,002 acres of the 3,105 acre LNP site. Forty-one percent of these wetlands have been altered by years of intensive forest management practices and are presently dominated by planted pine. Another 44 percent of the wetlands are forested wetland swamps such as cypress swamps. These areas have also been logged in various degrees and range from intact natural forest stands to a mixture of natural and planted trees. The remaining 14 percent of wetlands at the project site have been recently clearcut or heavily logged and not yet been replanted. A total of ±319 acres (16 percent) of wetlands at this site would be permanently filled. Approximately 1,500 acres of undeveloped lands at LNP will be restored or preserved to offset impacts to

wetlands within the project site. These lands will be enhanced by eliminating silvicultural practices and other practices that are further explained in the wetland mitigation plan included in the Final EIS.

Most of the habitat located along the 180 miles of planned transmission line corridors has been altered by residential development, forest management, agriculture, and utility development. Much of the upland habitat on and around the corridors has been disturbed, cleared or altered by low-density residential, utilities, open land, and pastureland. However, there are areas of undisturbed mixed hardwood forests and smaller stands of longleaf pine and xeric oak scrub. Most of the wetlands found on the corridors are predominately freshwater marshes, cypress swamps, and mixed wetland forests. These wetlands have reduced functionality due to past and ongoing disturbance (e.g., tree canopy removal, drainage alteration, livestock grazing). Ninety percent of the remaining transmission lines will be collocated with existing right-of-ways that have been already cleared and are maintained. The upland areas along the transmission lines will be avoided if possible to reduce the amount of impacts to listed species found there. If these areas cannot be avoided, other conservation measures to offset the impacts will be taken, such as restoration of adjacent areas to provide suitable habitat.

Other associated facilities such as the heavy-haul road, barge slip, barge-slip access road, make-up water and blowdown-water pipelines, and cooling-water intake will be constructed within the proposed LNP site and CFBC. A total of ±249 acres will be impacted for these facilities. Most of this habitat is currently in a pine plantation, open land, and mixed hardwood forest. Approximately 32 acres of wetlands will be impacted. These impacts will be offset/mitigated by actions described in the LNP wetland mitigation plan. Temporary impacts from roads and pipelines will alter ±30 acres of upland and wetland habitats that will be re-graded to previous conditions and seeded or allowed to regenerate naturally.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The affected area was considered to be the approximately 3,105-acre project site plus the proposed right-of-way for all associated off-site facilities, including ±180 miles of new transmission lines. All wetland mitigation will be conducted in the same watershed as the action area. An action area of this size is sufficient to capture the indirect and cumulative effects resulting from the proposed activities.

STATUS OF SPECIES/CRITICAL HABITAT

Florida scrub-jay (*Aphelocoma coeruluscens*)

This section summarizes the Florida scrub-jay biology and ecology as well as information regarding the status and trends of Florida scrub-jay throughout its entire range. We use this

information to assess whether a Federal action is likely to jeopardize the continued existence of the above mentioned species.

The following discussion is summarized from the South Florida Multi-Species Recovery Plan (MSRP) (Service 1999), as well as from recent research publications and monitoring reports. A complete Florida scrub-jay life history discussion may be found in the MSRP. No critical habitat has been designated for the Florida scrub-jay.

Description – Scrub-jays are about 25 to 30 centimeters (cm) (10 to 12 inches) long and weigh about 85 grams (3 ounces). They are similar in size and shape to the blue jay (*Cyanocitta cristata*), but differ significantly in coloration (Woolfenden and Fitzpatrick 1996a). Unlike the blue jay, scrub-jays do not have a crest. They also lack the conspicuous white-tipped wing and tail feathers, black barring and bridle of the blue jay. The Florida scrub-jay's head, nape, wings, and tail are pale blue, and it is pale gray on its back and belly. Its throat and upper breast are lightly striped and bordered by a pale blue-gray "bib." The sexes of scrub-jays are not distinguishable by plumage, and males average only slightly larger than females (Woolfenden 1978). The sexes may be differentiated by a distinct "hiccup" call vocalized only by females (Woolfenden and Fitzpatrick 1986). Scrub-jays less than about 5 months of age are easily distinguishable from adults; their plumage is smoky gray on the head and back, and they lack the blue crown and nape (neck) of adults. Molting occurs between early June and late November, and peaks between mid-July and late September (Bancroft and Woolfenden 1982). During late summer and early fall, when the first basic molt is nearly complete, fledgling scrub-jays may be indistinguishable from adults in the field (Woolfenden and Fitzpatrick 1984). The variety of vocalizations of scrub-jays is described in detail by Woolfenden and Fitzpatrick (1996b).

Scrub-jays are in the order Passeriformes and the family Curiae. They have been called a "superspecies complex," and described in four groups that differ in geographic distribution within the United States and Mexico: *Aphelocoma californicus*, from southwestern Washington through Baja California; *Aphelocoma insularis*, on Santa Cruz in the Channel Islands, California; *Aphelocoma woodhousii*, from southeastern Oregon and the Rocky Mountains and Great Plains to Oaxaca, Mexico; and *Aphelocoma coerulescens* in peninsular Florida (American Ornithologists' Union 1983). Other congeners include the Mexican jay or gray-breasted jay (*Aphelocoma ultramarina*) and the unicolored jay (*Aphelocoma unicolor*) of Central America and southwest North America (Woolfenden and Fitzpatrick 1996b).

The Florida scrub-jay has specific habitat requirements. It is native to peninsular Florida's ancient dune ecosystems or scrubs, which occur on well-drained to excessively well-drained sandy soils (Laessle 1958, 1968; Fitzpatrick et al. 1994). This relict oak-dominated scrub, or xeric oak scrub, is essential habitat to the Florida scrub-jay. This community type is adapted to nutrient-poor soils, periodic drought, high seasonal rainfall and frequent fires (Abrahamson 1984). In optimal habitat for scrub-jays, these oaks are 1 to 3 meters (m) high, interspersed with 10 to 50 percent unvegetated, sandy openings, and a sand pine (*Pinus clausa*) canopy of less than 20 percent (Woolfenden and Fitzpatrick 1990). Trees

and dense herbaceous vegetation are rare. Other vegetation noted along with the oaks include saw palmettos (*Serenoa repens*) and scrub palmetto (*Sabal etonia*), as well as woody shrubs such as Florida rosemary (*Ceratiola ericoides*) and rusty lyonia (*Lyonia ferruginea*).

Scrub-jays are rarely found in habitats with more than 50 percent canopy cover over 6 feet in height (Service 1990). Scrub-jays also prefer interspersed, exposed sand patches in the scrub matrix within which they forage and store acorns (Woolfenden and Fitzpatrick 1984). Breininger et al. (1995) noted that scrub-jays also occupy marginal habitat in large numbers in some locations.

The area covered by scrub has been reduced, fragmented, or degraded due to conversion to agricultural, commercial, and residential development. In addition, fire suppression has resulted in the succession of many areas to denser, vertically stratified scrub vegetation that no longer provides suitable habitat for scrub-jays. As a result of the direct and indirect loss of scrub habitat, scrub-jays have been extirpated in Alachua, Clay, Broward, Miami-Dade, Duval, Gilchrist, Pinellas, and St. Johns Counties, and their numbers reduced in Brevard, Hernando, Highlands, Levy, Orange, Palm Beach, and Seminole Counties (Cox 1987; Fitzpatrick et al. 1991, 1994, In Press). Fitzpatrick et al. (1994) estimated the scrub-jay population to be about 10,700 individuals. Fitzpatrick et al. (In Press) indicates that current population estimates represent only about 10 percent of pre-settlement scrub-jay population numbers.

Cox (1987) and later Fitzpatrick et al. (1994) identified several scrub areas of Florida that are occupied by over half of the existing population of scrub-jays. Fitzpatrick et al. (In Press) called these three areas "core populations" and suggested that maintenance and restoration of these areas was essential to maintaining scrub-jays in Florida. These core populations exist on Cape Canaveral/Merritt Island National Wildlife Refuge (NWR) (Brevard County), Ocala National Forest (NF) (primarily eastern Marion, southwestern Putnam, northeastern Lake, and western Volusia Counties), and the Lake Wales Ridge (LWR) (Polk, Highlands, and Glades Counties). Fitzpatrick et al. (1994) estimated that about 1,334 groups (34 percent) of scrub-jays were on Federal land, whereas 2,627 groups (66 percent) were located outside of Federal lands.

Scrub-jay habitat is managed on Federal lands, but because of conflicts with primary or multiple use mandates established for these lands, scrub-jay populations are not necessarily secure. Fitzpatrick et al. (1994) indicated that fire suppression at Cape Canaveral and Cape Canaveral Naval Air Station threatens the viability of this core population of scrub-jays. Furthermore, they stated that current forestry practices on Ocala NF are likely to contribute to the continued decline of scrub-jays in this core area. Scrub-jays occurring on private land also face continued threats due to habitat degradation, fragmentation, and loss.

Life History – Scrub-jays have a social structure that involves cooperative breeding, a trait that the western North American populations of scrub-jays do not exhibit (Woolfenden and Fitzpatrick 1984). Scrub-jays live in groups of two (a single mated pair) up to large,

extended families of eight adults and one to four juveniles. Fledgling scrub-jays remain with the breeding pair in their natal (birth) territory as "helpers," forming a closely-knit, cooperative family group. Pre-breeding numbers are generally reduced to either a pair with no helpers or families of three or four individuals (a pair plus one or two helpers). A well-developed intra-familial dominance hierarchy exists, with breeder males most dominant, followed by helper males, breeder females, and finally, female helpers (Woolfenden and Fitzpatrick 1977). Helpers participate in sentinel duties (McGowan and Woolfenden 1989), territorial defense, predator-mobbing, and the feeding of both nestlings (Stallcup and Woolfenden 1978) and fledglings (McGowan and Woolfenden 1990). The well-developed sentinel system involves having one individual occupying an exposed perch watching for predators or territory intruders. When a predator is observed, the sentinel jay gives a warning call and all group members seek cover in dense shrub vegetation (Fitzpatrick et al. 1991).

Florida scrub-jay pairs occupy year-round, multi-purpose territories (Woolfenden and Fitzpatrick 1984; Fitzpatrick et al. 1991, 1994). Territory size averages 22 to 25 acres, with a minimum size of about 12 acres. Territories are a limiting factor for scrub-jay populations. Because of this limitation, non-breeding adult males may remain at the natal territory as helpers for up to 5 years, waiting for either a mate or territory to become available (Fitzpatrick et al. 1991). New territories are established the following ways: by replacing a lost breeder on a territory (Woolfenden and Fitzpatrick 1984); through "territorial budding," where a helper male becomes a breeder in a segment of its natal territory (Woolfenden and Fitzpatrick 1978); by inheriting a natal territory following the death of a breeder; by establishing a new territory between existing territories (Woolfenden and Fitzpatrick 1984); or through "adoption" of an unrelated helper by a neighboring family followed by resident mate replacement (B. Toland, Service, personal communication, 1996). Territories can also be obtained by creation of suitable habitat through effective habitat management efforts (Thaxton and Hingtgen 1994).

Reproduction and Demography

To become a breeder, a scrub-jay must acquire a territory as well as a mate. Evidence presented by Woolfenden and Fitzpatrick (1984) suggests that scrub-jays are permanently monogamous. The pair retains ownership and sole breeding privileges in their particular territory year after year. Courtship to form the pair is lengthy and ritualized, and involves posturing and vocalizations made by the male to the female (Woolfenden and Fitzpatrick 1996b). Copulation between the pair is generally out of sight of other jays (Woolfenden and Fitzpatrick 1984). These authors also reported never observing copulation between unpaired jays, nor courtship behavior between a female and a jay other than her mate. Age at first breeding in the Florida scrub-jay varies from 1 to 7 years, although most individuals become breeders between 2 and 4 years of age (Fitzpatrick and Woolfenden 1988). Persistent breeding populations of scrub-jays exist only where there are scrub oaks in sufficient quantity to provide an ample winter acorn supply, cover from predators, and nest sites during the spring (Woolfenden and Fitzpatrick 1996b).

Florida scrub-jay nests are typically placed in shrubby oaks, at a height of 1 to 2 m (3 to 7 feet). Scrub oak and sand live oak is the preferred shrubs on the LWR (Woolfenden and Fitzpatrick 1984) and myrtle oak is favored on the Atlantic Coastal Ridge (Toland 1991). In suburban areas, scrub-jays nest in the same evergreen oak species as well as in introduced or exotic trees; however, they construct their nests in a significantly higher position in these oaks than when in natural scrub habitat (Bowman et al. 1996). Florida scrub-jay nests are an open cup, about 7 to 8 inches outside diameter, and 3 to 4 inches inside diameter. The outer basket is bulky and constructed of coarse twigs from oaks and other vegetation, and the inside is lined with tightly wound palmetto or cabbage palm fibers. There is no foreign material as may be present in a blue jay nest (Woolfenden and Fitzpatrick 1996b).

Nesting is synchronous, normally occurring from the beginning of March through the end of June (Woolfenden and Fitzpatrick 1990; Fitzpatrick et al. 1994). On the Atlantic Coastal Ridge, nesting may be protracted through the end of July. In suburban habitats, nesting is consistently initiated earlier (March and April) than in natural scrub habitat (Fleischer 1996).

Clutch sizes range from one to five eggs, but are typically three or four eggs. Clutch sizes are generally larger (up to six eggs) in suburban habitats, and the birds attempt to rear more broods per year (Fleischer 1996). Double brooding by as much as 20 percent has been documented on the Atlantic Coastal Ridge, compared to about 2 percent on the LWR. Scrub-jay eggs measure 1.1 inches by 0.8 inch (length by breath) (Woolfenden and Fitzpatrick 1996b), and coloration "varies from a pea green to pale glaucous green, blotched and spotted with irregularly shaped markings of cinnamon rufous and vinaceous cinnamon, these being heaviest about the larger end" (Bendire *in* Bent 1946). Eggs are incubated for 17 to 18 days and fledging occurs 16 to 21 days after hatching (Woolfenden 1974, 1978; Fitzpatrick et al. 1994). Only the breeding female incubates and broods eggs and nestlings (Woolfenden and Fitzpatrick 1984). Average production of young is two fledglings per pair per year (Woolfenden and Fitzpatrick 1990; Fitzpatrick et al. 1994) and the presence of helpers improves fledging success (Mumme 1992). Annual productivity must average at least two young fledged per pair for a population of scrub-jays to maintain long-term stability (Fitzpatrick et al. 1991). Data from Indian River County show that mean annual productivity declines significantly in suburban areas. Toland (1991) reported that productivity averaged 2.2 young fledged per pair in contiguous, optimal scrub; 1.8 young fledged per pair in fragmented, moderately developed scrub; 1.2 young per pair fledged in fragmented, suboptimal scrub; and only about 0.5 young per pair in residential lawns. Overall nest success (probability of fledging at least 1.0 young) is about 50 percent on the LWR and about 70 percent on the Atlantic Coastal Ridge in Indian River County.

Nesting failures are almost always caused by predation, most frequently by ground-based predators, including eastern coachwhip (*Masticophis flagellum*), eastern indigo snake, rat snake (*Elaphe obsoleta*), corn snake (*E. guttata*), raccoon (*Procyon lotor*), and domestic cat (*Felis catus*) (Fitzpatrick et al. 1991; Schaub et al. 1992).

Fledglings remain nutritionally dependent for about 10 weeks, during which time they are fed by both breeders and helpers (Woolfenden 1975; McGowan and Woolfenden 1990). Survival of scrub-jays from fledgling to the yearling age class averages 35 percent, while annual survival of adult males and females averages around 80 percent (Fitzpatrick et al. 1994). The maximum observed lifespan of a Florida scrub-jay is 15.5 years (Woolfenden and Fitzpatrick 1996b).

Dispersal

Scrub-jays are nonmigratory, sedentary, and permanently territorial. Juveniles remain in their natal territory for up to 5 years before dispersing to become breeders (Woolfenden and Fitzpatrick 1984). Once they pair and become breeders, generally within two territories of their natal ground, they remain on their breeding territory until death. In suitable habitat, fewer than 5 percent of scrub-jays disperse more than 5 miles (Fitzpatrick et al. 1994). All documented long-distance dispersals have been in unsuitable habitat such as woodland, pasture, or suburban plantations. Scrub-jay dispersal behavior is affected by the intervening landscape matrix. Protected scrub habitats will most effectively sustain scrub-jay subpopulations if they are located within a matrix of surrounding habitats that can be used and traversed by scrub-jays. Brushy pastures, scrubby corridors along railway and country road right-of-ways, and open, burned flatwoods provide links for colonization among scrub-jay subpopulations. Stith et al. (1996) believe that a dispersal distance of 5 miles is close to the biological maximum for scrub-jays.

Foraging

Scrub-jays forage mostly on or near the ground, often along the edges of natural or man-made openings. They visually search for food by hopping or running along the ground beneath the scrub or by jumping from shrub to shrub. Insects, particularly orthopteran and lepidopteran larvae, comprise the majority of the animal diet throughout most of the year (Woolfenden and Fitzpatrick 1984). Acorns are the most important plant food (Fitzpatrick et al. 1991). From August to November each year, scrub-jays may harvest and cache 6,000 to 8,000 acorns (DeGange et al. 1989). Acorns are typically buried 1/2 to 1 inch beneath the surface of bare sand in openings during fall, and retrieved and consumed in winter and early spring. On the Atlantic Coastal Ridge, acorns are frequently cached in pine trees, either in forks of branches, in the ends of pine boughs, under bark, or on epiphytic plants, between 1 to 30 feet in height. Other small nuts, fruits, and seeds are also eaten.

Vertebrate prey items comprise the minority of the diet, but may include a wide array of species weighing up to 0.9 ounces. Notable vertebrate prey species documented by Woolfenden and Fitzpatrick (1984) for scrub-jays on both the LWR and the Atlantic Coastal Ridge include the green treefrog (*Hyla cinerea*), squirrel treefrog (*H. squirella*), green anole (*Anolis carolinensis*), brown anole (*A. sagrei*), Florida scrub lizard (*Sceloporus woodi*), six-lined racerunner (*Cnemidophorus sexlineatus*), black racer (*Coluber constrictor*), peninsula crowned snake (*Tantilla relicta relicta*), rough green snake (*Opheodrys aestivus*), house mouse (*Mus musculus*), cotton mouse (*Peromyscus gossypinus*), oldfield mouse (*P.*

polionotus), and Florida mouse (*Podomys floridanus*). In suburban areas, scrub-jays will accept supplemental foods offered by humans, such as peanuts, corn, and sunflower seeds.

Population Dynamics – Stith et al. (1996) used a Geographic Information System (GIS) buffering procedure and 2.2-mile dispersal buffer to delineate 191 separate Florida scrub-jay subpopulations. Of these, 152 subpopulations (over 80 percent) contained fewer than 10 pairs of scrub-jays, 33 subpopulations contained between 10 to 99 pairs, and only 6 contained at least 100 pairs. The overall Florida population of scrub-jays is divided into five subregions, corresponding to the major sand deposits throughout the peninsula. Three of these subregions are considered "core populations" because they contain well over half of the State's remaining scrub-jays. These population cores occur at Merritt Island/Cape Canaveral Complex, Ocala NF, and on the southern LWR, and are respectively named the Atlantic coast subregion, the Ocala subregion, and the LWR subregion (Service 1999; Fitzpatrick et al. Unpublished Manuscript).

All existing scrub-jay populations outside of the three core population subregions consist of smaller subpopulations that are isolated to varying degrees (Fitzpatrick et al. Unpublished Manuscript). Along the Gulf coast from Levy County south to Lee County, scrub-jays historically occurred in a contiguous fourth major population: the Gulf coast subregion. Today, however, this population is divided into two subregions: the northern Gulf coast subregion and the southern Gulf coast subregion, because of the extensive amount of habitat fragmentation and loss that has occurred in Pinellas, Hillsborough, Pasco, and Hernando Counties (Fitzpatrick et al. 1994).

