Progress Energy

Serial: NPD-NRC-2009-107
June 12, 2009

10 CFR 52.79

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

**LEVY COUNTY NUCLEAR POWER PLANT, UNITS 1 AND 2**
**DOCKET NOS. 52-029 AND 52-030**
**SUPPLEMENT 1 TO RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING THE ENVORINMENTAL REVIEW**

References:
1. Letter from Douglas Bruner (NRC) to James Scarola (PEF), dated February 24, 2009, "Request for Additional Information Regarding the Environmental Review of the Combined Operating License Application for the Levy Nuclear Plant, Units 1 and 2"
2. Letter from Garry D. Miller (PEF) to the U. S. Nuclear Regulatory Commission dated March 27, 2009, "Response To Request For Additional Information Regarding The Environmental Review", Serial NPD-NRC-2009-042

Ladies and Gentlemen:

Progress Energy Florida, Inc. (PEF) hereby submits a supplemental response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in the referenced letter.

A revised response to several of the NRC questions is provided in Enclosure 1. The revised response is provided to clarify items identified in the staff's review of the referenced response dated March 27, 2009. The enclosure also identifies changes that will be made in a future revision of the Levy County Nuclear Power Plant Units 1 and 2 Environmental Report. Enclosure 2 provides a list of files included on the attached CD (Attachment 1). These files have been prepared in accordance with NRC electronic submittal guidance. A pre-flight report is included as Enclosure 3.

If you have any further questions, or need additional information, please contact Bob Kitchen at (919) 546-6992, or me at (919) 546-6107.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 10, 2009.

Sincerely,

Garry D. Miller
General Manager
Nuclear Plant Development

**Progress Energy Carolinas, Inc.**
P.O. Box 1551
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D094
NRO

Enclosure/Attachments

cc: (with 4 copies of attached CD)
Mr. Douglas Bruner, U S Environmental Project Manager

cc: (without attached CD)
U.S. NRC Region II, Regional Administrator
Mr. Brian Anderson, U.S. NRC Project Manager

**Levy Nuclear Power Plant Units 1 and 2**
**Supplement 1 To Response To Request For Additional Information Regarding The Envorinmental Review, dated February 24, 2009**

| NRC RAI # | Progress Energy RAI # | Progress Energy Response |
|---|---|---|
| 2.7-1 | L-0076 | March 27, 2009: NPD-NRC-2009-042 |
| 3.3-1 | L-0077 | March 27, 2009: NPD-NRC-2009-042 |
| 4.5-1 | L-0078 | March 27, 2009: NPD-NRC-2009-042 |
| 5.4.4-1 | L-0079 | March 27, 2009: NPD-NRC-2009-042 |
| 3.6.3-1 | L-0082 | March 27, 2009: NPD-NRC-2009-042 |
| 5.3.3-1 | L-0083 | March 27, 2009: NPD-NRC-2009-042 |
| 2.3.1-2 | L-0085 | March 27, 2009: NPD-NRC-2009-042 |
| 2.3.1-4 | L-0087 | March 27, 2009: NPD-NRC-2009-042 |
| 2.3.1-5 | L-0088 | March 27, 2009: NPD-NRC-2009-042 |
| 2.3.1-6 | L-0089 | March 27, 2009: NPD-NRC-2009-042 |
| 2.3.3-1 | L-0090 | March 27, 2009: NPD-NRC-2009-042 |
| 2.3.3-2 | L-0091 | March 27, 2009: NPD-NRC-2009-042 |
| 4.6-1 | L-0092 | March 27, 2009: NPD-NRC-2009-042 |
| 4.6-2 | L-0093 | March 27, 2009: NPD-NRC-2009-042 |
| 5.2.2-2 | L-0095 | March 27, 2009: NPD-NRC-2009-042 |
| 5.3.2.1-1 | L-0097 | March 27, 2009: NPD-NRC-2009-042 |
| 2.4.2-1 | L-0098 | March 27, 2009: NPD-NRC-2009-042 |
| 2.4.2-2 | L-0099 | March 27, 2009: NPD-NRC-2009-042 |
| 2.4.2-3 | L-0100 | March 27, 2009: NPD-NRC-2009-042 |
| 4.7-1 | L-0101 | March 27, 2009: NPD-NRC-2009-042 |
| 2.4.1-5 | L-0106 | March 27, 2009: NPD-NRC-2009-042 |
| 4.3.1-3 | L-0109 | March 27, 2009: NPD-NRC-2009-042 |
| 4.3.1-4 | L-0110 | March 27, 2009: NPD-NRC-2009-042 |
| 4.3.1-6 | L-0112 | March 27, 2009: NPD-NRC-2009-042 |
| 4.7-2 | L-0114 | March 27, 2009: NPD-NRC-2009-042 |
| 2.5.1-1 | L-0116 | March 27, 2009: NPD-NRC-2009-042 |
| 2.5.2-2 | L-0118 | March 27, 2009: NPD-NRC-2009-042 |
| 2.5.2-3 | L-0119 | March 27, 2009: NPD-NRC-2009-042 |
| 2.5.2-4 | L-0120 | March 27, 2009: NPD-NRC-2009-042 |