Status and Distribution – The Florida scrub-jay was federally listed as threatened in 1987 primarily because of habitat fragmentation, degradation, and loss (52 Federal Register [FR] 20715; Service 1987a). Scrub habitats associated with Florida's barrier islands, mainland coasts, and LWR are some of the most imperiled natural communities in the United States, with estimates of habitat loss since presettlement times ranging from 70 to more than 80 percent (Bergen 1994; Fitzpatrick et al. 1994). Historically, this vegetation occurred as large, continuous patches, some of them for over hundreds of miles (Cox 1987). Today, only relict patches of xeric oak scrub remain. Throughout the northern part of the range, population declines in scrub-jays are attributed to scrub fragmentation and degradation, due primarily to widespread fire suppression. Citrus conversion and residential development continue to be the most important factors causing the decline of scrub-jay populations in the southern extremes of their range (Fernald 1989; Fitzpatrick et al. 1991).

The decreasing trend of the Florida scrub-jay population is closely correlated with loss of scrub habitat. A statewide survey of scrub-jays conducted during 1992-1993 documented about 11,000 scrub-jays (approximately 4,000 pairs) as of 1993, extrapolating from the average scrub-jay group size of 2.8 individuals, and estimated that at least two-thirds of the population inhabits Federal lands (Fitzpatrick et al. 1994). This population estimate is no more than 15 percent of the pre-settlement population estimate and corresponds to a similar reduction in the distribution of scrub habitat. Half of all remaining scrub-jays occurred in Brevard County (1,232 families) and Highlands County (890 families) (Fitzpatrick et al.

1994). A total of 19 occupied counties contained 30 or fewer groups of scrub-jays. The greatest population decline has occurred during the last 10 to 12 years with an estimated 25 to 50 percent reduction in scrub-jay numbers (Fitzpatrick et al. 1994).

Countywide surveys of Brevard County and Charlotte County have revealed population declines. The 1992-1993 statewide survey estimated that on Federal lands within Brevard County there were 860 pairs of scrub-jays. Surveys from outside Federal lands estimate 276 breeding pairs were present (Fitzpatrick et al. 1994). The scrub-jay population estimate on non-Federal lands dropped to 185 pairs in 1999 (Toland 1999). A countywide survey in Charlotte County showed similar numbers of scrub-jays overall, from 134 families in 1992-1993 to 135 families in 2001 (Miller and Stith 2002). The appearance of stability in the Charlotte County survey may be due to a more intensive survey effort on private property during the recent survey. Some metapopulations, such as the one known as Tippecanoe, have shown a decline of 33 families with 75 individuals in 1992-1993 to 10 families with 35 individuals in 2001. During the 1992-1993 survey, the coastal western metapopulation was estimated at 51 families with 117 individuals. These numbers dropped to 35 families with 89 individuals in 2001 (Miller and Stith 2002).

Results from population viability analysis indicate that a population of jays with fewer than 10 breeding pairs has a 50 percent probability of extinction over 100 years. This improves to a 2 to 3 percent chance of extinction for populations with at least 100 pairs. Only the three subregion core populations currently have enough breeding pairs, each with a low quasi-extinction risk and an estimated 99 percent probability of survival over 100 years (Stith 1999).

Scrub-jays will inhabit suburban areas where patches of scrub remain. In central Florida, the highest densities of scrub-jays are in areas where development is 33 percent or less (Bowman 1998). Scrub-jay increases in human-modified habitat probably result from supplemental food sources (primarily peanuts) and the initial creation of openings in the scrub and visual buffers (buildings) to neighboring jay families. However, as human development increases toward buildout, the survivorship of fledgling jays declines and failed nesting attempts increase (Toland 1991). Females from suburban territories may have fewer opportunities to pair with single males, because most males in suburban areas gain territories through breeder replacement (Thaxton and Hingtgen 1996). In addition, the potential for males remaining as helpers to inherit suitable habitat in suburban areas is reduced when compared to protected areas. Resident males may be less likely to maintain any natal territory as a breeder in suburban areas (Thaxton and Hingtgen 1996).

Scrub-jay population numbers are also affected by the frequency and severity of catastrophic mortalities. Epidemic disease is the only known catastrophe that affects Florida scrub-jay populations (Fitzpatrick et al. 1991). Archbold Biological Station experienced an epidemic between September 1979 and February 1980 that killed 70 percent of the scrub-jays on that site; 11 years later the population had still not recovered to pre-epidemic numbers. The probability of such an epidemic occurring in the future should be considered, along with habitat quality and management, to better predict the future status of

scrub-jay populations in Florida. Root (1996) used spatially-explicit models to show that an annual epidemic rate 0.001 (1 in 1,000 years) produced quasi-extinction probabilities of at least 66 percent for scrub-jays in Brevard County, Florida, under optimal habitat conditions and no dispersal, and at least 52 percent when dispersal was allowed among her modeled populations. The addition of connectivity between populations can mitigate the effects of epidemics and should be an important component of reserve designs for conservation of scrub-jays.

Analysis of the species/critical habitat likely to be affected

The proposed action has the potential to adversely affect Florida scrub-jay adults, juveniles, nests, and hatchlings within and around the proposed project area. Potential effects include injury, mortality, habitat loss or degradation, and disturbance resulting from construction, operation, maintenance, and management of the proposed project.

Critical habitat has not been designated for this species; therefore, the proposed action will not result in the destruction or adverse modification of critical habitat.

Climate Change

Climate change is evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level, according to the Intergovernmental Panel on Climate Change Report (IPCC 2007). The IPCC Report describes changes in natural ecosystems with potential wide-spread effects on many organisms, including marine mammals and migratory birds. The potential for rapid climate change poses a significant challenge for fish and wildlife conservation. Species' abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the Department of the Interior (DOI) requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007).

Temperatures are predicted to rise from 2° C to 5° C (3.6° F - 9.0° F) for North America by the end of this century (IPCC 2007a,b). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing and distribution), storms (frequency and intensity), and sea level rise.

Climatic changes in Florida could amplify current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management. Global warming will be a particular challenge for endangered, threatened, and other "at risk" species. It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. The Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for

adjusting our management strategies in response to climate change (Service 2006). As the level of information increases concerning the effects of global climate change on sandhill and scrub communities, the Service will have a better basis to address the nature and magnitude of this potential threat and will more effectively evaluate these effects to the range-wide status of species occurring in these habitats.

ENVIRONMENTAL BASELINE

This section summarizes information on status and trends of the species specifically within the action area. These summaries provide the foundation for our assessment of the effects of the proposed action, as presented in the "Effects of the Action" section.

The environmental baseline includes the past and present impacts of all Federal, State, private actions, and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impacts of State or private actions, which are contemporaneous with the consultation in progress.

Status of the species within the action area

Florida scrub-jay- The Citrus-S.W. Marion metapopulation and population viability modeling suggests this metapopulation is at high risk of extinction or quasi-extinction (Stith 1999). Scrub-jays are found in this metapopulations are located in small isolated clusters in S.W. Marion and N.W. Sumter Counties. The lands comprising this metapopulations are mostly in private ownership, such as the Marion Oaks Subdivision. Eight Florida Scrub-jays have been observed along the right of way of the project area along the Levy to Central Florida South transmission line primarily south of Marion Oaks subdivision in Marion County and one scrub-jay found in Citrus County. Additionally, these birds are likely utilizing the scrub and xeric hammock on adjacent private and public property.

Factors affecting species environment within the action area

Scrub-jays evolved in a landscape matrix of nearly contiguous habitat patches that shifted in size and distribution in response to natural fire events. Habitat quality and the location of suitable habitat patches were dependent on periodic fires that retarded vegetative succession. Natural fire events created temporal, optimal, early-successional xeric vegetative communities that were exploited by scrub-jays.

Over the last 100 years, human occupation of central Florida resulted in direct habitat loss through land clearing, habitat fragmentation, and habitat degradation through fire suppression. These same factors continue to act synergistically against scrub-jays in this metapopulation. However, as scrub-jay populations become smaller and more isolated, the adverse demographic effects of urbanization influences may be magnified - small populations are more susceptible than larger populations.

Demographic modeling indicates that scrub-jays in this metapopulation are highly vulnerable to extinction and quasi-extinction risk (Stith, 1999) and there are few opportunities available to acquire and/or manage existing habitat to reduce these risks. The prognosis for the long-term survival of this metapopulation is not good because habitat quality will continue to decline on private property due to vegetative succession and development. There are few remaining public lands (Cross Florida Greenway) with suitable or potentially suitable habitat available for acquisition in this area. If habitat management expands to include all available suitable habitat on public lands, scrub-jays may persist in the metapopulation for some time, but they would still be vulnerable to disease and catastrophic events such as hurricanes.

Climate Change

Based on the present level of available information concerning the effects of global climate change on the status of the Florida scrub-jay, the Service acknowledges the potential for changes to occur in the action area, but presently has no basis to evaluate if or how these changes are affecting these species. Nor does our present knowledge allow the Service to project what the future effects from global climate change may be or the magnitude of these potential effects.

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the Florida scrub-jay, the supporting habitat, and its interrelated and interdependent activities.

Factors to be considered

The proposed transmission line corridor associated with this project will impact scrub-jay habitat along the right-of-way. Land clearing is typically one of the first measures undertaken in constructing a new utility line. Once native vegetation has been removed, suitability of the habitat along the right-of-way for scrub-jays use will be limited to foraging around the edges and will remain so throughout the construction period. Once completed, the site's value to the scrub-jay will depend on the remaining vegetation. The reduction or loss of scrub-jay habitat along the corridor will be permanent.

Analysis for effects of the action

PEF conducted scrub-jay surveys along all transmission line corridors where suitable habitat for scrub-jays was found. The survey found scrub-jays along the Levy to South Central Florida transmission line corridor. One scrub-jay was observed in Citrus County and seven more where observed south of Marion Oaks Subdivision in Marion County. Majority of the construction for this corridor will take place within the existing utility corridor. This project should just result in a minimal amount of scrub habitat impacted. Also, most of the scrub-jay territories will be found on the adjacent scrub habitat. Additional surveys will be

conducted within 2 years prior to the initiation of any land clearing or construction activities associated with any facilities included within the action area.

Beneficial Effects

Since the effects of this project may not take place for many years, additional surveys of this and other areas along the transmission lines may be needed prior to any construction activities. However, every measure will be taken to not impact scrub-jay habitat, but if occupied habitat can't be avoided, other conservation measures to offset the impacts will be taken, such as restoration of adjacent areas to provide suitable habitat will be discussed during our reinitiation of this biological opinion.

Direct Effects

The direct effect of the proposed project is the possible loss of occupied scrub-jay habitat along the Levy to South Central Florida transmission line. We do not believe that the amount of habitat potentially impacted would result in scrub-jays abandoning their territory. Large areas of intact scrub habitat are adjacent to this area and provide suitable habitat that make up most of their territory.

Indirect Effects

Scrub-jays are known to be killed due to collisions with cars. During clearing and construction operations, there will be an increase in vehicle traffic and a resulting increase in the risk of scrub-jay road mortality. This increase in risk is not measurable and expected to be minor.

Interrelated and Interdependent Actions

Interrelated or interdependent actions are not expected to result from the proposed action.

Species' response to the proposed action

The destruction of native scrub habitat is likely to have adverse effects to existing scrub-jays. The reduction in sheltering and nesting habitat will likely reduce adult survivorship, reproductive success, and/or juvenile survival and possibly lead to abandonment of the territory. Since other unoccupied, suitable habitat is known to exist within normal dispersal distance, it is likely that these families of scrub-jays will continue to survive in this territory.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

We anticipate that the loss of occupied scrub-jay habitat will occur within some portions of the action area. Future development proposed within occupied scrub-jay habitat should be addressed through either section 7 or section 10 of the ESA and is not addressed here. However, future development and its associated infrastructure will result in destruction of native vegetation that is not occupied by scrub-jays but may be used by birds dispersing from occupied habitat. In addition, future development will result in an increasing hostile environment surrounding occupied scrub-jay habitat. There will be more buildings, roads, and associated infrastructure, all of which have the potential to have indirect adverse effects on scrub-jays (e.g., increasing road mortality, decreasing habitat quality because of lack of fire, increased predation and competition from more urban adapted wildlife, etc.).

However, these cumulative effects are difficult to quantify because we cannot predict where or when they might occur and we cannot specifically attribute adverse impacts to any one particular project. In the future, these factors will probably work synergistically against scrub-jays within the Citrus- S.W. Marion metapopulations, however due to the minimal amount of loss of habitat this project may have we expect the impacts will have little effect to the metapopulation viability.

CONCLUSION

After reviewing the status of the scrub-jay, the environmental baseline for the action area, and the cumulative effects, it is the Service's biological opinion that the issuance of this ITS is not likely to jeopardize the continued existence of the scrub-jay throughout their range.

Limited mortality of Florida scrub-jay and their nests resulting from habitat loss will occur from the construction, operations, and maintenance of the proposed action. However, the loss of this habitat is not expected to appreciably affect the overall survival and recovery of this species. The Florida scrub-jay is not anticipated to be extirpated from the action area but will be confined to the suitable habitat remaining in the project area and the surrounding areas. The Florida scrub-jay also has some ability to move away from many situations that may result in direct injury or disturbance and has the ability to access adjacent habitat if escape opportunities are made available. The proposed action will not appreciably reduce the number, distribution, and reproduction of the Florida scrub-jay.

No critical habitat has been identified for the scrub-jay; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described in the BA and since used here, are nondiscretionary and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to the PEF, as appropriate, for the exemption in action 7(o)(2) to apply. The NRC and Corps have a continuing duty to regulate the activity covered by this incidental take statement. If the NRC and Corps (1) fail to assume and implement the terms and conditions or (2) fail to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the NRC and Corps must report the progress of the action and its impact on the species to itself as specified in the incidental take statement.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Based on the Applicant's survey results and available biological information at this time, the Service anticipates that a family of scrub-jays may be incidentally taken as a result of the destruction of its territory along the Levy to South Central Florida transmission line that will impact occupied scrub-jay habitat. However, due to the delay in construction of the transmission line, surveys should be conducted within 2 years prior to any land clearing or construction to determine if the amount or extent of take for this action has increased. This incidental take will be in the form of "harass." If scrub-jays are found and impacts cannot be avoided, minimization measures will be implemented by PEF.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

RESONABLE AND PRUDENT MEASURES/TERMS AND CONDITIONS

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action.

The action agency's BA includes methods to minimize on-site habitat disturbances and deal with unforeseen future circumstances. However, the Service has reviewed these measures and believes that the scrub-jay surveys mentioned in the BA should be conducted within 2

years of construction or any habitat modification that includes land clearing for this project. If scrub-jays are still observed within the action area appropriate conservation measures mentioned below should be implemented to minimize the level of incidental take impacts. Therefore, the measures described in BA are incorporated by reference into the Service's BO as required reasonable and prudent measures. The Service considers the following reasonable and prudent measures are necessary and minimize impacts of incidental take of Florida scrub-jays:

1. Avoid construction during the scrub-jay nesting season from March 1 through June 30 to the maximum extent practicable.

2. Notify the Service of any unauthorized take of scrub-jays during the construction of the proposed action.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the NRC and Corps must implement the measures as described in their BA in order to fulfill their responsibilities for complying with the terms and conditions of this BO. These include conducting threatened and endangered species surveys within 2 years of construction or any habitat modification that includes land clearing for this project. These terms and conditions are non-discretionary. To implement the above reasonable and prudent measures, the Service has outlined the following terms and conditions for incidental take. In accordance with the Interagency Cooperation Regulation (50 CFR 402), these terms and conditions must be complied with to implement the reasonable and prudent measures for incidental take:

1. If clearing of occupied scrub-jay habitat is to occur within the species' nesting season (typically March 1 through June 30), the areas must be surveyed prior to clearing to determine if there are any active scrub-jay nests located within the vegetation. If an active scrub-jay nest is located, to the maximum extent practicable, clearing activities must not take place within 150 feet of the nest site until nestlings have fledged or until it has been determined that the nest has failed.

2. Unauthorized take of scrub-jays associated with the proposed activity should be reported immediately to the Service's Jacksonville Field Office (904) 731-3336. If a dead scrub-jay is found on the project site, the specimen should be thoroughly soaked in water and frozen for later analysis.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the

purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat, to help implement recovery plans, or to develop information.

- Cooperate with Federal, State, or local research supporting implementation of recovery actions which may include long-term ecological monitoring on Florida scrub-jay, manatee, wood stork, and eastern indigo snakes in the project area.

- We recommend the applicants review and incorporate applicable management conservation recommendations and best management practices within the LNP site as well as other conservation lands identified in the wetland mitigation plan.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the cooperation of the NRC, Corps and applicant's environmental consultant during this consultation. If you have any questions regarding this biological opinion, please contact Annie Dziergowski (904) 731-3089.

Sincerely,

Heath Rau

for David L. Hankla
Field Supervisor

cc: FWC, Tallahassee, Ted Hoehn
Service, Vero Beach, Al Begazo
USACE, Jacksonville, Don Hambrick

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LITERATURE CITED

Abrahamson, W.G. 1984. Post-fire recovery of the Florida Lake Wales Ridge vegetation. American Journal of Botany 71: 9-21.

American Ornithologists' Union. 1983. Checklist of North American Birds. Sixth edition. Allan Press; Lawrence, Kansas.

Bancroft, G.T., and G.E. Woolfenden. 1982. The molt of scrub jays and blue jays in Florida. Ornithological Monograph Number 29. American Ornithologists' Union; Washington, D.C.

Bent, A.C. 1946. Life histories of North American jays, crows and titmice. U.S. National Museum Bulletin No. 191.

Bergen, S. 1994. Characterization of fragmentation in Florida scrub communities. Master's thesis. Florida Institute of Technology, Department of Biological Sciences; Melbourne, Florida.

Bowman, R.G. 1998. Population dynamics, demography, and contributions to metapopulation dynamics by suburban populations of the Florida scrub-jay, *Aphelocoma coerulescens*. Final Report, Project No. NG94-032. Archbold Biological Station, Lake Placid, Florida.

Bowman, R.G. Woolfenden, A.L. Fleischer, Jr., and L.M. Walton. 1996. Nest site selection by Florida scrub-jays in natural and modified habitats. Abstract, Archbold Biological Station 1996 Symposium. 12 September, 1996. Lake Placid, Florida.

Breininger, D.R., V.L. Larson, B.W. Duncan, R.B. Smith, D.M. Oddy, and M.F. Goodchild. 1995. Landscape patterns of Florida scrub jay habitat use and demographic success. Conservation Biology 9(6):1442-1453.

Breininger, D.R., V.L. Larson, B.W. Duncan, and R.B. Smith. 1998. Linking habitat suitability to demographic success in Florida scrub-jays. Wildlife Society Bulletin 26(1):118-128.

Cox, J.A. 1987. Status and distribution of the Florida scrub jay. Florida Ornithological Society Special Publication No. 3.

DeGange, A.R., J.W. Fitzpatrick, J.N. Layne, and G.E. Woolfenden. 1989. Acorn harvesting by Florida scrub jays. Ecology 70(2):348-356.

Fernald, R.T. 1989. Coastal xeric scrub communities of the Treasure Coast Region, Florida: A summary of their distribution and ecology, with guidelines for their preservation and management. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report Number 6. Tallahassee, Florida.

Fitzpatrick, J.W., and G. E. Woolfenden. 1988. Components of lifetime reproductive success in the Florida scrub jay. Pages 305-320 *in* T.H. Clutton-Brock, ed., Reproductive Success. University of Chicago Press; Chicago, Illinois.

Fitzpatrick, J.W., G.E. Woolfenden, and M.T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub jay (*Aphelocoma coerulescens coerulescens*). Florida Game and Freshwater Fish Comm. Nongame Wildlife Program Technical Report No. 8. Tallahassee, Florida

Fitzpatrick, J.W., R. Bowman, D.R. Breininger, M.A. O'Connell, B. Stith, J. Thaxton, B.R. Toland, and G.E. Woolfenden. Unpublished manuscript. Habitat conservation plans for the Florida scrub jay: a biological framework. Archbold Biological Station, Lake Placid, Florida.

Fitzpatrick, J.W., B. Pranty, and B. Stith. 1994. Florida scrub jay Statewide Map. 1992-1993. Archbold Biological Station. Lake Placid, Florida.

Fleischer, A.L., Jr. 1996. Pre-breeding time budgets of female Florida scrub-jays in natural and suburban habitats. Abstract, Archbold Biological Station 1996 Symposium. 12 September, 1996. Lake Placid, Florida.

Laessle, A.M. 1958. The origin and successional relationships of sandhill vegetation and sand pine scrub. Ecological Monographs 28:361-387.

Laessle, A.M. 1968. Relationships of sand pine scrub to former shore lines. Quarterly Journal of the Florida Academy of Science 30:269-286.

McGowan, K.J., and G.E. Woolfenden. 1989. A sentinel system in the Florida scrub jay. Animal Behavior 37:1000-1006.

McGowan, K.J., and G.E. Woolfenden. 1990. Contributions to fledgling feeding in the Florida scrub jay. Journal of Animal Ecology 59:691-707.

Miller, K.E. and B.M. Stith. 2002. Florida Scrub-jay distribution and habitat in Charlotte County. Center for Avian Conservation, Final Report. Contract No. 2001000116: Charlotte County scrub-jay survey.

Mumme, R.L. 1992. Do helpers increase reproductive success? An experimental analysis in the Florida scrub jay. Behavioral Ecology and Sociobiology 31:319-328.

Root, K.V. 1998. Population viability analysis for the Florida scrub-jay (*Aphelocoma coerulescens coerulescens*) in Brevard County, Florida. Ph.D. Dissertation, Florida Institute of Technology, Melbourne, Florida, May 1996.

Schaub, R., R.L. Mumme, and G.E. Woolfenden. 1992. Predation on the eggs and nestlings of Florida scrub jays. Auk. 109:585-593.

Stith, B.M. 1999. Metapopulation viability analysis of the Florida scrub-jay (*Aphelocoma coerulescens*): a statewide assessment. Final Report to the Endangered Species Office, U.S. Fish and Wildlife Service, Jacksonville, FL. Contract No. 1448-40181-98-M324.

Stith, B.M., J.W. Fitzpatrick, G.E. Woolfenden, and B. Pranty. 1996. Classification and conservation of metapopulations: a case study of the Florida scrub jay. Pages 187-215 *in* Metapopulations and wildlife conservation. Island Press; Washington, D.C.

Thaxton, J.E. and T.M. Hingtgen. 1996. Effects of suburbanization and habitat fragmentation on Florida scrub-jay dispersal. Florida Field Naturalist 24 (2):25-60.

Toland, B.R. 1991. Nest site characteristics of a Florida scrub jay population in Indian River County. Abstract. Florida scrub jay Workshop. May 23, 1991. Ormond Beach, Florida.

Toland, B.R. 1999. Current status and conservation recommendations for the Florida scrub-jay in Brevard County. Report to the Brevard County Board of County Commissioners. Brevard County Natural Resources Management Office, Viera, Florida.

U.S. Fish and Wildlife Service (Service). 1987a. Final Rule: determination of threatened status for Florida scrub-jay. Federal Register 52:20715-20719.

U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. Fish and Wildlife Service; Atlanta, Georgia.

Woolfenden, G.E. 1975. Florida scrub jay helpers at the nest. Auk 92:1-15.

Woolfenden, G.E. 1978. Growth and survival of young Florida scrub jays. Wilson Bulletin 90:1-18.

Woolfenden, G.E., and J.W. Fitzpatrick. 1977. Dominance in the Florida scrub jay. Condor 79:1-12.

Woolfenden, G.E., and J.W. Fitzpatrick. 1984. The Florida scrub jay: demography of a cooperative-breeding bird. Princeton University Press, Princeton, New Jersey

Woolfenden, G.E., and J.W. Fitzpatrick. 1986. Sexual asymmetries in the life histories of the Florida scrub jay. Pages 97-107 *in* D. Rubenstrin and R.W. Wrangham, eds. Ecological aspects of social evolution: birds and mammals. Princeton University Press, Princeton, New Jersey.

Woolfenden, G.E., and J.W. Fitzpatrick. 1990. Florida scrub jays: A synopsis after 18 years of study. Pages 241-266 *in* P.B. Stacey, and W.B. Koenig, eds. Cooperative breeding in birds. Cambridge University Press.

Woolfenden, G.E., and J.W. Fitzpatrick. 1996a. Florida scrub jay. Pages 267-280 *in* J. A. Rodgers, H. W. Kale, and H. T. Smith, eds. Rare and Endangered Biota of Florida, Volume V. Birds. University Presses of Florida; Gainesville, Florida.

Woolfenden, G.E., and J.W. Fitzpatrick. 1996b. Florida scrub-jay. Pages 1-27 *in* A. Poole and F. Gill, eds. The birds of North America, No.228. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union; Washington, D.C.

Appendix G

Supporting Socioeconomic Documentation

Appendix G

Supporting Socioeconomic Documentation

Transient population numbers and projections in Table G-1 and Table G-2, which apply to a 10-mi radius around the proposed site include people who work for major employers (more than 100 employees) within 10 mi of the proposed LNP site; migrant workers; guests in hotels, motels, or bed-and-breakfast establishments; people who have seasonal residences; visitors to recreation areas; and “special populations” – residents of schools, in-patients at hospitals and nursing homes, and inmates in correctional facilities. Transient population numbers in Table G-3 and Table G-4, which apply to the population between 10 and 50 mi around the proposed site, do not include workers for major employers because the region is presumed large enough so the number of people who commute in is balanced by those who commute out, nor “special populations” because it is presumed that the U.S. Census Bureau tabulates long-term residents of these facilities, while short-term residents generally live within the 50-mi region.

Table G-1. Population Distribution Among Sectors Within 10 mi of the LNP Site for the Year 2000

	km mi	0-1.6 0-1	1.6-3.2 1-2	3.2-4.8 2-3	4.8-6.4 3-4	6.4-8.1 4-5	8.1-16.1 5-10	Total for Sector
North-residential		0	5	35	67	18	11	136
North-transient		3	12	11	16	20	168	230
North-northeast-residential		0	4	14	14	8	270	310
North-northeast-transient		3	7	11	16	20	168	225
Northeast-residential		1	1	6	10	5	806	829
Northeast-transient		3	7	11	16	20	137	194
East-northeast-residential		1	0	0	0	4	1066	1071
East-northeast-transient		3	7	11	16	20	126	183
East-residential		1	2	2	0	11	2300	2316
East-transient		3	7	11	16	20	1234	1291
East-southeast-residential		2	7	11	45	90	2725	2880
East-southeast-transient		3	7	11	16	22	281	340
Southeast-residential		2	7	31	322	294	1582	2238
Southeast-transient		3	7	11	16	40	1187	1264
South-southeast-residential		2	7	27	48	277	2474	2835
South-southeast-transient		3	7	11	22	36	309	388
South-residential		2	7	13	16	44	1455	1537
South-transient		3	7	11	16	34	1004	1075
South-southwest-residential		2	5	49	419	33	102	610
South-southwest-transient		3	7	11	18	37	305	381
Southwest-residential		2	8	55	499	599	210	1373
Southwest-transient		3	7	11	16	30	1009	1076
West-southwest-residential		2	11	26	142	239	736	1156
West-southwest-transient		3	7	11	16	20	479	536
West-residential		1	5	3	7	22	8	46
West-transient		3	7	11	16	20	421	478
West-northwest-residential		0	2	4	4	1	6	17
West-northwest-transient		3	7	11	16	20	168	225
Northwest-residential		0	2	4	5	5	3	19
Northwest-transient		3	7	11	16	20	168	225
North-northwest-residential		0	2	22	18	35	7	84
North-northwest-transient		3	7	11	16	20	168	225
Residential total		18	75	302	1616	1685	13,761	17,457
Cumulative total (residential plus transient)		66	192	478	1880	2084	21,093	25,793

Source: PEF 2009
To account for the difference in distance between each LNP unit and the LNP centerpoint, 0.16 km (0.1 mi) was added to each radial distance to conservatively adjust the population data. The totals are subject to rounding differences.

Table G-2. Population Distribution Among Sectors Within 10 mi of the LNP Site Projected Through 2080

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
			North-Residential				
2005 Population	0	5	39	73	20	11	148
2010 Population	0	6	43	82	22	14	167
2015 Population	0	6	47	90	24	14	181
2020 Population	0	7	51	97	26	17	198
2030 Population	0	8	58	111	29	20	226
2040 Population	0	9	69	130	34	23	265
2050 Population	0	10	82	153	40	26	311
2060 Population	0	12	97	181	47	30	367
2070 Population	0	14	115	214	56	36	435
2080 Population	0	16	136	252	66	42	512
			North-Transient				
2005 Population	3	13	12	18	22	185	253
2010 Population	4	15	14	20	25	207	285
2015 Population	4	16	15	22	27	226	310
2020 Population	5	18	17	24	30	245	339
2030 Population	6	20	19	27	34	277	383
2040 Population	7	24	22	32	40	328	453
2050 Population	8	28	26	38	47	388	535
2060 Population	9	33	31	45	56	459	633
2070 Population	11	39	37	53	66	543	749
2080 Population	13	46	44	63	78	642	886
			North-Northeast-Residential				
2005 Population	0	4	15	15	9	297	340
2010 Population	0	5	17	17	9	327	375
2015 Population	0	5	18	18	10	356	407
2020 Population	0	6	20	20	10	384	440
2030 Population	0	7	22	22	11	434	496
2040 Population	0	8	26	26	13	511	584
2050 Population	0	9	30	31	15	600	685
2060 Population	0	11	35	36	17	706	805
2070 Population	0	13	41	42	20	832	948
2080 Population	0	15	48	49	23	979	1114
			North-Northeast-Transient				
2005 Population	3	8	12	18	22	192	255
2010 Population	4	9	14	20	25	217	289
2015 Population	4	10	15	22	27	240	318
2020 Population	5	11	17	24	30	263	350
2030 Population	6	12	19	27	34	301	399
2040 Population	7	14	22	32	40	366	481
2050 Population	8	17	26	38	47	445	581

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	45	56	541	702
2070 Population	11	24	37	53	66	658	849
2080 Population	13	28	44	63	78	800	1026
Northeast-Residential							
2005 Population	1	1	7	11	6	939	965
2010 Population	1	1	7	12	6	1060	1087
2015 Population	1	1	8	13	7	1168	1198
2020 Population	1	1	8	14	7	1304	1335
2030 Population	1	1	9	16	8	1515	1550
2040 Population	1	1	11	19	9	1859	1900
2050 Population	1	1	13	22	11	2292	2340
2060 Population	1	1	15	26	13	2842	2898
2070 Population	1	1	18	31	15	3513	3579
2080 Population	1	1	21	37	18	4345	4423
Northeast-Transient							
2005 Population	3	8	12	18	22	156	219
2010 Population	4	9	14	20	25	177	249
2015 Population	4	10	15	22	27	196	274
2020 Population	5	11	17	24	30	214	301
2030 Population	6	12	19	27	34	245	343
2040 Population	7	14	22	32	40	298	413
2050 Population	8	17	26	38	47	362	498
2060 Population	9	20	31	45	56	440	601
2070 Population	11	24	37	53	66	535	726
2080 Population	13	28	44	63	78	650	876
East-Northeast-Residential							
2005 Population	1	0	0	0	4	1255	1260
2010 Population	1	0	0	0	5	1443	1449
2015 Population	1	0	0	0	5	1609	1615
2020 Population	1	0	0	0	6	1786	1793
2030 Population	1	0	0	0	7	2071	2079
2040 Population	1	0	0	0	8	2576	2585
2050 Population	1	0	0	0	9	3207	3217
2060 Population	1	0	0	0	11	4006	4018
2070 Population	1	0	0	0	13	4999	5013
2080 Population	1	0	0	0	15	6235	6251
East-Northeast-Transient							
2005 Population	3	8	12	18	22	144	207
2010 Population	4	9	14	20	25	163	235
2015 Population	4	10	15	22	27	180	258
2020 Population	5	11	17	24	30	197	284
2030 Population	6	12	19	27	34	225	323
2040 Population	7	14	22	32	40	274	389
2050 Population	8	17	26	38	47	333	469

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	45	56	405	566
2070 Population	11	24	37	53	66	492	683
2080 Population	13	28	44	63	78	598	824
East-Residential							
2005 Population	1	2	2	0	12	2706	2723
2010 Population	1	2	2	0	13	3111	3129
2015 Population	1	2	2	0	14	3472	3491
2020 Population	1	2	2	0	15	3845	3865
2030 Population	1	2	2	0	17	4446	4468
2040 Population	1	2	2	0	20	5537	5562
2050 Population	1	2	2	0	23	6909	6937
2060 Population	1	2	2	0	27	8617	8649
2070 Population	1	2	2	0	32	10,749	10,786
2080 Population	1	2	2	0	38	13,411	13,454
East-Transient							
2005 Population	3	8	12	18	22	1400	1463
2010 Population	4	9	14	20	25	1577	1649
2015 Population	4	10	15	22	27	1734	1812
2020 Population	5	11	17	24	30	1891	1978
2030 Population	6	12	19	27	34	2151	2249
2040 Population	7	14	22	32	40	2592	2707
2050 Population	8	17	26	38	47	3123	3259
2060 Population	9	20	31	45	56	3763	3924
2070 Population	11	24	37	53	66	4534	4725
2080 Population	13	28	44	63	78	5463	5689
East-Southeast-Residential							
2005 Population	2	8	12	50	99	3045	3216
2010 Population	2	9	14	55	111	3396	3587
2015 Population	2	10	15	60	121	3692	3900
2020 Population	2	11	17	65	132	4005	4232
2030 Population	2	12	19	73	150	4505	4761
2040 Population	2	14	22	86	177	5324	5625
2050 Population	2	17	26	102	209	6302	6658
2060 Population	2	20	31	120	246	7466	7885
2070 Population	2	24	37	143	291	8870	9367
2080 Population	2	28	44	168	344	10,514	11,100
East-Southeast-Transient							
2005 Population	3	8	12	18	24	319	384
2010 Population	4	9	14	20	27	359	433
2015 Population	4	10	15	22	29	395	475
2020 Population	5	11	17	24	32	430	519
2030 Population	6	12	19	27	36	489	589
2040 Population	7	14	22	32	43	589	707
2050 Population	8	17	26	38	51	710	850

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	45	60	855	1020
2070 Population	11	24	37	53	71	1030	1226
2080 Population	13	28	44	63	84	1241	1473
			Southeast-Residential				
2005 Population	2	8	34	356	331	1759	2490
2010 Population	2	9	38	395	367	1964	2775
2015 Population	2	10	41	432	399	2126	3010
2020 Population	2	11	45	468	431	2315	3272
2030 Population	2	12	52	529	484	2604	3683
2040 Population	2	14	61	622	573	3062	4334
2050 Population	2	17	71	734	678	3609	5111
2060 Population	2	20	84	867	802	4260	6035
2070 Population	2	24	99	1023	949	5039	7136
2080 Population	2	28	117	1208	1123	5944	8422
			Southeast-Transient				
2005 Population	3	8	12	18	45	1333	1419
2010 Population	4	9	14	20	50	1482	1579
2015 Population	4	10	15	22	55	1613	1719
2020 Population	5	11	17	24	59	1745	1861
2030 Population	6	12	19	27	67	1961	2092
2040 Population	7	14	22	32	79	2320	2474
2050 Population	8	17	26	38	93	2745	2927
2060 Population	9	20	31	45	110	3248	3463
2070 Population	11	24	37	53	130	3843	4098
2080 Population	13	28	44	63	154	4547	4849
			Southeast-Residential				
2005 Population	2	8	30	53	311	2766	3170
2010 Population	2	9	32	59	345	3082	3529
2015 Population	2	10	35	64	376	3352	3839
2020 Population	2	11	37	69	406	3628	4153
2030 Population	2	12	42	77	455	4078	4666
2040 Population	2	14	50	90	538	4815	5509
2050 Population	2	17	58	106	638	5691	6512
2060 Population	2	20	68	125	755	6728	7698
2070 Population	2	24	81	147	893	7964	9111
2080 Population	2	28	95	173	1056	9411	10,765
			South-Southeast-Transient				
2005 Population	3	8	12	24	40	347	434
2010 Population	4	9	14	27	45	386	485
2015 Population	4	10	15	29	49	420	527
2020 Population	5	11	17	32	53	454	572
2030 Population	6	12	19	36	60	510	643
2040 Population	7	14	22	43	71	603	760
2050 Population	8	17	26	51	84	713	899

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	60	99	844	1063
2070 Population	11	24	37	71	117	999	1259
2080 Population	13	28	44	84	138	1182	1489
			South-Residential				
2005 Population	2	8	14	17	49	1627	1717
2010 Population	2	9	16	19	53	1807	1906
2015 Population	2	10	17	20	57	1966	2072
2020 Population	2	11	19	22	62	2126	2242
2030 Population	2	12	22	25	69	2388	2518
2040 Population	2	14	26	29	81	2817	2969
2050 Population	2	17	30	33	95	3327	3504
2060 Population	2	20	35	39	110	3928	4134
2070 Population	2	24	42	46	129	4648	4891
2080 Population	2	28	50	53	152	5492	5777
			South-Transient				
2005 Population	3	8	12	18	38	1128	1207
2010 Population	4	9	14	20	42	1254	1343
2015 Population	4	10	15	22	46	1365	1462
2020 Population	5	11	17	24	50	1476	1583
2030 Population	6	12	19	27	56	1658	1778
2040 Population	7	14	22	32	66	1962	2103
2050 Population	8	17	26	38	78	2321	2488
2060 Population	9	20	31	45	92	2746	2943
2070 Population	11	24	37	53	109	3249	3483
2080 Population	13	28	44	63	129	3844	4121
			South-Southwest-Residential				
2005 Population	2	6	53	460	36	112	669
2010 Population	2	6	61	515	39	124	747
2015 Population	2	7	66	561	42	134	812
2020 Population	2	7	73	610	45	145	882
2030 Population	2	8	83	690	50	164	997
2040 Population	2	9	98	816	57	192	1174
2050 Population	2	11	115	965	66	224	1383
2060 Population	2	13	135	1138	77	261	1626
2070 Population	2	15	160	1345	90	310	1922
2080 Population	2	18	189	1587	105	362	2263
			South-Southwest-Transient				
2005 Population	3	8	12	20	41	343	427
2010 Population	4	9	14	22	46	381	476
2015 Population	4	10	15	24	50	415	518
2020 Population	5	11	17	26	54	449	562
2030 Population	6	12	19	29	61	505	632
2040 Population	7	14	22	34	72	597	746
2050 Population	8	17	26	40	85	706	882

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	47	101	835	1043
2070 Population	11	24	37	56	119	988	1235
2080 Population	13	28	44	66	141	1169	1461
Southwest-Residential							
2005 Population	2	9	60	551	661	236	1519
2010 Population	2	10	67	615	737	263	1694
2015 Population	2	11	72	670	803	287	1845
2020 Population	2	12	79	731	869	309	2002
2030 Population	2	14	89	826	983	347	2261
2040 Population	2	17	105	973	1160	410	2667
2050 Population	2	20	123	1148	1368	484	3145
2060 Population	2	24	145	1359	1614	573	3717
2070 Population	2	28	170	1605	1906	679	4390
2080 Population	2	33	199	1895	2251	803	5183
Southwest-Transient							
2005 Population	3	8	12	18	33	1133	1207
2010 Population	4	9	14	20	37	1260	1344
2015 Population	4	10	15	22	40	1372	1463
2020 Population	5	11	17	24	44	1483	1584
2030 Population	6	12	19	27	50	1666	1780
2040 Population	7	14	22	32	59	1971	2105
2050 Population	8	17	26	38	70	2332	2491
2060 Population	9	20	31	45	83	2759	2947
2070 Population	11	24	37	53	98	3264	3487
2080 Population	13	28	44	63	116	3862	4126
West-Southwest-Residential							
2005 Population	2	13	29	155	264	811	1274
2010 Population	2	13	32	174	296	907	1424
2015 Population	2	15	35	189	323	986	1550
2020 Population	2	15	38	206	353	1074	1688
2030 Population	2	17	43	233	401	1211	1907
2040 Population	2	20	51	275	473	1428	2249
2050 Population	2	24	60	325	557	1686	2654
2060 Population	2	28	71	382	660	1991	3134
2070 Population	2	33	84	451	780	2355	3705
2080 Population	2	39	99	532	918	2780	4370
West-Southwest-Transient							
2005 Population	3	8	12	18	22	533	596
2010 Population	4	9	14	20	25	594	666
2015 Population	4	10	15	22	27	648	726
2020 Population	5	11	17	24	30	702	789
2030 Population	6	12	19	27	34	791	889
2040 Population	7	14	22	32	40	936	1051
2050 Population	8	17	26	38	47	1107	1243