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| 4.4.2-2 | L-0123 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-3 | L-0124 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-4 | L-0125 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-5 | L-0126 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-6 | L-0127 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-7 | L-0128 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-8 | L-0129 | March 27, 2009: NPD-NRC-2009-042 |
| 4.4.2-10 | L-0131 | March 27, 2009: NPD-NRC-2009-042 |
| 4.7-1 | L-0132 | March 27, 2009: NPD-NRC-2009-042 |
| 5.11-1 | L-0133 | March 27, 2009: NPD-NRC-2009-042 |
| 5.8.2-1 | L-0134 | March 27, 2009: NPD-NRC-2009-042 |
| 9.4.1-1 | L-0135 | March 27, 2009: NPD-NRC-2009-042 |
| 9.4.1-2 | L-0136 | March 27, 2009: NPD-NRC-2009-042 |
| 9.4.2-2 | L-0138 | March 27, 2009: NPD-NRC-2009-042 |
| 9.4.2-3 | L-0139 | March 27, 2009: NPD-NRC-2009-042 |
| 9.3-1 | L-0140 | March 27, 2009: NPD-NRC-2009-042 |
| 9.3.2.1-1 | L-0141 | March 27, 2009: NPD-NRC-2009-042 |
| 3.7-1 | L-0142 | March 27, 2009: NPD-NRC-2009-042 |
| 3.7-2 | L-0143 | March 27, 2009: NPD-NRC-2009-042 |
| 4.8.3-1 | L-0144 | March 27, 2009: NPD-NRC-2009-042 |
| 6.2-1 | L-0145 | March 27, 2009: NPD-NRC-2009-042 |
| 5.2.2-1 | L-0396 | Revised Response enclosed – see following pages |
| 5.2.2-3 | L-0397 | Revised Response enclosed – see following pages |
| 2.3.1-1 | L-0398 | Revised Response enclosed – see following pages |
| 2.3.1-3 | L-0399 | Revised Response enclosed – see following pages |
| 9.4.2-1 | L-0400 | Revised Response enclosed – see following pages |
| 7.1-1 | L-0401 | Revised Response enclosed – see following pages |
| 2.4.1-1 | L-0402 | Revised Response enclosed – see following pages |
| 2.4.1-2 | L-0403 | Revised Response enclosed – see following pages |
| 2.4.1-3 | L-0404 | Revised Response enclosed – see following pages |
| 2.4.1-4 | L-0405 | Revised Response enclosed – see following pages |
| 4.3.1-1 | L-0406 | Revised Response enclosed – see following pages |

| NRC RAI # | Progress Energy RAI # | Progress Energy Response |
|---|---|---|
| 4.3.1-2 | L-0407 | Revised Response enclosed – see following pages |
| 4.3.1-5 | L-0408 | Revised Response enclosed – see following pages |
| 4.3.1-7 | L-0409 | Revised Response enclosed – see following pages |
| 5.3.3.2-1 | L-0410 | Revised Response enclosed – see following pages |
| 4.4.2-1 | L-0411 | Revised Response enclosed – see following pages |
| 2.5.2-1 | L-0412 | Revised Response enclosed – see following pages |
| 2.5.4-1 | L-0413 | Revised Response enclosed – see following pages |
| 2.7.5-1 | L-0414 | Revised Response enclosed – see following pages |
| 4.4.2-9 | L-0416 | Revised Response enclosed – see following pages |

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 5.2.2-1

**Text of NRC RAI:**

Describe the extent of and the impacts from the saltwater drawn from the Gulf of Mexico during operations of LNP Units 1 and 2 on the old arm of the Withlacoochee River upstream of its confluence with the CFBC.

ER Section 5.2.2.2 states: "These freshwater contributions are the subject of current additional study, and the results will be presented in a supplement to the ER." During the site audit, PEF stated that the above statement refers to the study currently being conducted regarding the biological communities in the Withlacoochee River just downstream of the Inglis Dam and is anticipated to be available in February 2009. Describe the extent of and the impacts from saltwater drawn from the Gulf of Mexico during operations of LNP Units 1 and 2 on the old arm of the Withlacoochee River upstream of its confluence with the Cross Florida Barge Canal (CFBC).

**PGN RAI ID #:** L-0396

**PGN Response to NRC RAI:**

In addition to NRC's original RAI as stated above, additional information was also requested during a conference call on April 29, 2009. More specifically, information regarding the salinity modeling of the CFBC and the Old Withlacoochee River (OWR) was requested, as follows:

a) During low-flow conditions, the OWR is assumed to receive 70 cfs of fresh water due to leakage through/around Inglis Dam. The CFBC and the OWR are assumed to receive an additional 50 cfs of groundwater seepage. Where is the additional 50 cfs of seepage assumed to enter the CFBC and OWR systems? How was the assumption of seepage estimated and/or justified?

b) The CFBC and OWR salinity model assumes that from the CFBC-OWR junction to the proposed LNP intake location (i.e., approximately 2 mi. upstream of the junction), salinity will be reduced due to mixing with freshwater flow from the OWR with a salinity in the range of approximately 15 practical salinity units (psu). This conclusion appears to assume that the discharge from the OWR will flow upstream towards the LNP intake. Please provide more details on how this was accounted for in the modeling.