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	45	56	1309	1470
2070 Population	11	24	37	53	66	1548	1739
2080 Population	13	28	44	63	78	1831	2057
			West-Residential				
2005 Population	1	5	3	7	25	9	50
2010 Population	1	6	3	8	27	9	54
2015 Population	1	6	3	8	30	10	58
2020 Population	1	7	3	9	32	10	62
2030 Population	1	8	3	10	36	11	69
2040 Population	1	9	3	11	41	12	77
2050 Population	1	10	3	12	49	14	89
2060 Population	1	12	3	13	57	16	102
2070 Population	1	14	3	15	67	18	118
2080 Population	1	16	3	17	79	21	137
			West-Transient				
2005 Population	3	8	12	18	22	464	527
2010 Population	4	9	14	20	25	518	590
2015 Population	4	10	15	22	27	566	644
2020 Population	5	11	17	24	30	614	701
2030 Population	6	12	19	27	34	694	792
2040 Population	7	14	22	32	40	821	936
2050 Population	8	17	26	38	47	971	1107
2060 Population	9	20	31	45	56	1148	1309
2070 Population	11	24	37	53	66	1358	1549
2080 Population	13	28	44	63	78	1606	1832
			West-Northwest-Residential				
2005 Population	0	2	4	4	1	7	18
2010 Population	0	2	5	4	1	7	19
2015 Population	0	2	5	4	1	8	20
2020 Population	0	2	6	4	1	8	21
2030 Population	0	2	7	4	1	9	23
2040 Population	0	2	8	4	1	11	26
2050 Population	0	2	9	4	1	13	29
2060 Population	0	2	11	4	1	15	33
2070 Population	0	2	13	4	1	18	38
2080 Population	0	2	15	4	1	21	43
			West-Northwest-Transient				
2005 Population	3	8	12	18	22	185	248
2010 Population	4	9	14	20	25	207	279
2015 Population	4	10	15	22	27	226	304
2020 Population	5	11	17	24	30	245	332
2030 Population	6	12	19	27	34	277	375
2040 Population	7	14	22	32	40	328	443
2050 Population	8	17	26	38	47	388	524

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	45	56	459	620
2070 Population	11	24	37	53	66	543	734
2080 Population	13	28	44	63	78	642	868
Northwest-Residential							
2005 Population	0	2	4	6	6	3	21
2010 Population	0	2	5	6	6	3	22
2015 Population	0	2	5	7	7	3	24
2020 Population	0	2	6	7	7	3	25
2030 Population	0	2	7	8	8	3	28
2040 Population	0	2	8	9	9	3	31
2050 Population	0	2	9	11	11	3	36
2060 Population	0	2	10	13	13	3	41
2070 Population	0	2	12	15	15	3	47
2080 Population	0	2	14	18	18	3	55
Northwest-Transient							
2005 Population	3	8	12	18	22	185	248
2010 Population	4	9	14	20	25	207	279
2015 Population	4	10	15	22	27	226	304
2020 Population	5	11	17	24	30	245	332
2030 Population	6	12	19	27	34	277	375
2040 Population	7	14	22	32	40	328	443
2050 Population	8	17	26	38	47	388	524
2060 Population	9	20	31	45	56	459	620
2070 Population	11	24	37	53	66	543	734
2080 Population	13	28	44	63	78	642	868
North-Northwest-Residential							
2005 Population	0	2	24	20	39	8	93
2010 Population	0	2	27	22	43	8	102
2015 Population	0	2	29	24	47	9	111
2020 Population	0	2	32	26	51	9	120
2030 Population	0	2	36	30	58	10	136
2040 Population	0	2	42	35	69	11	159
2050 Population	0	2	49	41	81	13	186
2060 Population	0	2	58	49	96	15	220
2070 Population	0	2	68	58	113	17	258
2080 Population	0	2	80	68	133	20	303
North-Northwest-Transient							
2005 Population	3	8	12	18	22	185	248
2010 Population	4	9	14	20	25	207	279
2015 Population	4	10	15	22	27	226	304
2020 Population	5	11	17	24	30	245	332
2030 Population	6	12	19	27	34	277	375
2040 Population	7	14	22	32	40	328	443
2050 Population	8	17	26	38	47	388	524

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
2060 Population	9	20	31	45	56	459	620
2070 Population	11	24	37	53	66	543	734
2080 Population	13	28	44	63	78	642	868
			2005 Population				
Residential Total	18	63	330	1778	1873	15,591	19,673
Cumulative Total (Residential plus transient)	66	216	522	2074	2314	23,823	29,015
			2010 Population				
Residential Total	18	91	369	1983	2080	17,525	22,066
Cumulative Total (Residential plus transient)	82	241	593	2312	2577	26,721	32,526
			2015 Population				
Residential Total	18	99	398	2160	2266	19,192	24,133
Cumulative Total (Residential plus transient)	82	273	676	2702	2993	30,756	37,482
			2020 Population				
Residential Total	18	107	436	2348	2453	20,968	26,330
Cumulative Total (Residential plus transient)	98	290	708	2742	3045	31,866	38,749
			2030 Population				
Residential Total	18	119	494	2654	2767	23,816	29,868
Cumulative Total (Residential plus transient)	114	319	798	3097	3437	36,120	43,885
			2040 Population				
Residential Total	18	137	582	3125	3263	28,591	35,716
Cumulative Total (Residential plus transient)	130	371	934	3650	4053	43,232	52,370
			2050 Population				
Residential Total	18	161	680	3687	3851	34,400	42,797
Cumulative Total (Residential plus transient)	146	444	1096	4310	4782	51,820	62,598
			2060 Population				
Residential Total	18	189	800	4352	4546	41,457	51,362
Cumulative Total (Residential plus transient)	162	522	1296	5089	5651	62,186	74,906

Table G-2. (contd)

	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.1 km (4-5 mi)	8.1-16.1 km (5-10 mi)	Total for Sector
			2070 Population				
Residential Total	18	222	945	5139	5370	50,050	61,744
Cumulative Total (Residential plus transient)	194	621	1537	6008	6674	74,720	89,754
			2080 Population				
Residential Total	18	258	1112	6061	6340	60,383	74,172
Cumulative Total (Residential plus transient)	226	724	1816	7093	7882	89,744	107,485

Source: PEF 2009

To account for the difference in distance between each LNP unit and the LNP centerpoint, 0.16 km (0.1 mi) was added to each radial distance to conservatively adjust the population data. The totals are subject to rounding differences.

Table G-3. Population Distribution Among Sectors Between 10 and 50 mi of the LNP Site for the Year 2000

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
North-residential	637	5551	8364	11,512	26,064
North-transient	141	267	303	845	1556
North-northeast-residential	2646	77,541	21,826	156,599	188,825
North-northeast-transient	146	323	3560	3251	7280
Northeast-residential	2242	3503	11,136	6797	23,678
Northeast-transient	306	748	986	706	2746
East-northeast-residential	7762	32,043	58,111	6919	104,835
East-northeast-transient	473	1716	3219	1384	6792
East-residential	5920	34,574	65,253	17,122	122,869
East-transient	2383	771	1242	1451	5847
East-southeast-residential	6607	5148	22,170	60,649	94,574
East-southeast-transient	975	1239	1701	4065	7980
Southeast-residential	24,287	28,151	11,061	17,376	80,875
Southeast-transient	1333	3370	2159	3959	10,821
South-southeast-residential	17,636	11,629	25,828	18,790	73,883
South-southeast-transient	3082	1978	2650	5179	12,889
South-residential	10,602	4087	31,161	90,824	136,674
South-transient	8684	1567	1708	1174	13,133
South-southwest-residential	199	0	0	0	199
South-southwest-transient	330	27	0	0	357
Southwest-residential	0	0	0	0	0
Southwest-transient	3	0	0	0	3
West-southwest-residential	0	0	0	0	0
West-southwest-transient	0	0	0	0	0
West-residential	0	510	0	0	510
West-transient	7	233	0	0	240
West-northwest-residential	2	1093	476	238	1809
West-northwest-transient	74	1453	380	101	2008
Northwest-residential	62	726	1202	5258	7248
Northwest-transient	141	234	4152	3168	7695
North-northwest-residential	453	907	11,875	8811	22,046
North-northwest-transient	141	234	1841	1394	3610
Residential total	79,055	135,676	268,463	400,895	884,089
Cumulative total (residential plus transient)	97,274	149,836	292,364	427,572	967,046

Source: PEF 2009
To account for the difference in distance between each LNP unit and the LNP centerpoint, 0.16 km (0.1 mi.) was added to each radial distance to conservatively adjust the population data. The totals are subject to rounding differences.

Table G-4. Population Distribution Among Sectors Between 10 and 50 mi of the LNP Site Projected Through 2080

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		North-Residential			
2005 Population	696	6109	9260	12,757	28,822
2010 Population	778	6805	10,173	13,966	31,722
2015 Population	844	7414	10,945	15,017	34,220
2020 Population	918	8049	11,758	16,050	36,775
2030 Population	1038	9096	13,018	17,691	40,843
2040 Population	1219	10,713	15,105	20,465	47,502
2050 Population	1430	12,620	17,534	23,699	55,283
2060 Population	1685	14,873	20,402	27,469	64,429
2070 Population	1989	17,558	23,755	31,863	75,165
2080 Population	2343	20,697	27,702	37,001	87,743
		North-Transient			
2005 Population	155	295	336	941	1727
2010 Population	174	324	375	1049	1922
2015 Population	190	350	409	1142	2091
2020 Population	206	375	443	1235	2259
2030 Population	233	416	498	1386	2533
2040 Population	276	483	588	1636	2983
2050 Population	326	561	695	1931	3513
2060 Population	385	651	821	2280	4137
2070 Population	455	756	970	2691	4872
2080 Population	538	877	1146	3177	5738
		North-Northeast-Residential			
2005 Population	2907	8580	24,118	172,975	208,580
2010 Population	3251	9586	26,129	187,350	226,316
2015 Population	3530	10,474	27,859	199,699	241,562
2020 Population	3850	11,387	29,588	212,061	256,886
2030 Population	4355	12,883	32,213	230,725	280,176
2040 Population	5133	15,253	36,690	262,668	319,744
2050 Population	6042	18,080	41,795	299,001	364,918
2060 Population	7123	21,425	47,622	340,460	416,630
2070 Population	8425	25,413	54,270	387,657	475,765
2080 Population	9936	30,128	61,850	441,450	543,364

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		North-Northeast-Transient			
2005 Population	166	364	4017	3591	8138
2010 Population	189	407	4489	3889	8974
2015 Population	209	444	4901	4145	9699
2020 Population	229	482	5314	4402	10,427
2030 Population	262	542	5981	4789	11,574
2040 Population	319	645	7118	5453	13,535
2050 Population	388	768	8471	6209	15,836
2060 Population	472	914	10,081	7070	18,537
2070 Population	574	1088	11,997	8051	21,710
2080 Population	698	1295	14,277	9168	25,438
		Northeast-Residential			
2005 Population	2532	4119	13,003	7531	27,185
2010 Population	2859	4740	14,828	8225	30,652
2015 Population	3144	5291	16,445	8821	33,701
2020 Population	3444	5847	18,120	9438	36,849
2030 Population	3937	6766	20,829	10,392	41,924
2040 Population	4756	8443	25,723	12,019	50,941
2050 Population	5745	10,535	31,812	13,945	62,037
2060 Population	6962	13,147	39,387	16,226	75,722
2070 Population	8437	16,408	48,790	18,919	92,554
2080 Population	10,225	20,483	60,488	22,127	113,323
		Northeast-Transient			
2005 Population	349	853	1125	784	3111
2010 Population	396	967	1258	858	3479
2015 Population	438	1068	1373	921	3800
2020 Population	479	1170	1488	984	4121
2030 Population	548	1339	1671	1084	4642
2040 Population	666	1628	1995	1251	5540
2050 Population	810	1979	2382	1444	6615
2060 Population	985	2406	2844	1667	7902
2070 Population	1197	2925	3395	1925	9442
2080 Population	1455	3556	4053	2222	11,286

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		East-Northeast-Residential			
2005 Population	9139	37,729	68,427	8144	123,439
2010 Population	10,515	43,428	78,736	9372	142,051
2015 Population	11,732	48,506	87,958	10,461	158,657
2020 Population	12,998	53,635	97,213	11,572	175,418
2030 Population	15,045	62,086	112,532	13,397	203,060
2040 Population	18,741	77,482	140,456	16,713	253,392
2050 Population	23,383	96,733	175,374	20,865	316,355
2060 Population	29,195	120,782	219,002	26,060	395,039
2070 Population	36,436	150,808	273,471	32,537	493,252
2080 Population	45,490	188,343	341,558	40,628	616,019
		East-Northeast-Transient			
2005 Population	557	2021	3791	1630	7999
2010 Population	641	2326	4363	1876	9206
2015 Population	716	2598	4874	2096	10,284
2020 Population	791	2871	5384	2315	11,361
2030 Population	915	3323	6231	2679	13,148
2040 Population	1143	4150	7782	3346	16,421
2050 Population	1428	5183	9719	4179	20,509
2060 Population	1783	6473	12,138	5219	25,613
2070 Population	2227	8084	15,160	6518	31,989
2080 Population	2781	10,096	18,934	8141	39,952
		East-Residential			
2005 Population	6969	40,704	76,846	20,245	144,764
2010 Population	8016	46,848	88,407	23,363	166,634
2015 Population	8930	52,316	98,764	26,154	186,164
2020 Population	9920	57,861	109,196	28,954	205,931
2030 Population	11,502	66,987	126,408	33,592	238,489
2040 Population	14,318	83,611	157,718	42,125	297,772
2050 Population	17,856	104,384	196,898	52,874	372,012
2060 Population	22,303	130,355	245,866	66,396	464,920
2070 Population	27,834	162,766	306,976	83,374	580,950
2080 Population	34,755	203,267	383,384	104,772	726,178

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		East-Transient			
2005 Population	2806	908	1463	1845	7022
2010 Population	3230	1045	1683	2211	8169
2015 Population	3608	1167	1880	2537	9192
2020 Population	3986	1290	2077	2863	10,216
2030 Population	4613	1493	2404	3411	11,921
2040 Population	5761	1865	3002	4559	15,187
2050 Population	7195	2329	3749	6094	19,367
2060 Population	8986	2909	4682	8146	24,723
2070 Population	11,223	3633	5848	10,889	31,593
2080 Population	14,017	4537	7304	14,555	40,413
		East-Southeast-Residential			
2005 Population	7417	6044	30,162	77,446	121,069
2010 Population	8240	6907	37,235	93,326	145,708
2015 Population	8985	7692	43,698	107,638	168,013
2020 Population	9725	8503	50,197	121,952	190,377
2030 Population	10,948	9832	61,330	146,236	228,346
2040 Population	12,968	12,226	87,177	197,776	310,147
2050 Population	15,370	15,272	124,127	267,851	422,620
2060 Population	18,228	19,165	176,938	363,253	577,584
2070 Population	21,672	24,087	252,557	493,502	791,818
2080 Population	25,729	30,373	360,879	671,463	1,088,444
		East-Southeast-Transient			
2005 Population	1122	1524	2092	5170	9908
2010 Population	1269	1789	2457	6194	11,709
2015 Population	1400	2019	2773	7107	13,299
2020 Population	1530	2250	3090	8020	14,890
2030 Population	1745	2632	3614	9556	17,547
2040 Population	2122	3396	4664	12,774	22,956
2050 Population	2580	4382	6019	17,075	30,056
2060 Population	3137	5655	7767	22,824	39,383
2070 Population	3815	7297	10,023	30,509	51,644
2080 Population	4639	9416	12,934	40,781	67,770

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		Southeast-Residential			
2005 Population	27,227	31,575	14,057	23,351	96,210
2010 Population	30,230	35,046	16,755	28,631	110,662
2015 Population	32,895	38,145	19,220	33,461	123,721
2020 Population	35,570	41,256	21,687	38,329	136,842
2030 Population	39,943	46,325	25,894	46,649	158,811
2040 Population	47,205	54,781	35,184	65,801	202,971
2050 Population	55,815	64,795	48,181	93,089	261,880
2060 Population	65,976	76,599	66,413	132,007	340,995
2070 Population	78,078	90,668	92,129	187,654	448,529
2080 Population	92,322	107,229	128,494	267,238	595,283
		Southeast-Transient			
2005 Population	1497	3785	2637	4920	12,839
2010 Population	1664	4208	3078	5800	14,750
2015 Population	1812	4581	3458	6580	16,431
2020 Population	1959	4954	3838	7359	18,110
2030 Population	2201	5567	4465	8655	20,888
2040 Population	2604	6587	5709	11,280	26,180
2050 Population	3081	7794	7300	14,701	32,876
2060 Population	3645	9222	9334	19,160	41,361
2070 Population	4313	10,911	11,935	24,972	52,131
2080 Population	5103	12,910	15,260	32,546	65,819
		South-Southeast-Residential			
2005 Population	19,789	13,060	29,743	21,737	84,329
2010 Population	21,986	14,517	33,501	24,551	94,555
2015 Population	23,922	15,806	36,884	27,085	103,697
2020 Population	25,890	17,101	40,267	29,613	112,871
2030 Population	29,091	19,220	45,838	33,764	127,913
2040 Population	34,403	22,743	55,568	41,102	153,816
2050 Population	40,687	26,917	67,368	50,040	185,012
2060 Population	48,121	31,856	81,674	60,924	222,575
2070 Population	56,946	37,724	99,063	74,205	267,938
2080 Population	67,351	44,652	120,152	90,388	322,543

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		South-Southeast-Transient			
2005 Population	3462	2251	3016	6041	14,770
2010 Population	3848	2520	3376	6847	16,591
2015 Population	4189	2759	3697	7574	18,219
2020 Population	4530	2999	4017	8301	19,847
2030 Population	5090	3392	4543	9493	22,518
2040 Population	6022	4065	5444	11,639	27,170
2050 Population	7125	4871	6524	14,270	32,790
2060 Population	8430	5837	7818	17,496	39,581
2070 Population	9974	6995	9368	21,451	47,788
2080 Population	11,801	8382	11,226	26,300	57,709
		South-Residential			
2005 Population	11,888	4582	35,916	105,711	158,097
2010 Population	13,188	5095	40,462	119,626	178,371
2015 Population	14,369	5545	44,592	132,217	196,723
2020 Population	15,521	6006	48,655	144,817	214,999
2030 Population	17,430	6754	55,404	165,460	245,048
2040 Population	20,597	7985	67,206	202,504	298,292
2050 Population	24,352	9441	81,528	247,823	363,144
2060 Population	28,775	11,175	98,894	303,355	442,199
2070 Population	34,057	13,242	120,027	371,408	538,734
2080 Population	40,260	15,679	145,678	454,841	656,458
		South-Transient			
2005 Population	9754	1783	1969	1369	14,875
2010 Population	10,843	1996	2220	1552	16,611
2015 Population	11,804	2186	2445	1717	18,152
2020 Population	12,765	2375	2670	1882	19,692
2030 Population	14,343	2686	3039	2152	22,220
2040 Population	16,970	3219	3688	2638	26,515
2050 Population	20,078	3857	4475	3234	31,644
2060 Population	23,756	4622	5430	3965	37,773
2070 Population	28,107	5539	6589	4861	45,096
2080 Population	33,255	6638	7996	5960	53,849

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		South-Southwest-Residential			
2005 Population	222	0	0	0	222
2010 Population	246	0	0	0	246
2015 Population	267	0	0	0	267
2020 Population	288	0	0	0	288
2030 Population	323	0	0	0	323
2040 Population	380	0	0	0	380
2050 Population	447	0	0	0	447
2060 Population	527	0	0	0	527
2070 Population	622	0	0	0	622
2080 Population	734	0	0	0	734
		South-Southwest-Transient			
2005 Population	371	30	0	0	401
2010 Population	412	34	0	0	446
2015 Population	449	37	0	0	486
2020 Population	485	40	0	0	525
2030 Population	545	45	0	0	590
2040 Population	645	53	0	0	698
2050 Population	763	63	0	0	826
2060 Population	903	75	0	0	978
2070 Population	1068	89	0	0	1157
2080 Population	1264	105	0	0	1369
		Southwest-Residential			
2005 Population	0	0	0	0	0
2010 Population	0	0	0	0	0
2015 Population	0	0	0	0	0
2020 Population	0	0	0	0	0
2030 Population	0	0	0	0	0
2040 Population	0	0	0	0	0
2050 Population	0	0	0	0	0
2060 Population	0	0	0	0	0
2070 Population	0	0	0	0	0
2080 Population	0	0	0	0	0

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		Southwest-Transient			
2005 Population	3	0	0	0	3
2010 Population	4	0	0	0	4
2015 Population	4	0	0	0	4
2020 Population	5	0	0	0	5
2030 Population	6	0	0	0	6
2040 Population	7	0	0	0	7
2050 Population	8	0	0	0	8
2060 Population	9	0	0	0	9
2070 Population	11	0	0	0	11
2080 Population	13	0	0	0	13
		West-Southwest-Residential			
2005 Population	0	0	0	0	0
2010 Population	0	0	0	0	0
2015 Population	0	0	0	0	0
2020 Population	0	0	0	0	0
2030 Population	0	0	0	0	0
2040 Population	0	0	0	0	0
2050 Population	0	0	0	0	0
2060 Population	0	0	0	0	0
2070 Population	0	0	0	0	0
2080 Population	0	0	0	0	0
		West-Southwest-Transient			
2005 Population	0	0	0	0	0
2010 Population	0	0	0	0	0
2015 Population	0	0	0	0	0
2020 Population	0	0	0	0	0
2030 Population	0	0	0	0	0
2040 Population	0	0	0	0	0
2050 Population	0	0	0	0	0
2060 Population	0	0	0	0	0
2070 Population	0	0	0	0	0
2080 Population	0	0	0	0	0

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		West-Residential			
2005 Population	0	561	0	0	561
2010 Population	0	625	0	0	625
2015 Population	0	681	0	0	681
2020 Population	0	740	0	0	740
2030 Population	0	836	0	0	836
2040 Population	0	982	0	0	982
2050 Population	0	1158	0	0	1158
2060 Population	0	1365	0	0	1365
2070 Population	0	1608	0	0	1608
2080 Population	0	1893	0	0	1893
		West-Transient			
2005 Population	8	257	0	0	265
2010 Population	9	287	0	0	296
2015 Population	10	314	0	0	324
2020 Population	11	340	0	0	351
2030 Population	12	385	0	0	397
2040 Population	14	455	0	0	469
2050 Population	17	538	0	0	555
2060 Population	20	636	0	0	656
2070 Population	24	752	0	0	776
2080 Population	28	889	0	0	917
		West-Northwest-Residential			
2005 Population	2	1206	528	261	1997
2010 Population	2	1340	582	291	2215
2015 Population	2	1461	630	313	2406
2020 Population	2	1584	684	344	2614
2030 Population	2	1793	763	384	2942
2040 Population	2	2116	892	446	3456
2050 Population	2	2493	1039	517	4051
2060 Population	2	2943	1219	608	4772
2070 Population	2	3474	1423	709	5608
2080 Population	2	4096	1664	826	6588

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
West-Northwest-Transient					
2005 Population	82	1602	421	112	2217
2010 Population	91	1789	467	124	2471
2015 Population	99	1955	508	134	2696
2020 Population	108	2121	549	145	2923
2030 Population	122	2399	618	162	3301
2040 Population	144	2837	727	190	3898
2050 Population	170	3355	856	223	4604
2060 Population	201	3967	1007	261	5436
2070 Population	238	4691	1185	306	6420
2080 Population	281	5547	1395	358	7581
Northwest-Residential					
2005 Population	67	801	1321	5843	8032
2010 Population	75	892	1476	6451	8894
2015 Population	82	973	1608	6994	9657
2020 Population	88	1058	1746	7540	10,432
2030 Population	101	1197	1970	8435	11,703
2040 Population	117	1414	2323	9871	13,725
2050 Population	137	1668	2735	11,551	16,091
2060 Population	162	1970	3222	13,531	18,885
2070 Population	191	2329	3802	15,839	22,161
2080 Population	224	2752	4479	18,542	25,997
Northwest-Transient					
2005 Population	155	258	4598	3523	8534
2010 Population	174	288	5104	3889	9455
2015 Population	190	315	5555	4215	10,275
2020 Population	206	341	6005	4541	11,093
2030 Population	233	386	6755	5080	12,454
2040 Population	276	456	7950	5950	14,632
2050 Population	326	539	9357	6969	17,191
2060 Population	385	637	11,012	8163	20,197
2070 Population	455	753	12,960	9562	23,730
2080 Population	538	890	15,253	11,200	27,881

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
North-Northwest-Residential					
2005 Population	501	998	13,160	9828	24,487
2010 Population	556	1115	14,811	11,031	27,513
2015 Population	606	1217	16,248	12,078	30,149
2020 Population	659	1323	17,729	13,144	32,855
2030 Population	745	1496	20,175	14,914	37,330
2040 Population	877	1767	24,076	17,804	44,524
2050 Population	1034	2084	28,734	21,248	53,100
2060 Population	1217	2463	34,322	25,379	63,381
2070 Population	1441	2911	41,008	30,318	75,678
2080 Population	1695	3438	48,992	36,241	90,366
North-Northwest-Transient					
2005 Population	155	258	2049	1551	4013
2010 Population	174	288	2299	1741	4502
2015 Population	190	315	2520	1908	4933
2020 Population	206	341	2741	2076	5364
2030 Population	233	386	3112	2357	6088
2040 Population	276	456	3710	2810	7252
2050 Population	326	539	4422	3350	8637
2060 Population	385	637	5271	3993	10,286
2070 Population	455	753	6283	4760	12,251
2080 Population	538	890	7490	5674	14,592
2005 Population					
Residential Total	89,356	156,068	316,541	465,829	1,027,794
Cumulative Total (Residential plus transient)	109,998	172,257	344,055	497,306	1,123,616
2010 Population					
Residential Total	99,942	176,944	363,095	526,183	1,166,164
Cumulative Total (Residential plus transient)	123,060	195,212	394,264	562,213	1,274,749
2015 Population					
Residential Total	109,308	195,521	404,851	579,938	1,289,618
Cumulative Total (Residential plus transient)	134,616	215,629	439,244	620,014	1,409,503

Table G-4. (contd)

	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)	Total for Sector
		2020 Population			
Residential Total	118,873	214,350	446,840	633,814	1,413,877
Cumulative Total (Residential plus transient)	146,369	236,299	484,456	677,937	1,545,061
		2030 Population			
Residential Total	134,460	245,271	516,374	721,639	1,617,744
Cumulative Total (Residential plus transient)	165,561	270,262	559,305	772,443	1,767,571
		2040 Population			
Residential Total	160,716	299,516	648,118	889,294	1,997,644
Cumulative Total (Residential plus transient)	197,961	329,811	700,495	952,820	2,181,087
		2050 Population			
Residential Total	192,300	366,180	817,125	1,102,503	2,478,108
Cumulative Total (Residential plus transient)	236,921	402,938	881,094	1,182,182	2,703,135
		2060 Population			
Residential Total	230,276	448,118	1,034,961	1,375,668	3,089,023
Cumulative Total (Residential plus transient)	283,758	492,759	1,113,166	1,475,912	3,365,595
		2070 Population			
Residential Total	276,130	548,996	1,317,271	1,727,985	3,870,382
Cumulative Total (Residential plus transient)	340,266	603,262	1,412,984	1,854,480	4,210,992
		2080 Population			
Residential Total	331,066	673,030	1,685,320	2,185,517	4,874,933
Cumulative Total (Residential plus transient)	408,015	739,058	1,802,588	2,345,599	5,295,260

Source: PEF 2009
To account for the difference in distance between each LNP unit and the LNP centerpoint, 0.16 km (0.1 mi) was added to each radial distance to conservatively adjust the population data. The totals are subject to rounding differences.

Table G-5. Regional Employment and Earnings by Industry

	Region[a]								
	1990[b]			2000[b]			2005[c]		
Industry	Number of Jobs	Percent of Total	Total Earnings, $[d]	Number of Jobs	Percent of Total	Total Earnings, $[d]	Number of Jobs	Percent of Total	Total Earnings, $[d]
Farming	7728	2.8	86,101	8842	2.3	113,952	8304	1.9	105,201
Agricultural services, forestry, fishing	4967	1.8	67,699	5635	1.5	130,179	3637	0.8	110,094
Mining	947	0.3	19,680	663	0.2	23,355	873	0.2	37,083
Construction	18,589	6.6	410,574	24,185	6.4	622,438	39,022	8.9	1,255,192
Manufacturing	19,140	6.8	484,215	23,419	6.2	859,613	19,150	4.4	892,384
Transportation and public utilities	9153	3.3	289,191	13,053	3.5	557,050	6947	1.6	372,452
Wholesale trade	9008	3.2	220,159	9930	2.6	344,654	10,634	2.4	463,248
Retail trade	54,459	19.5	675,486	72,599	19.2	1,210,890	56,352	12.8	1,340,936
Finance, insurance, and real estate	19,294	6.9	239,869	26,870	7.1	766,545	35,878	8.2	871,835
Services	73,755	26.3	1,427,258	114,319	30.3	2,871,800	170,304	38.8	4,794,559
Government and government enterprises	61,725	22.1	1,687,955	75,286	19.9	2,782,314	77,017	17.5	3,788,924
Regional Total	279,701		5,618,630	377,752		10,309,374	439,252		14,295,215

Table G-5. (contd)

Industry	Region[a] 1990[b] Number of Jobs	1990[b] Percent of Total	1990[b] Total Earnings, $[d]	2000[b] Number of Jobs	2000[b] Percent of Total	2000[b] Total Earnings, $[d]	2005[c] Number of Jobs	2005[c] Percent of Total	2005[c] Total Earnings, $[d]
Levy County									
Farming	741	8.9	12,945	1003	8.5	24,204	855	6.0	24,294
Agricultural services, forestry, fishing	NA	NA	6384	585	5.0	12,488	NA	NA	20,985
Mining	NA	NA	77	NA	NA	139	NA	NA	NA
Construction	672	8.0	12,319	1168	9.9	28,437	1393	9.8	36,329
Manufacturing	444	5.3	7965	432	3.7	11,430	839	5.9	29,938
Transportation and public utilities	282	3.4	7326	519	4.4	17,436	NA	NA	10,549
Wholesale trade	186	2.2	3980	NA	NA	NA	364	2.6	10,292
Retail trade	1701	20.3	19,814	2368	20.1	33,813	1766	12.4	38,880
Finance, insurance, and real estate	623	7.4	5198	744	6.3	12,440	1087	7.7	17,617
Services	1583	18.9	19,075	2488	21.1	41,560	3857	27.2	82,105
Government and government enterprises	1555	18.6	38,061	2032	17.2	67,412	2172	15.3	87,421
Levy County Total	8368		137,911	11,802		261,921	14,185		370,863
Citrus County									
Farming	358	1.2	90	404	1.0	2189	403	0.8	2303
Agricultural services, forestry, fishing	585	1.9	5941	668	1.6	10,721	365	0.7	4338
Mining	86	0.3	1576	77	0.2	1889	88	0.2	2296
Construction	3045	10.1	64,428	3718	8.9	95,653	5872	11.9	170,098

Table G-5. (contd)

Industry	Region[a] 1990[b] Number of Jobs	Percent of Total	Total Earnings, $[d]	2000[b] Number of Jobs	Percent of Total	Total Earnings, $[d]	2005[c] Number of Jobs	Percent of Total	Total Earnings, $[d]
Manufacturing	985	3.3	18,696	1685	4.0	49,598	910	1.8	25,312
Transportation and public utilities	2477	8.2	106,516	2603	6.2	164,728	NA	NA	14,225
Wholesale trade	492	1.6	8568	771	1.8	20,392	910	1.8	30,648
Retail trade	6872	22.8	81,982	8449	20.3	126,601	7217	14.6	166,682
Finance, insurance, and real estate	2491	8.2	18,483	3773	9.1	77,103	5061	10.2	82,545
Services	8966	29.7	160,981	15,160	36.4	331,517	21,803	44.1	569,403
Government and government enterprises	3846	12.7	93,350	4382	10.5	151,349	4807	9.7	205,174
Citrus County Total	30,203		560,611	41,690		1,031,740	49,471		1,408,781
Marion County									
Farming	2966	3.6	32,675	3183	2.8	40,187	2880	2.1	33,743
Agricultural services, forestry, fishing	2116	2.6	27,810	3210	2.8	60,396	2541	1.9	58,580
Mining	197	0.2	4953	206	0.2	6193	288	0.2	11,226
Construction	6131	7.4	144,175	8151	7.2	215,114	12,987	9.6	439,855
Manufacturing	10,289	12.5	250,068	12,054	10.6	441,145	10,080	7.5	486,880

Table G-5. (contd)

	Region[a]								
	1990[b]			2000[b]			2005[c]		
Industry	Number of Jobs	Percent of Total	Total Earnings, $[d]	Number of Jobs	Percent of Total	Total Earnings, $[d]	Number of Jobs	Percent of Total	Total Earnings, $[d]
Transportation and public utilities	2368	2.9	61,550	4303	3.8	152,508	3646	2.7	143,895
Wholesale trade	4587	5.6	119,555	4205	3.7	147,606	4512	3.3	196,915
Retail trade	16,881	20.5	221,878	23,082	20.4	416,595	19,619	14.5	498,141
Finance, insurance, and real estate	5807	7.0	75,601	8603	7.6	249,745	12,212	9.0	312,175
Services	19,190	23.3	358,774	30,581	27.0	770,045	49,614	36.7	1,388,613
Government and government enterprises	11,958	14.5	299,781	15,697	13.9	562,047	16,675	12.3	707,111
Marion County Total	82,490		1,596,820	113,275		3,055,581	135,054		4,277,134

Source: PEF 2009 using data from Bureau of Economic Analysis, U.S. Department of Commerce.

(a) Although the 50 mi region includes Pasco, Lake, and Putnam counties, these counties were not included in these data because only very small portions of these counties fall within the region.

(b) Employment estimates and earnings are based on the 1987 Standard Industrial Classification (SIC) system.

(c) Employment estimates and earnings are based on the 2002 North American Industry Classification System (NAICS). These industry classifications vary slightly from the SIC system, and therefore have been regrouped into the SIC system. Affected classifications for the 2005 employment and earnings estimates include the following: the transportation and public utilities classification includes the NAICS warehousing classification; the services classification includes the NAICS Information, professional and technical services, management of companies and enterprises, administrative and waste services, educational services, health care and social assistance, arts, entertainment, and recreation, accommodation and food services, and other services, except public administration, classifications.

(d) Estimated earnings are in thousands of dollars.

Some employment and earnings estimates for individual industry classifications may not represent accurate totals because some industry estimates include confidential (unreported) numbers, and industries with less than 10 jobs or $50,000 in earnings were not reported in individual industry estimates; however, the all-industry total number of jobs and all-industry total earnings include these estimates.

NA = Data not available.

Table G-6. Citrus, Levy, and Marion County Expenditures and Revenues by Category

Citrus County	2006, $[a]	2007, $[b]	2008, $[b]
County Revenues by Category			
Ad valorem taxes	67,624,568	82,903,323	82,249,144
Other taxes	7,964,164	9,435,671	8,424,261
Licenses and permits	4,235,986	3,988,937	2,862,016
Intergovernmental revenue	22,968,183	14,862,007	13,872,288
Charges for services	27,968,379	22,964,235	30,619,269
Fines and forfeitures	127,468	72,400	169,124
Miscellaneous revenues	28,252,575	20,036,354	20,122,903
Other non operating revenue	5,149,840	2,040,000	1,660,000
Statutory revenues	--	(7,716,222)	(7,971,867)
Sub-total	164,291,163	148,586,705	152,007,138
Cash carry forward	--	60,919,219	107,254,576
Interfund transfers	16,543,309	15,390,656	18,884,533
Total	180,834,472	224,896,580	278,146,247
County Expenditures by Category			
Personal services	57,364,498	63,283,860	66,877,252
Operating expenses	51,430,335	49,681,825	56,406,659
Capital outlay	29,317,996	37,606,541	64,683,646
Grants in aid	2,113,818	2,089,167	2,263,589
Debt service	4,850,730	7,740,652	15,018,529
Sub-total	145,077,377	160,402,045	205,249,675
Budgeted reserves	--	45,453,302	49,752,180
Interfund transfers	16,637,778	19,041,233	23,144,392
Total	161,715,155	224,896,580	278,146,247

Levy County	2006, $
Total County Revenues by Category	
Taxes	18,227,533
Licenses and permits	383,737
Intergovernmental revenues	9,778,043
Charges for services	5,534,382
Fines and forfeitures	331,477
Miscellaneous revenues	4,627,448
Total revenues	38,882,620
Total County Expenditures by Category	
General government	7,364,869
Public safety	15,825,754
Physical education	484,352

Table G-6. (contd)

Levy County	2006, $
Transportation	5,745,654
Economic environment	643,891
Human services	1,384,155
Culture/recreation	1,167,066
Court related	1,333,507
Capital outlay	506,306
Debt service	
Principal	484,155
Interest	317,063
Total Expenditures	35,056,772
Marion County	**2007-2008, $**
Total County Revenues by Type	
Property taxes	130,386,669
Other taxes	17,309,507
Licenses and permits	5,531,850
Inter-governmental revenues	48,208,397
Charges for services	61,062,195
Fines and forfeitures	1,274,235
Miscellaneous revenues	18,326,534
Impact fees	31,885,770
Special assessments	39,454,674
Administrative transfers	898,416
Debt proceeds	15,899,867
Balances forward	196,347,010
Total Budgeted Revenues	566,585,124
Total County Expenditures by Function	
General government	118,803,705
Debt service	7,546,745
Public safety	154,023,361
Physical environment	66,469,111
Human services	22,878,263
Transportation	100,196,518
Culture/recreation	21,888,857
Court related expenditures	24,142,293
Reserves	50,636,271
Total Budgeted Expenditures	566,585,124

Source: PEF 2009, based on data from Levy County Clerk of Court, Citrus County Board of Commissioners, and Marion County Budget

(a) Actual budget for fiscal year (FY) 2006.

(b) Adopted budget for FY 2007 and FY 2008.

G.1 References

Progress Energy Florida, Inc. (PEF). 2009. Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage. Revision 1, St. Petersburg, Florida. Accession No. ML092860995.

Appendix H

Authorizations, Permits, and Certifications

Appendix H

Authorizations, Permits, and Certifications

This appendix contains a list of environmental-related authorizations, permits, and certifications potentially required by Progress Energy Florida, Inc. (PEF) from Federal, State, regional, local, and affected Native American Tribal agencies related to the combined construction permits and operating licenses (COLs) for the proposed new nuclear Units 1 and 2 at the Levy Nuclear Plant (LNP) site in Levy County, Florida. The table is based on Table 1.2-1 of the Environmental Report (ER), Revision 1, submitted on October 2, 2009 by PEF to the U.S. Nuclear Regulatory Commission (NRC).

Table H-1. Federal, State, and Local Environmental Permits and Authorizations

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
		Federal			
NRC	Construction and safety review of the site.	Combined License	--[a]	--[a]	10 CFR 52.97
NRC	Approval for construction and operation of nuclear power plant.	Combined License	--[a]	--[a]	10 CFR 50.10
NRC	Possession of source material.	Source Material License	--[a]	--[a]	10 CFR 40.3
NRC	Possession of Special Nuclear Material.	Special Nuclear Material License	--[a]	--[a]	10 CFR 70.3
NRC	Possession of fuel.	By-Product License	--[a]	--[a]	10 CFR 30.3
NRC	Operation of units.	License to Operate	--[a]	--[a]	10 CFR 52
NRC	Above-grade fills within the 100-year floodplain.	Floodplain Construction Compliance	--[a]	--[a]	Executive Order 11988
U.S. Army Corps of Engineers, Jacksonville District (USACE)	Activities involving the discharge of dredged or fill material into waters of the United States.	Section 404 Permit[c]	--[a]	--[a]	CWA 33 CFR 320.1
USACE	Activities involving work in navigable waters.	Section 10 – Rivers and Harbors Act Permit	--[a]	--[a]	33 USC 403
U.S. Department of Transportation	Hazardous materials shipments.	USDOT Registration	--[a]	--[a]	49 USC 5108
U. S. Environmental Protection Agency (EPA)	Requires SPCC Plan outlining containment and countermeasures for oil storage. May require Facility Response Plan.	Oil Terminal Facility Registration	--[a]	--[a]	40 CFR 112
EPA	Aggregate oil storage in aboveground tanks >1320 gallons or any single tank >660 gallons.	SPCC Plan	--[a]	--[a]	40 CFR 112

Table H-1. (contd)

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
Federal Aviation Administration (FAA)[b]	Construction of structures affecting air navigation.	Construction Notice	--[a]	--[a]	49 USC 44718
FAA, Southeast Region, Atlanta, Georgia; other regions as appropriate. Coordinate with Florida Department of Transportation (FDOT).	Stack construction within airspace for approach to airport.	FAA Stack Height Waiver	--[a]	--[a]	14 CFR 77.21, FS §333.025
U.S. Fish and Wildlife Service (FWS)	Construction in areas where threatened and endangered species or critical habitat could be impacted as a result of the construction and/or operation of the proposed facility.	Endangered Species Act, Bald and Golden Eagle Protection Act	--[a]	--[a]	16 USC 703-712, 16 USC 668a-d
FWS	Incidental taking of a protected species.	Incidental Take Permit	--[a]	--[a]	50 CFR 17.21
National Marine Fisheries Service	Provides for the protection of fishery resources and essential fish habitat.	Magnuson-Stevens Act/Fisheries Management Plan	--[a]	--[a]	16 USC 1851
State					
All State, regional, and local permits (except certain local zoning/building permits) are covered under the Power Plant Siting Act (PPSA) Certification. It is not necessary to apply for most of these permits individually, but they are listed below for informational purposes. Those Federal permit program requirements that are delegated to the State and require individual permit applications to be submitted as part of the Site Certification Application (SCA) are shown in bold italics. The issuing agency remains the applicable State agency, although the delegating Federal agency is noted in the Issuing Agency column of the table.					

Table H-1. (contd)

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
Florida Department of Environmental Protection (FDEP)	Above-grade fills within the 100-year floodplain.	Floodplain Construction Compliance (Part of Site Certification)	PA08-51	NA	Chapter 40D-4 FAC
Federal Emergency Management Agency	Post-construction Flood Insurance Rate Map flood map change.	Letter of Map Revision	--[(a)]	--[(a)]	44 CFR 65.5(a)
Florida Historical Commission	Construction in an area where historic or archeological resources may be affected.	Compliance with the National Historic Preservation Act	--[(a)]	--[(a)]	Chapter 267, FAC
FDEP	Construction of a power plant with more than 75 MW of steam generated power and associated facilities.	Power Plant Certification	PA08-51	NA	FS § 403.519 Chapter 62-17
FDEP	Required for projects on sovereign submerged lands.	Sovereign Submerged Lands Lease or Easement	--[(a)]	--[(a)]	Chapter 18-21, FAC
FDEP	Required for projects that affect surface waters, wetlands, or sovereign submerged lands. FDEP coordinates review with other State agencies to address natural resource and cultural resource issues.	ERP (Part of Site Certification)	PA08-51	NA	Chapter 40D-4, FAC
FDEP, EPA Region IV review	Required for all generators, transporters, as well as the disposal of hazardous waste.	Florida Notification of Regulated Waste Activity/Regulation Standards	--[(a)]	--[(a)]	Chapter 62-730, FAC
FDEP	Construction and operation of facilities generating air emissions.	State Construction Permit for Air Emission Facilities	PSC-FL-403	01/01/2018	Chapter 62-4.210, FAC

Table H-1. (contd)

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
FDEP, EPA Region IV review	Construction and operation of facilities generating air emissions.	Prevention of Significant Deterioration Construction Permit	PSC-FL-403	01/01/2018	Chapter 62-212, FAC
FDEP, EPA Region IV review	Operation of facilities generating air emissions.	Title V Operating Permit	--[(a)]	--[(a)]	Chapter 62-213, FAC
FDEP, EPA Region IV review	Not Applicable	Phase II Acid Rain Permit/Acid Rain Compliance Plan	--[(a)]	--[(a)]	Chapter 62-214, FAC
FDEP	Projects with potential to impact waters of the state.	Section 401 Water Quality Certification (CWA)(Part of Site Certification)	PA08-51	N/A	Chapter 62-4, FAC
FDEP	Projects requiring Section 404/10 permitting. Conducted in conjunction with ERP process.	Compliance with Fish and Wildlife Coordination Act	--[(a)]	--[(a)]	FS § 373.4144
FDEP, EPA Region IV review	Discharge of wastewater, cooling water, etc. to surface waters.	NPDES Permit for wastewater discharge. Compliance with CWA Section 316a		--[(a)]	FS § 403.0885
FDEP, EPA Region IV review	Intake of makeup water, addresses the impingement and entrainment impacts of cooling water intakes on biological populations.	NPDES Permit, Compliance with 316b	--[(a)]	--[(a)]	40 CFR 125, Subpart I
FDEP	Construction of any facility that disturbs 1 acre or more.	NPDES Construction Stormwater Permit; requires Surface Water Management and Sediment Control Plans	Generic	--[(a)]	Chapters 62-25, 62-40 FAC
FDEP, EPA Region IV review	Operation of an industrial facility.	NPDES Operating Stormwater Permit for Industrial Activities		--[(a)]	Chapter 62-621, FAC

Table H-1. (contd)

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
FDEP	Under the CWA, industrial facilities have to prepare an SWP3 as part of the stormwater NPDES permit.	SWP3	--[(a)]	--[(a)]	Chapter 62-330.200, FAC
FDEP, Water Management District	Consumptive withdrawal of surface or groundwater.	Water Use Permit (Part of Site Certification)	PA08-51	NA	40D-2, FAC
FDEP, Water Management District	Required if dewatering is required for construction.	Dewatering Permit (Part of Site Certification)	PA08-51	NA	40D-2, FAC
FDEP, Water Management District	Construction of water wells.	Well Construction Permit	--[(a)]	--[(a)]	40D-3, FAC
FDEP	Management of onsite stormwater.	Surface Water Management/Erosion and Sediment Control Plan required (Part of Site Certification)	PA08-51	NA	Chapter 62.40, FAC
FDEP- Local Branch	Construction of any facility that disturbs 5 acres or more.	Erosion & Sedimentation Control Plan (Part of Site Certification)	PA08-51	NA	Chapter 62.40, FAC
FDEP	Construction of transmission lines and substation.	Electric and Magnetic Fields Standards (Part of Site Certification)	PA08-51	NA	FS § 403.521, et seq. Chapter 62-814, FAC
FDEP	Approval for use of uplands.	Easement	--[(a)]	--[(a)]	Chapter 18-2, FAC
FDEP	Approval for use of uplands	Easement for Barge Slip and Intake	31959	12/23/2080	Chapter 18-2, FAC
FDEP	Aboveground oil storage tanks.	Aboveground Storage Tank Registration	--[(a)]	--[(a)]	FS § 376.323

Table H-1. (contd)

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
FDOT	Connect to State Roadway	Driveway Permit	--[a]	--[a]	Chapter 14-96 and 14-97, FAC
Florida Game and Freshwater Fish Conservation Commission	Incidental taking of a protected species.	Incidental Take Permit	--[a]	--[a]	Chapter 68A-27, FAC
Florida Public Service Commission	Reviews the appropriateness of the proposed project and issues a "determination of need."	Electrical Transmission Line (as Associated Facility under PPSA)	Order No. PSC-08-0518-FOF-EI[)]	--[a]	FS § 350.001 et seq.
Florida Department of Community Affairs	Determines project consistency with coastal zone management plan.	Coastal Zone Consistency Determination (Part of Site Certification)	PA08-51	--[a]	FS § 380.23
Local					
All State, regional, and local permits (except certain local zoning/building permits) are covered under the PPSA Certification. It may be necessary to apply for these permits individually as required by the government agency.					
City, County, or Municipal District	New water and sewer connections (if available).	Water and Sewer Connection	--[a,d]	--[a,d]	TBD[d]
City, County, or Municipal District	Required if land is not zoned appropriately for project or to address local zoning requirements that apply specifically to this type of facility.	Zoning/Land Use Compliance	--[a,d]	--[a,d]	TBD
Levy County	Required for connection of driveway to public roads.	Driveway Permit	--[a,d]	--[a,d]	TBD
Levy County	Above-grade fills within the 100-year floodplain.	Floodplain Construction Compliance (Part of Site Certification)	PA08-51	NA	Levy County Code of Ordinances – Chapter 50 Article VI

Table H-1. (contd)

Issuing Agency	Activity	Permit/Authorization	License Number	Expiration Date	Authority
Local County Department of Community Development	Required for removal of on-site vegetation.	Vegetation Removal	--[a,d]	--[a,d]	TBD
Local County Health Department	Required for construction and operation of a new septic system, if sewage service not available in the area. One copy of the survey and one copy of construction plans must bear original Health Department approval.	Health Department Septic Permit and Operating Permit	--[a,d]	--[a,d]	TBD
City, County, or Municipal District	Construction of new buildings and facilities.	Building Permit; Plumbing Permit; HVAC Permit; Contractors License, etc.	--[a,d]	--[a,d]	TBD
		Other Permits/Approvals			
U.S. Department of Interior	Prevention of "taking" of Bald Eagle nests, eggs, or birds.	Migratory Bird Treaty Act of 1918; authorization for "taking" of Bald Eagle nest would be required per 50 CFR 21.	--[a]	--[a]	16 USC 703-712

(a) Data not available.
(b) Initial consultation with Agency occurs prior to combined license application submittal.
(c) Applications for permits will be made during the pre-construction phase.
(d) Issuing authority. License numbers and expiration dates will be included in the table when known.

Appendix I

Carbon Dioxide Footprint Estimates for a Model 1000-MW(e) Light Water Reactor (LWR)

Appendix I

Carbon Dioxide Footprint Estimates for a Model 1000-MW(e) Light Water Reactor (LWR)

The review team has estimated the carbon dioxide (CO_2) footprint of various activities associated with nuclear power plants. These activities include building, operating, and decommissioning the plant. The estimates include direct emissions from the nuclear facility and indirect emissions from workforce transportation and the uranium fuel cycle.

Construction equipment estimates listed in Table I-1 are based on hours of equipment use estimated for a single nuclear power plant at a site requiring a moderate amount of terrain modification. Equipment usage for a multiple unit facility would be larger, but it is likely that it would not be a factor of 2 larger. A reasonable set of emissions factors used to convert the hours of equipment use to CO_2 emissions are based on carbon monoxide (CO) emissions (UniStar 2007) scaled to CO_2 using a scaling factor of 165 tons of CO_2 per ton of CO. This factor is based on emissions factors in Table 3.3-1 of AP-42 (EPA 1995). Equipment emissions estimated for decommissioning are one-half of those for construction.

Table I-1. Construction Equipment CO_2 Emissions (metric tons equivalent)

Equipment	Construction Total[(a)]	Decommissioning Total[(b)]
Earthwork and Dewatering	1.1×10^4	5.4×10^3
Batch Plant Operations	3.3×10^3	1.6×10^3
Concrete	4.0×10^3	2.0×10^3
Lifting and Rigging	5.4×10^3	2.7×10^3
Shop Fabrication	9.2×10^2	4.6×10^2
Warehouse Operations	1.4×10^3	6.8×10^2
Equipment Maintenance	9.6×10^3	4.8×10^3
TOTAL[(c)]	3.5×10^4	1.8×10^4

(a) Based on hours of equipment usage over 7-year period.
(b) Based on equipment usage over 10-year period.
(c) Total not equal to the sum due to rounding.

Workforce estimates are typical workforce numbers for new plant construction and operation based on estimates in various applications for combined construction permits and operating licenses (COLs), and decommissioning workforce emissions estimates are based on decommissioning workforce estimates in NUREG-0586 S1, *Generic Environmental Impact*

Statement on Decommissioning of Nuclear Facilities, Supplement 1 Regarding the Decommissioning of Nuclear Power Reactors (NRC 2002). A typical construction workforce averages about 2500 for a 7-year period with a peak workforce of about 4000. A typical operations workforce for the 40-year life of the plant is assumed to be about 400, and the decommissioning workforce during a decontamination and dismantling period of 10 years is assumed to be 200 to 400. In all cases, the daily commute is assumed to involve a 100-mi roundtrip with two individuals per vehicle. Considering shifts, holidays, and vacations, 1250 roundtrips per day are assumed each day of the year during construction, 200 roundtrips per day are assumed each day during operations, and 150 roundtrips per day are assumed 250 days per year for the decontamination and dismantling portion of decommissioning. If the SAFSTOR decommissioning option is included in decommissioning, 20 roundtrips each day of the year are assumed for the caretaker workforce.

Table I-2 lists the review team's estimates of the CO_2 equivalent emissions associated with workforce transport. The table lists the assumptions used to estimate total miles traveled by each workforce; the factors used to convert total miles to metric tons CO_2 equivalent; and CO_2 equivalent accounts for other greenhouse gases, such as methane and nitrous oxide, emitted by internal combustion engines. The workers are assumed to travel in gasoline-powered passenger vehicles (cars, trucks, vans, and sports utility vehicles) that average 19.7 mpg of gas (FHWA 2006). Conversion from gallons of gasoline burned to CO_2 equivalent is based on U.S. Environmental Protection Agency (EPA) emissions factors (EPA 2007a, b).

Table I-2. Workforce CO_2 Footprint Estimates

	Construction Workforce	Operational Workforce	Decommissioning Workforce	SAFSTOR Workforce
Roundtrips per day	1250	200	150	20
Miles per roundtrip	100	100	100	100
Days per year	365	365	250	365
Years	7	40	10	40
Miles traveled	3.2×10^8	2.9×10^8	3.8×10^7	2.92×10^7
Miles per gallon[(a)]	19.7	19.7	19.7	19.7
Gallons fuel burned	1.6×10^7	1.5×10^7	1.9×10^6	1.58×10^6
Metric tons CO_2 per gallon[(b)]	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}
Metric tons CO_2	1.4×10^5	1.3×10^5	1.7×10^4	1.3×10^4
CO_2 equivalent factor[(c)]	0.971	0.971	0.971	0.971
Metric tons CO_2 equivalent	1.5×10^5	1.3×10^5	1.7×10^4	1.3×10^4

Sources:
(a) FHWA 2006
(b) EPA 2007b
(c) EPA 2007a.

Published estimates of uranium fuel cycle CO_2 emissions required to support a nuclear power plant range from about 1 percent to nearly 5 percent of the CO_2 emissions from a comparably sized coal-fired plant (Sovacool 2008). A coal-fired power plant emits about 1 metric ton (MT) of CO_2 for each megawatt hour (MWh) generated (Miller and Van Atten 2004). Therefore, for consistency with Table S-3 of 10 CFR 51.51, the NRC staff estimated the uranium fuel cycle CO_2 emissions as 0.05 MT of CO_2 per MWh generated and assumed an 80 percent capacity factor. Finally, the review team estimated the CO_2 emissions directly related to plant operations from the typical use of various diesel generators on site using EPA emissions factors (EPA 1995). The review team assumed an average of 600 hours of emergency diesel generator operation per year (total for 4 generators) and 200 hours of station blackout diesel generator operation per year (total for 2 generators).

Given the various sources of CO_2 emissions, the review team estimates the total life CO_2 footprint for a reference 1000-MW(e) nuclear power plant to be about 18 million MT. The components of the footprint are summarized in Table I-3. The uranium fuel cycle component of the footprint dominates all other components. It is directly related to power generated. As a result, it is reasonable to use reactor power to scale the footprint to larger reactors.

Table I-3. Reference Reactor Lifetime Carbon Dioxide Footprint

Source	Activity Duration (year)	Total Emissions (metric tons)
Construction Equipment	7	3.5×10^4
Construction Workforce	7	1.5×10^5
Plant Operations	40	1.9×10^5
Operations Workforce	40	1.3×10^5
Uranium Fuel Cycle	40	1.7×10^7
Decommissioning Equipment	10	1.8×10^4
Decommissioning Workforce	10	1.7×10^4
SAFSTOR Workforce	40	1.3×10^4
Total		1.8×10^7

In closing, the review team considers the footprint estimated in Table I-3 to be appropriately conservative. The CO_2 emissions estimates for the dominant component (uranium fuel cycle) are based on 30-year-old enrichment technology, assuming the energy required for enrichment is provided by coal-fired generation. Different assumptions related to the source of energy used for enrichment or the enrichment technology that would be just as reasonable could lead to a significantly reduced footprint.

Emissions estimates presented in the body of this EIS have been scaled to values that are appropriate for the proposed project. The uranium fuel cycle emissions have been scaled by reactor power using the scaling factor determined in Chapter 6 and by the number of reactors to

be built. Plant operations emissions have been adjusted to represent the number of large CO_2 emissions sources (diesel generators, boilers, etc.) associated with the project. The workforce emissions estimates have been scaled to account for differences in workforce numbers and commuting distance. Finally, equipment emissions estimates have been scaled by estimated equipment usage. As shown in Table I-3, only the scaling of the uranium fuel cycle emissions estimates makes a significant difference in the total carbon footprint of the project.

I.1 References

Federal Highway Administration (FHWA). 2006. *Highway Statistics 2005 (Table VM-1)*. Office of Highway Policy Information, U.S. Department of Transportation. Washington, D.C.

Miller, P.J., and C. Van Atten. 2004. *North American Power Plant Air Emissions*. Commission for Environmental Cooperation of North America, Montreal, Canada.

Sovacool, B.K. 2008. "Valuing the Greenhouse Gas Emissions from Nuclear Power: A Critical Survey." Energy Policy 36(8):2950-2963.

UniStar Nuclear Energy, LLC (UniStar). 2007. *Technical Report in Support of Application of UniStar Nuclear Operating Services, LLC for Certificate of Public Convenience and Necessity Before the Maryland Public Service Commission for Authorization to Construct Unit 3 at Calvert Cliffs Nuclear Power Plant and Associated Transmission Lines*. Prepared for the Public Service Commission of Maryland. Baltimore, Maryland. Accession No. ML090680053.

U.S. Environmental Protection Agency (EPA). 1995. *Compilation of Air Pollutant Emission Factors Volume 1: Stationary Point and Area Sources*. AP-42, 5th Edition, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2007a. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005*. Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2007b. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: Fast Facts 1990-2005, Conversion Factors to Energy Units (Heat Equivalents) Heat Contents and Carbon Content Coefficients of Various Fuel Types*. EPA-430-R-07-002, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2002. *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*. NUREG-0586, Supplement 1, Vols. 1 and 2, Washington, D.C.

Appendix J

Supporting Documentation on Radiological Dose Assessment

Appendix J

Supporting Documentation on Radiological Dose Assessment

The U.S. Nuclear Regulatory Commission (NRC) staff performed an independent dose assessment of the radiological impacts resulting from normal operation of the proposed new nuclear Units 1 and 2 at the Progress Energy Florida, Inc. (PEF) Levy County site, approximately 9.4 mi north of the Crystal River Energy Complex (CREC) Unit 3 nuclear power station. The results of the assessment are presented in this appendix and are compared to the results from PEF's Environmental Report (ER) (PEF 2009a) found in EIS Section 5.9, "Radiological Impacts of Normal Operations." Appendix G is divided into three sections: (1) dose estimates to the public from liquid effluents, (2) dose estimates to the public from gaseous effluents, and (3) cumulative dose estimates.

J.1 Dose Estimates to the Public from Liquid Effluents

The NRC staff used the dose-assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the LADTAP II computer code (Strenge et al. 1986) to estimate doses to the maximally exposed individual (MEI) and population from the liquid effluent pathway of the proposed Levy Nuclear Plant (LNP) Units 1 and 2.

J.1.1 Scope

Doses from the LNP Units 1 and 2 to the MEI were calculated and compared with regulatory criteria for the following:

- Total Body – Dose was the total for all pathways (i.e., fish consumption, shoreline usage, swimming exposure, and boating) with the highest value for either the adult, teen, child, or infant compared to the 3-mrem/yr per reactor dose design objective in Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix I.
- Organ – Dose was the total for each organ for all pathways (i.e., fish consumption, shoreline usage, swimming exposure, and boating) with the highest value for either the adult, teen, child, or infant compared to the 10-mrem/yr per reactor dose design objective specified in 10 CFR Part 50, Appendix I.

The NRC staff reviewed the assumed exposure pathways and input parameters and values used by PEF in ER Section 5.4 (PEF 2009a) for appropriateness, including references made to the Westinghouse Advanced Passive 1000 (AP1000) Design Control Document (DCD) Revision 17 (Westinghouse 2008). Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The staff concluded that the assumed exposure pathways were reasonable and the input parameters and values used by PEF were appropriate.

J.1.2 Resources Used

To calculate doses to the public from liquid effluents, the NRC staff used a personal-computer (PC) version of the LADTAP II code entitled, NRCDOSE, Version 2.3.10 (Chesapeake Nuclear Services, Inc. 2006), obtained through the Oak Ridge Radiation Safety Information Computational Center (RSICC).

J.1.3 Input Parameters

Table J-1 lists the major parameters used by PEF and NRC staff in calculating dose to the public from liquid effluent releases during normal operation. For population dose assessment, PEF used the population projections for the year 2020 (5 years from the time of licensing action), which is consistent with the guidance in Section 5.4.1 of the *Environmental Standard Review Plan* (NRC 2000). These population projections are presented in ER Tables 2.5-1 through 2.5-5 (PEF 2009a).

When site-specific information was not available for its LADTAP II calculations, PEF chose to use the Regulatory Guide 1.109 default assumptions. These assumptions generally will lead to an overestimation of doses from the liquid pathway to the MEI, the population, and biota. The staff concludes this approach is bounding.

J.1.4 Comparison of Results

Table J-2 compares doses to the public calculated by PEF for liquid effluent releases for one unit with dose estimates determined by the NRC staff. NRC staff doses calculated were identical to the doses calculated by PEF.

Table J-1. LADTAP Parameters and Selected Inputs

Parameter	Staff Value		Comments
Radionuclide source-term file created from: LNP one unit liquid effluent source term (Ci/yr).	H-3	1.01×10^{3}	Releases to Discharge Canal (Ci/yr). Values from Westinghouse AP1000 DCD Table 11.2-7, Rev 19 (Westinghouse 2011).
	Na-24	1.63×10^{-3}	
	Cr-51	1.85×10^{-3}	
	Mn-54	1.30×10^{-3}	
	Fe-55	1.00×10^{-3}	
Only radionuclides included in Regulatory Guide 1.109 are considered (NRC 1977).	Fe-59	2.00×10^{-4}	
	Co-58	3.36×10^{-3}	
	Co-60	4.40×10^{-4}	
	Zn-65	4.10×10^{-4}	
	Br-84	2.00×10^{-5}	
	Rb-88	2.70×10^{-4}	
	Sr-89	1.00×10^{-4}	
	Sr-90	1.00×10^{-5}	
	Sr-91	2.00×10^{-5}	
	Y-91m	1.00×10^{-5}	
	Y-93	9.00×10^{-5}	
	Zr-95	2.30×10^{-4}	
	Nb-95	2.10×10^{-4}	
	Mo-99	5.70×10^{-4}	
	Tc-99m	5.50×10^{-4}	
	Ru-103	4.93×10^{-3}	
	Ru-106	7.352×10^{-2}	
	Rh-106	7.352×10^{-2}	
	Ag-110m	1.05×10^{-3}	
	Ag-110	1.40×10^{-4}	
	Te-129m	1.20×10^{-4}	
	Te-129	1.50×10^{-4}	
	Te-131m	9.00×10^{-5}	
	Te-131	3.00×10^{-5}	
	Te-132	2.40×10^{-4}	
	I-131	1.413×10^{-2}	
	I-132	1.64×10^{-3}	
	I-133	6.70×10^{-3}	
	I-134	8.10×10^{-4}	
	I-135	4.97×10^{-3}	
	Cs-134	9.93×10^{-3}	
	Cs-136	6.30×10^{-4}	
	Cs-137	1.332×10^{-2}	
	Ba-137m	1.245×10^{-2}	
	Ba-140	5.52×10^{-3}	
	La-140	7.43×10^{-3}	
	Ce-141	9.00×10^{-5}	
	Ce-143	1.90×10^{-4}	
	Ce-144	3.16×10^{-3}	
	Pr-143	1.30×10^{-4}	
	Pr-144	3.16×10^{-3}	
	W-187	1.30×10^{-4}	
	Np-239	2.40×10^{-4}	
	All others	2.00×10^{-5}	
Discharge flow rate	63 cfs one unit.		
Source-term multiplier selected	1.0 for one unit.		

Table J-1. (contd)

Parameter	Staff Value	Comments
Population fractions modify defaults	NO	
Site type	Saltwater selected.	
Dose contributions print by radionuclide	YES	
Reconcentration model	NONE selected	
ALARA Max. Individual: shore – width actor	1.0 (tidal basin),	
Dilution factor	LNP FSAR Table 11.2-201 Rev 0	
Dilution factors for all pathways	21	
Transit time	0.00	
ALARA max. individual shore – width values:	discharge canal bank 0.1	
River shoreline	0.2	
Lake shore	0.3	
Nominal ocean site	0.5	
Tidal basin	1.0	
Additional usage	NONE	

	Fish	Invertebrate	Shoreline	Swimming	Boating
	Consumption, kg/yr		Usage, hr/yr		
Adult	21	5	12	12	100
Teen	16	3.8	67	67	67
Child	6.9	1.7	14	14	14
Infant	None	None	None	None	None
Sport fish harvest		210,246 kg/yr	dilution factor – 21		transit time – 0
Sport invertebrate harvest		142,438 kg/yr	dilution factor – 21		transit time – 0
Commercial fishing		734,960 kg/yr	dilution factor – 21		transit time – 0
Commercial invertebrate		1,424,384 kg/yr	dilution factor – 21		transit time – 0
Population usage all checked:			drinking water, shoreline, boating, swimming		
Drinking water		None	None		None
Shoreline: width factor 1.0		32,541,940 per-hr/yr	dilution factor – 21		transit time – 0
Boating		32,071,440 per-hr/yr	dilution factor – 21		transit time – 0
Swimming		32,541,940 per-hr/yr	dilution factor – 21		transit time – 0
Irrigation food data: none			pathway and water usage locations		
Biota exposures			None		
Block data: change block data			NO		

Table J-2. Comparison of Doses to the Public from Liquid Effluent Releases for One Unit

Type of Dose	PEF [(a) (b) (c)]	Staff Calculation	Percent Difference
Total body (mrem/yr)	0.0052 (teen)	0.0052 (teen)	0
Organ dose (mrem/yr)	0.071 (adult GI tract)	0.071 (adult GI tract)	0
Thyroid (mrem/yr)	0.0127 (teen)	0.0127 (teen)	0
Population dose from liquid pathway (person-rem/yr)	1.13	1.13	0
Population maximum organ dose from liquid pathway (person-rem/yr)	2.89	2.89	0

(a) LADTAP II Output File (PEF 2009b).
(b) MEI results from PEF ER Tables 5.4-6 (PEF 2009a).
(c) Population results from PEF ER Table 5.4-11 (PEF 2009a).

J.2 Dose Estimates to the Public from Gaseous Effluents

The NRC staff used the dose-assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the GASPAR II computer code (Strenge et al. 1987) to estimate doses to the MEI from the gaseous effluent pathway and to the population within the 50-mi radius of the LNP site from the gaseous effluent pathway for proposed Units 1 and 2.

J.2.1 Scope

The NRC staff and PEF independently calculated the maximum gamma air dose, beta air dose, total body dose, maximum organ dose (bone), and thyroid dose and skin dose to receptors located at the maximum exposure for each pathway discussed in Section 5.9. The maximum atmospheric dispersion factor and the maximum ground deposition occurs in the west-southwest (WSW) direction. The MEI is assumed to be located at 0.83 mi WSW in Section 5.4 of the ER (PEF 2009a). Dose to the MEI was calculated for the following exposure pathways: plume immersion, direct shine from deposited radionuclides, inhalation, ingestion of local farm or garden vegetables, and ingestion of locally produced beef and goat milk.

The NRC staff reviewed the input parameters and values used by PEF for appropriateness, including references made to the AP1000 DCD Rev 17, which are unchanged in AP1000 DCD Revision 19 (Westinghouse 2011). When site-specific input parameters were not available, default values from Regulatory Guide 1.109 (NRC 1977) were used. The staff concluded the assumed exposure pathways, input parameters, and values used by PEF were appropriate. The NRC staff used these pathways and parameters in its independent calculations using GASPAR II.

Joint frequency-distribution data of wind speed and wind direction by atmospheric-stability class for the LNP site (PEF 2009a) were used as input to the XOQDOQ code (Sagendorf et al. 1982) to calculate long-term average atmospheric dispersion factor (χ/Q) and atmospheric deposition factor (D/Q) values for routine releases. Based on 2 years of meteorological data, the staff's independent results are similar as those reported by PEF in ER Tables 2.7-58 through and 2.7-61 Rev 1 (PEF 2009a).

Population doses were calculated for all types of releases (i.e., noble gases, iodines and particulates, ^{3}H, and ^{14}C) using the GASPAR II code for the following exposure pathways: plume immersion, direct shine from deposited radionuclides, ingestion of vegetables, and ingestion of cow and goat milk, and meat.

J.2.2 Resources Used

To calculate doses to the public from gaseous effluents, the staff used a PC version of the XOQDOQ and GASPAR II codes entitled, NRCDOSE Version 2.3.10 (Chesapeake Nuclear Services, Inc. 2006), obtained through the Oak Ridge RSICC.

J.2.3 Input Parameters

Table J-3 lists the major parameters used in calculating dose to the public from gaseous effluent releases during normal operation.

J.2.4 Comparison of Doses to the Public from Gaseous Effluent Releases

Table J-3 presents dose estimates to the MEI for each gaseous pathway as calculated by PEF and the NRC staff. The doses provided by PEF in its ER Rev 1 and those calculated by NRC are similar, as shown in Table J-4.

J.2.5 Comparison of Liquid and Gaseous Doses with 10 CFR Part 50 Appendix I

Table J-5 presents noble gas, radioiodine, and particulate matter dose estimates for the MEI as calculated by both PEF and the NRC staff along with dose design objectives of 10 CRF Part 50, Appendix I.

Table J-3. GASPAR Parameters and Selected Inputs

Parameter	Staff Value		Comments
New unit gaseous effluent source term (Ci/yr)	Ar-41	3.4×10^{1}	Values are consistent with Westinghouse AP1000 DCD Table 11.3-3 for a single unit (Westinghouse 2011). Except for rounding differences, these values are the same as those reported in ER Table 3.5-2 (PEF 2009a).
	Kr-85m	3.6×10^{1}	
	Kr-85	4.093×10^{3}	
	Kr-87	1.5×10^{1}	
	Kr-88	4.6×10^{1}	
	Xe-131m	1.776×10^{3}	
	Xe-133m	8.7×10^{1}	
	Xe-133	4.642×10^{3}	
	Xe-135m	7.0×10^{0}	
	Xe-135	3.34×10^{2}	
	Xe-138	6.0×10^{0}	
	I-131	1.168×10^{-1}	
	I-133	4.017×10^{-1}	
	H-3	3.5×10^{2}	
	C-14	7.3×10^{0}	
	Cr-51	6.06×10^{-4}	
	Mn-54	4.331×10^{-4}	
	Co-57	8.2×10^{-6}	
	Co-58	2.316×10^{-2}	
	Co-60	8.75×10^{-3}	
	Fe-59	7.88×10^{-5}	
	Sr-89	3.024×10^{-3}	
	Sr-90	1.159×10^{-3}	
	Zr-95	1.008×10^{-3}	
	Nb-95	2.452×10^{-3}	
	Ru-103	8.02×10^{-5}	
	Ru-106	7.77×10^{-5}	
	Sb-125	6.09×10^{-5}	
	Cs-134	2.298×10^{-3}	
	Cs-136	8.53×10^{-5}	
	Cs-137	3.552×10^{-3}	
	Ba-140	4.23×10^{-4}	
	Ce-141	4.164×10^{-4}	

Table J-3. (contd)

GASPAR code entry, Site Specifics	Input value	Reference
Source terms: annual average gaseous release		DCD Table 11.3-3 Rev 19
Source multiplication factor	1.0	
Release time for purges	0.0 hr	
Milk production data, meat production data, and vegetable production data		ER Table 5.4-5 Agricultural Statistics rounded to three significant figures by sector and distance
Population control		Population Data refer to ER Table 2.5-4 2020 population residential
Distance from site to northeast corner of United States (mi)	1680	
Fraction of the year that leafy vegetables are grown	0.92	ER Table 5.4-3
Fraction of the year milk cows are on pasture	0.92	
Fraction of maximum individual vegetable intake from own garden	1.00	ER Table 5.4-3
Fraction of milk-cow feed from pasture	1.00	
Fraction of the year goats on pasture	1.00	ER Table 5.4-3
Fraction of the year goats feed from pasture while on pasture	1.00	ER Table 5.4-3
Fraction of the year beef cattle are on pasture	0.92	ER Table 5.4-3
Fraction of beef cattle feed from pasture while on pasture	1.00	ER Table 5.4-3

Sources: PEF 2009a; Westinghouse 2011.

Table J-4. Comparison PEF and Staff Results Annual Individual Doses to the Maximally Exposed Individual from Gaseous Effluents for One Unit

Pathway	Age Group	PEF Total Body Dose[a] (mrem/yr)	Staff Total Body Dose[b] (mrem/yr)	PEF Max Organ (Bone)[a] (mrem/yr)	Staff Max Organ (Bone)[b] (mrem/yr)	PEF & Staff Skin Dose[c] (mrem/yr)	PEF Thyroid Dose[a] (mrem/yr)	Staff Thyroid Dose[b] (mrem/yr)
Plume (0.83 mi WSW)	All	0.985	0.985	0.985	0.985	6.32	0.985	0.985
Ground (0.83 mi WSW)	All	0.114	0.114	0.114	0.114	0.133	0.114	0.114
Goat Milk (2.4 mi NNW)	Adult	0.0253	0.0253	0.0770	0.0770	N/A	0.155	0.155
	Teen	0.0404	0.0404	0.141	0.141	N/A	0.246	0.246
	Child	0.0867	0.0867	0.347	0.347	N/A	0.497	0.497
	Infant	0.170	0.170	0.673	0.673	N/A	1.17	1.17
Inhalation (0.83 mi WSW)	Adult	0.0598	0.156	0.00863	0.0243	N/A	0.521	1.39
	Teen	0.0605	0.158	0.0104	0.0294	N/A	0.649	1.73
	Child	0.0536	0.140	0.0127	0.0356	N/A	0.753	2.01
	Infant[d]	0.0309	0.0806	0.00637	0.0178	N/A	0.673	1.80
Vegetable (1.7 mi WSW)	Adult	0.530	0.530	2.08	2.08	N/A	1.43	1.43
	Teen	0.804	0.804	3.40	3.40	N/A	1.98	1.98
	Child	1.80	1.80	8.16	8.16	N/A	4.05	4.05
Meat (2.8 mi SSW)[e]	Adult	0.0128	0.0231	0.0564	0.102	N/A	0.0180	0.0287
	Teen	0.0104	0.0188	0.0476	0.0857	N/A	0.0142	0.0229
	Child	0.0189	0.0341	0.08741	0.161	N/A	0.0246	0.0403

(a) PEF 2009a; See PEF ER Table 5.4-7 Gaseous Pathways – Dose Summary Maximum Exposed Individuals for one AP1000 Unit .
(b) Staff estimates.
(c) Skin dose is applicable for plume and ground, not for inhalation, vegetable, milk, and meat pathways. PEF and NRC staff estimates had the same results.
(d) Infant doses are not calculated for the vegetable or meat pathways because the doses that infants receive from this diet would be bounded by the dose calculated for the child.
(e) The NRC staff selected a more conservative meat location (2.2 mi NW) than the PEF-reported meat location (2.8 mi SSW).

Table J-5. Comparisons of MEI Dose Estimates from Liquid and Gaseous Effluents to 10 CFR Part 50, Appendix I Design Objectives[(a)]

Radionuclide Releases/Dose	PEF Assessment[(b)]	NRC Staff Assessment	Appendix I Design Objectives
Gaseous Effluents (noble gases only)			
Beta air dose	9.9 mrad	9.35 mrad	20 mrad
Gamma air dose	1.7 mrad	1.67 mrad	10 mrad
Whole body dose	3.1 mrem	3.16 mrem (Child – whole body)	5 mrem
Skin dose	6.3 mrem	6.45 mrem	15 mrem
Gaseous Effluents (radioiodine and particulate matter)			
Critical organ dose from all pathways	9.7 mrem (Child – bone)	9.80 mrem (Child – bone)	15 mrem
Liquid Effluents			
Total body dose from all pathways	0.0052 mrem (Teen – all pathways)	0.0052 mrem (Teen – all pathways)	3 mrem
Critical organ dose from all pathways	0.071mrem (Adult – GI-LLI)	0.0714 mrem (Adult – GI-LLI)	10 mrem

(a) All doses are for one AP1000 unit.
(b) Calculated doses presented in PEF ER Tables 5.4-6 and 5.4-8 (PEF 2009a).

J.2.6 Comparison of Population Dose from Liquid and Gaseous Exposures

Table J-6 presents person-rem dose estimates to individuals living within the 50-mi radius of LNP calculated by PEF and the staff. The population doses from gaseous effluents to individuals living within the 50-mi radius of LNP were calculated. For these doses, the population data were projected to the year 2020. The population doses for the various pathways (immersion, inhalation, ingestion, and ground deposition) are presented.

Population doses resulting from natural background radiation to individuals living within the 50-mi radius of LNP are presented in Table J-7. Table J-7 shows that the calculated person-rem/yr exposure from the LNP Units 1 and 2 would be much less than the estimated person-rem/yr exposure from natural radiation.

Table J-6. Calculated Doses to the Population within 50 mi of the Proposed LNP Site from Gaseous and Liquid Pathways (Two AP1000 Units) (person-rem/yr-unit)

	Whole Body	
Pathway	**PEF Rev 1 Estimate[(a)]**	**Staff Estimate**
Gaseous		
Plume	1.02	1.19
Ground	0.10	0.10
Inhalation	0.37	0.36
Vegetable ingestion	3.10	3.03
Cow milk ingestion	0.28	0.24
Meat ingestion	0.88	0.87
Total gaseous	5.74	5.79
Liquid		
Sport fish	0.027	0.0272
Commercial fish	0.001	0.0012
Sport invertebrate	0.042	0.0422
Commercial invertebrate	0.001	0.0013
Shoreline	1.050	1.050
Swimming	0.005	0.005
Boating	0.003	0.00252
Total liquid	1.13	1.15

(a) PEF 2009a

Table J-7. Natural Background – Estimated Whole Body Dose to the Population Within 50 mi of the LNP Site

Source	Annual Individual Dose Source (mrem/yr)	Annual Population Dose[(a)] (person-rem/yr)
PEF Estimate	360[(b)]	$5.2 \times 10^{+5}$[(c)]
Staff Estimate	311[(d)]	$4.5 \times 10^{+5}$

(a) Annual population dose based on projected residential population of 1,440,207 in year 2020 (from PEF ER Tables 2.5-2 and 2.5-4) (PEF 2009a).
(b) 360 mrem/yr taken from NRC Fact Sheet, "Biological Effects of Radiation."
(c) Taken from PEF ER Table 5.4-12 Rev 1 (PEF 2009a).
(d) NCRP 2009.

J.3 Cumulative Dose Estimates

Table J-8 presents the comparison of doses for LNP Units 1 and 2 with the dose standards of 40 CFR Part 190. The table shows the NRC staff's assessment of total doses to the MEI from LNP liquid and gaseous effluents. The assessment of doses includes releases of radiation from CREC Unit 3 because LNP shares a common discharge point for liquid releases with the CREC Unit 3. In additional, although the LNP and CREC sites are separated by nearly 10 mi, the staff adopted PEF's approach and added the gaseous effluent doses for CREC to the gaseous effluent doses for LNP to provide a bounding assessment for LNP. As stated in Section 5.9.1, the direct radiation doses from LNP Units 1 and 2 at the site boundary would be negligible. The assessment shows that the 40 CFR Part 190 standards would be met.

Table J-8. Cumulative Site Dose to MEI from LNP Units 1 and 2 Combined with CREC-3

Type Dose (mrem/yr)	CREC-3 Liquid & Gaseous[(a)]	LNP Unit 1 & 2 Liquid Dose (Teen)[(b)]	LNP Unit 1 & 2 Gaseous Dose (Child)[(b)]	Combined Max Individual Dose	40 CFR 190 Dose Standards
T-Body	8E-05	0.0104	2.96	2.97	25
Thyroid	0.002	0.0254	10.9	10.9	75
Bone	0.002	0.0113	14.5	14.5	25
GI-LLI[(c)]	0.002	0.286 (Adult)	3.6	3.9	25
Skin	0.002	0.00506	5.59	5.6	25
Other (worse case)	0.002	0.286	14.5	14.8	25

(a) CREC-3 operational data PEF ER Table 5.4-10 (PEF 2009a). NRC Staff notes that a 20-percent power uprate is planned at CREC Unit 3 in 2009–2011. NRC staff concluded that any potential increases in radiation exposure associated with this uprate would not change the combined maximum individual doses.
(b) NRC staff-calculated values.
(c) GI-LLI = gastrointestinal.

J.4 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

40 CFR Part 190. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

Chesapeake Nuclear Services, Inc. 2006. *NRCDose for Windows*. Radiation Safety Information Computational Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

National Council on Radiation Protection and Measurements (NCRP). 2009. *Ionizing Radiation Exposure of the Population of the United States*. NCRP Report No. 160, Bethesda, Maryland.

Progress Energy Florida, Inc. (PEF). 2009a. *Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage*. Revision 1, St. Petersburg, Florida. Accession No. ML092860995.

Progress Energy Florida, Inc. (PEF). 2009b. Letter from Garry D. Miller, PEF, to NRC, dated January 16, 2009, "Subject: Levy Nuclear Plant, Units 1 and 2, Docket Nos. 52-029 and 52-030, Supplemental Information for Environmental Audit – Information Needs with Attachments." Accession No. ML090750823.

Sagendorf, J.F., J.T. Croll, and W.F. Sandusky. 1982. *XOQDOQ: Computer Program for the Meteorological Evaluations of Routine Effluent Releases at Nuclear Power Stations*. Final Report, NUREG/CR-2919, U.S. Nuclear Regulatory Commission, Washington, D.C.

Strenge, D.L., R.A. Peloquin, and G. Whelan. 1986. *LADTAP II - Technical Reference and User Guide*. NUREG/CR-4013, U.S. Nuclear Regulatory Commission, Washington, D.C.

Strenge, D.L., T.J. Bander, and J.K. Soldat. 1987. *GASPAR II – Technical Reference and User Guide*. NUREG/CR-4653, March 1987, Pacific Northwest Laboratory, Richland, Washington.

U.S. Nuclear Regulatory Commission (NRC). 1977. *Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I*. Regulatory Guide 1.109, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2000. *Environmental Standard Review Plan (ESRP) — Standard Review Plans for Environmental Reviews for Nuclear Power Plants*. NUREG-1555, Vol. 1, Washington, D.C. Includes 2007 revisions.

Westinghouse Electric Company LLC (Westinghouse). 2011. *AP1000 Design Control Document*. APP-GW-GL-700, Revision 19, Pittsburgh, Pennsylvania. Accession No. ML11171A500.

Appendix K

Wildlife Species Observed During Pedestrian Surveys, 2006 – 2008

Appendix K

Wildlife Species Observed During Pedestrian Surveys, 2006 – 2008

Tables K-1 through K-3 list species observed during pedestrian surveys completed for the Levy Nuclear Plant (LNP) site by Progress Energy Florida, Inc. (PEF) between October 2006 and November 2008.

Table K-1. Mammalian Species Likely to Occur on the LNP Site and Blowdown Pipeline Corridor Sites

Common Name	Scientific Name	Observed Onsite[a]	Season Observed[b,c]
Bobcat	*Lynx rufus*	LNP Blowdown Pipeline Corridor	F, W, Sp W
Cotton mouse	*Peromyscus gossypinus*	NA LNP	NA F, W, Sp
Cottontail rabbit	*Sylvilagus floridanus*	Blowdown Pipeline Corridor	W
Coyote	*Canis latrans*	LNP LNP	F, W, Sp, S F, W, Sp
Eastern gray squirrel	*Sciurus carolinensus*	Blowdown Pipeline Corridor	W
Eastern mole	*Scalopus aquaticus*	NA LNP	NA F, W, Sp
Feral hog	*Sus scrofa*	Blowdown Pipeline Corridor	W
Southern flying squirrel	*Glaucomys volans*	NA LNP	NA F, W, Sp
Gray fox	*Urocyon cineroargentus*	Blowdown Pipeline Corridor LNP	W F, W, Sp
Hispid cotton rat	*Sigmodon hispidus*	Blowdown Pipeline Corridor	W
Marsh rabbit	*Sylvilagus palustris*	NA	NA
Mink	*Nustela vison*	NA LNP	NA F, W, Sp
Nine-branded armadillo	*Dasypus novemcinctus*	Blowdown Pipeline Corridor LNP	W F, W, Sp
Raccoon	*Procyon lotor*	Blowdown Pipeline Corridor	W
River otter	*Lutra canadensis*	Blowdown Pipeline Corridor	W
Striped skunk	*Mephitis mephitis*	NA LNP	NA F, W, Sp

Table K-1. (contd)

Common Name	Scientific Name	Observed Onsite[a]	Season Observed[b,c]
Virginia opossum	*Didelphis virginiana*	Blowdown Pipeline Corridor LNP	W F, W, Sp, S
White-tailed deer	*Odocoileus virginianus*	Blowdown Pipeline Corridor	W

Source: PEF 2009a
Notes:
South Site = the PEF-owned parcel immediately south of the LNP site
NA = Not directly observed.
(a) The species not directly observed were based on the Florida Natural Areas Inventory and Department of Natural Resources "Guide to the Natural Communities of Florida," February 1990 (PEF 2009b).
(b) F = Fall, W = Winter, Sp = Spring, S = Summer
(c) Observations along the blowdown pipeline corridor are based on winter survey only.

Table K-2. Bird Species Likely to Occur on the LNP Site and Blowdown Pipeline Corridor Sites

Common Name	Scientific Name	Observed Onsite[a]	Season Observed [b,c]
Acadian flycatcher	*Empidonax virescens*	NA	NA
American kestrel	*Falco sparverius*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Anhinga	*Anhinga anhinga*	LNP → flyover	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Bachman's sparrow	*Aimophila aestivalis*	NA	NA
Bald eagle	*Haliaeetus leucocephalus*	LNP	F, W, Sp, S
Barn swallow	*Hirundo rustica*	LNP	W
Barred owl	*Strix varia*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Black vulture	*Coragyps atratus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Blue-gray gnatcatcher	*Polioptila caerulea*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Blue jay	*Cyanocitta cristata*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Brown-headed nuthatch	*Sitta pusilla*	LNP	F, W, Sp
Brown pelican	*Pelecanus occidentalis*	NA	NA
Brown thrasher	*Toxastoma rufa*	Blowdown Pipeline Corridor	W
Carolina chickadee	*Parus carolinensis*	LNP	F, W, Sp
Carolina wren	*Thryothorus ludovicianus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Catbird	*Dumetella carolinensis*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Cattle egret	*Bubulcus ibis*	Blowdown Pipeline Corridor	W
Cedar waxwing	*Bombycilla cedrorum*	NA	NA
Common crow	*Corvus brachyrhynchos*	LNP	F, W, Sp
Common nighthawk	*Chordeiles minor*	LNP	Sp
Cooper's hawk	*Accipiter cooperii*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Double-crested cormorant	*Phalacrocorax auritus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Downy woodpecker	*Picoides pubescens*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W

Table K-2. (contd)

Common Name	Scientific Name	Observed Onsite[a]	Season Observed [b,c]
Eastern bluebird	*Sialia sialis*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Eastern kingbird	*Tyrannus tyrannus*	LNP	Sp
Eastern meadowlark	*Sturnella magna*	LNP	F, W, Sp, S
Eastern phoebe	*Sayornis phoebe*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Eastern screech owl	*Otus asio*	LNP	W
Fish crow	*Corvus ossifragus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Great blue heron	*Ardea herodias*	Blowdown Pipeline Corridor	W
		Blowdown Pipeline Corridor	W
Great-crested flycatcher	*Miarchus crinitus*	LNP	Sp
Great egret	*Ardea alba*	Blowdown Pipeline Corridor	W
Great-horned owl	*Bubo virginianus*	NA	NA
Green heron	*Butorides virescens*	Blowdown Pipeline Corridor	W
Hermit thrush	*Catharus guttatus*	LNP	W
House wren	*Troglodytes aedon*	LNP	W
		Blowdown Pipeline Corridor	W
Indigo bunting	*Passerina cyanea*	LNP	Sp
Little blue heron	*Egretta caerulea*	Blowdown Pipeline Corridor	W
Marsh wren	*Cistothorus palustris*	LNP	W
		Blowdown Pipeline Corridor	W
Mourning dove	*Zenada macrona*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Northern bobwhite	*Colinus virginianus*	LNP	F, W, Sp
Northern cardinal	*Cardinalis cardinalis*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Northern mockingbird	*Mimus polyglottos*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Osprey	*Pandion haliaetus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Palm warbler	*Dendroica palmarum*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Pileated woodpecker	*Dryocopus pileatus*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W

Table K-2. (contd)

Common Name	Scientific Name	Observed Onsite[a]	Season Observed [b,c]
Pine warbler	*Dendroica pinus*	LNP	F, W, Sp
Red-bellied woodpecker	*Melanerpes carolinus*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Red-eyed vireo	*Vireo olivaceus*	LNP	Sp
Red-headed woodpecker	*Melanerpes erythrocephalus*	LNP	F, W, Sp
Red-shouldered hawk	*Buteo lineatus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
Red-tailed hawk	*Buteo jamaicensis*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Redwinged blackbird	*Agelaius phoeniceus*	LNP	F, W, Sp
Ring-billed gull	*Larus delawarensis*	LNP – flyover Blowdown Pipeline Corridor	F, W, Sp W
American robin	*Turdus migratorius*	LNP Blowdown Pipeline Corridor	F, W, Sp W
Ruby-crowned kinglet	*Regulus calendula*	LNP Blowdown Pipeline Corridor	F, W, Sp W
Ruby-throated hummingbird	*Archilochus colubris*	NA	NA
Rufous-sided towhee	*Pipilo erythrophthalmus*	LNP Blowdown Pipeline Corridor	F, W, Sp W
Sandhill crane	*Grus canadensis*	LNP	F, W, Sp
Sharp-shinned hawk	*Accipiter striatus*	LNP	W
		Blowdown Pipeline Corridor	W
Snowy egret	*Egretta thula*	Blowdown Pipeline Corridor	W
Solitary vireo	*Vireo solitarius*	LNP	W
		Blowdown Pipeline Corridor	W
Southeastern American kestrel	*Falco sparverius paulus*	NA	NA
Summer tanager	*Piranga rubra*	LNP	Sp
Swallow-tailed kite	*Elanoides forficatus*	LNP	Sp
Tree swallow	*Tachycineta bicolor*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Tri-colored heron	*Egretta tricolor*	Blowdown Pipeline Corridor	W
Tufted titmouse	*Parus bicolor*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W

Table K-2. (contd)

Common Name	Scientific Name	Observed Onsite[a]	Season Observed [b,c]
Turkey vulture	*Cathartes aura*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
White-eyed vireo	*Vireo griseus*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
White ibis	*Eudocimus albus*	LNP	F, W, Sp, S
		Blowdown Pipeline Corridor	W
White pelican	*Pelecanus erythrorhynchos*	Blowdown Pipeline Corridor	W
Wild turkey	*Meleagris gallopavo*	LNP	F, W, Sp, S
		Blowdown Pipeline Corrdor	W
Wood duck	*Aix sponsa*	LNP	F, W, Sp
Wood stork	*Mycteria americana*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Woodcock	*Scolopax minor*	LNP	W
Yellow-rumped warbler	*Dendroica coronata*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Yellow-throated vireo	*Vireo flavifrons*	LNP	Sp
Yellow-throated warbler	*Dendroica dominica*	NA	NA

Source: PEF 2009a
(a) The species not directly observed were based on the Florida Natural Areas Inventory and Department of Natural Resources "Guide to the Natural Communities of Florida," February 1990 (PEF 2009b).
(b) F = fall, W = winter, Sp = spring, S = summer
(c) Blowdown corridor observations based on winter survey only.
LNP = Levy Nuclear Plant site, including south property down to barge slip.
NA = Not directly observed.

Table K-3. . Reptile and Amphibian Species Likely to Occur on the LNP Site and Blowdown Pipeline Corridor Sites

Common Name	Scientific Name	Observed Onsite[a]	Season Observed[b,c]
Black racer	*Coluber constrictor*	LNP	F, W, Sp
Pygmy rattlesnake	*Sistrurus miliarius*	NA	NA
Eastern cottonmouth	*Agkistrodon piscivorus*	LNP	Sp
Eastern indigo snake	*Drymarchon couperi*	NA	NA
Common garter snake	*Thamnophis sirtalis*	LNP	F, W, Sp
Red rat snake	*Elaphe guttata guttata*	NA	NA
Yellow rat snake	*Elaphe obsoleta quadrivittata*	NA	NA
Ringneck snake	*Diadophis punctatus punctatus*	NA	NA
Scarlet kingsnake	*Lampropeltis triangulum elapsoides*	NA	NA
American alligator	*Alligator mississippiensis*	LNP	Sp
Green anole	*Anolis carolinensis*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Fence lizard	*Sceloporus undulatus*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Oak toad	*Bufo quercicus*	LNP	F, W, Sp
Narrowmouth toad	*Gastrophryne carolinensis*	NA	NA
Southern toad	*Bufo terrestris*	LNP	F, W, Sp
Diamondback rattlesnake	*Crotalus adamanteus*	LNP	Sp
Eastern glass Lizard	*Ophisaurus ventralis*	NA	NA
Peninsula ribbon snake	*Thamnophis sauritus sackenii*	NA	NA
Ground skink	*Scincella lateralis*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Broadhead skink	*Eumeces laticpes*	LNP	F
Five-lined skink	*Eumeces fasciatus*	N/A	N/A
Southeastern five-lined skink	*Eumeces inexpectatus*	N/A	N/A
Florida cooter	*Pseudemys floridana floridana*	LNP	F

Table K-3. (contd)

Common Name	Scientific Name	Observed Onsite[(a)]	Season Observed[(b,c)]
Box turtle	*Terrapene carolina major*	LNP – shells	NA[(d)]
		Blowdown Pipeline Corridor – shells	
Striped mud turtle	*Kinosternon bauri*	NA	NA
Gopher tortoise	*Gopherus polyphemus*	LNP	F, W, Sp
Snapping turtle	*Chelydra serpentine*	LNP	W
Southern leopard frog	*Rana sphenocephala utricularia*	LNP	F, W, Sp
Little grass frog	*Pseudacris ocularis*	LNP	F, W, Sp W
		Blowdown Pipeline Corridor	W
Southern cricket frog	*Acris gryllus*	LNP	F, W, Sp
Southern chorus frog	*Pseudacris nigrita*	LNP	F, W, Sp
Pinewoods treefrog	*Hyla femoralis*	LNP	F, W, Sp
Barking treefrog	*Hyla gratiosa*	NA	–
Squirrel treefrog	*Hyla squirella*	LNP	F, W, Sp
Green treefrog	*Hyla cinerea*	LNP	F, W, Sp
Greenhouse frog	*Eleuthrodactylus planirostris*	LNP	F, W, Sp
		Blowdown Pipeline Corridor	W
Ornate chorus frog	*Pseudacris ornata*	NA	NA
Eastern spadefoot toad	*Scaphiopus holbrooki holbrooki*	NA	NA
Gopher frog	*Rana capito*	NA	

Source: PEF 2009a
LNP = Levy Nuclear Plant site, including south property down to barge slip.
NA = Not directly observed.
(a) The species not directly observed were based on the Florida Natural Areas Inventory and Department of Natural Resources "Guide to the Natural Communities of Florida," February 1990 (PEF 2009b).
(b) F = fall, W = winter, Sp = spring, no survey conducted during summer.
(c) Observations along the Blowdown Corridor based on winter survey only.
(d) Shells would not convey any information about season because they would have been onsite for an indeterminate amount of time, so season was disregarded.

K.1 References

Progress Energy Florida, Inc. (PEF). 2009a. Letter from Garry Miller, PEF, to NRC, dated June 12, 2009, regarding Supplement 1 to Response to Request for Additional Information Regarding the Environmental Review. Accession No. ML091740487.

Progress Energy Florida, Inc. (PEF). 2009b. *Levy Nuclear Plant Units 1 and 2 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage*. Revision 1, St. Petersburg, Florida. Accession No. ML092860995.

NRC FORM 335
(12-2010)
NRCMD 3.7

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.)

NUREG-1941 Vol. 1

2. TITLE AND SUBTITLE
Final Environmental Impact Statement for Combined Licenses (COLs) for Levy Nuclear Plant Units 1 and 2

3. DATE REPORT PUBLISHED

MONTH	YEAR
April	2012

4. FIN OR GRANT NUMBER

5. AUTHOR(S)

See Appendix A

6. TYPE OF REPORT

Technical

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)

Same as above

10. SUPPLEMENTARY NOTES
Docket Nos. 52-029, 52-030

11. ABSTRACT (200 words or less)

The environmental impact statement (EIS) has been prepared in response to the application submitted by Progress Energy Florida, Inc. (PEF) to the U.S. Nuclear Regulatory Commission (NRC) for combined licenses (COLs) for Units 1 and 2 at the Levy Nuclear Plant (LNP) site in Levy County, Florida. This EIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action and mitigation measures for reducing and avoiding adverse impacts.

The NRC staff's preliminary recommendation to the Commission, considering the environmental aspects

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

13. AVAILABILITY STATEMENT
unlimited

14. SECURITY CLASSIFICATION
(This Page)
unclassified
(This Report)
unclassified

15. NUMBER OF PAGES

16. PRICE

Printed
on recycled
paper

Federal Recycling Program

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

OFFICIAL BUSINESS