The proposed intake structure is about 6100 feet from the junction of the CFBC-OWR, and the locks are about 6900 feet from the junction. An evaluation of potential changes in salinity levels in the old arm of the Withlacoochee River has been performed and is described in Technical Memorandum 338884-TMEM-079, Rev. 1, "Estimated Salinity Changes in the Cross Florida Barge Canal and Old Withlacoochee River Channels after Levy Nuclear Plant Intake Operation" (see Attachment 5.2.2-1A).

The analysis provided in the technical memorandum was based on the results of water quality sampling, biological sampling, and surface water modeling to evaluate the potential impacts of the proposed cooling water withdrawal from the CFBC. A spreadsheet model of the salinity movement was constructed for the CFBC and the Old Withlacoochee River segments (one model for each). Salinity data obtained from the CFBC was used to calibrate the CFBC model. The USGS reports that low flow seepage under the Inglis Dam is 70 cubic feet per second (cfs). To make the model match the downstream salinity data, an additional 50 cfs of freshwater was assumed to be added just downstream of the lock to blend with the salinity from the Gulf during tidal exchanges. Seepage areas were visually observed immediately downstream of the lock during 2007 and 2008 site visits, supporting the use of additional freshwater input below the lock. Additionally, the USGS describes encountering "some steady ground-water flow from sparsely distributed fissures in the floor of the excavation" during the construction of the Inglis Lock (Reference RAI 5.2.2-1 01). No data are available concerning flow rates associated with seepage areas associated with the Inglis Lock or within the CFBC. After adding the additional freshwater seepage rates, the calibrated CFBC model was used to estimate the starting salinity at the confluence of the CFBC and the Old Withlacoochee River.

The LNP intake structure will be located near the locks on the CFBC and will withdraw approximately 190 cfs (122 million gallons per day). This withdrawal rate will exceed the amount of dry weather fresh water flow into the system of 120 cfs (i.e., 70 cfs from Inglis Dam plus 50 cfs of groundwater seepage). The additional 70 cfs will be drawn from the Gulf of Mexico up the CFBC. This will eventually result in an increase in salinity in the CFBC, with levels approaching that of the Gulf (i.e., 30 parts per thousand was assumed) at the confluence of the Old Withlacoochee River as the net flow is upstream. Because of the constant rate of freshwater leakage through the Inglis Dam, the salinity between the confluence of the CFBC and Old Withlacoochee River and the LNP intake structure will be reduced. For this assessment, it was assumed that the salinity in the CFBC would be completely mixed between the freshwater from the dam and the Gulf water moving upstream for an average salinity of 15 psu between the CFBC and Old Withlacoochee River confluence and the intake structure (50 percent of the flow from the Gulf at 30 psu and 50 percent from dam at 0 psu; see Figure 6 in Technical Memorandum 338884-TMEM-079, Rev. 1).

A conservative assessment of the Old Withlacoochee River was conducted given a conservative assumption that the salinity at the confluence of the CFBC was at 30 psu (Technical Memorandum 338884-TMEM-079, Rev. 1). The results of the water quality modeling of the Old Withlacoochee River segment indicated that the transition zone from freshwater communities to marine (saltwater) communities is expected to move upstream under this conservative assumption. However; the existing freshwater enclave near the Inglis Dam is expected to continue to have salinities below 5 parts per thousand for approximately one-half mile below the dam.

The biological monitoring identified marine (saltwater) communities in the lower reaches of the Old Withlacoochee River, transitioning to brackish and freshwater communities closer to Inglis Dam. The results of the evaluation, as described in Technical Memorandum 338884-TMEM-079, Rev. 1), indicate these communities will continue to be viable in the Old Withlacoochee River based on the salinities predicted by the modeling.

It is noted that the analysis that was described in Technical Memorandum 338884-TMEM-079, Rev. 1, was for a worst case (low flow) condition. It is also noted that there are periodic releases from Inglis Dam during storm events when water is released from Lake Rousseau. During these events, salinities in the Old Withlacoochee River segment are further reduced. This process will continue to occur after the LNP becomes operational. Technical Memorandum, 338884-TMEM-090, Rev. 0, "Historical Flow Data Analysis at Inglis Dam, Citrus County, Florida", summarizes the historical releases over Inglis Dam as reported by the USGS (see Attachment 5.2.2-1B).

**Reference**:

Reference RAI 5.2.2-1 01:

U.S. Geological Survey, 1973. "*Geohydrology of the Cross Florida Barge Canal Area With Special Reference to the Ocala Vicinity*, Water-Resources Investigations Report I-73.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 001 Attachment 5.2.2-1A.pdf
- 002 Attachment 5.2.2-1B.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 5.2.2-3

**Text of NRC RAI:**

Discuss implementation of the DWRM2 TMR groundwater model. Discuss the predicted impacts of groundwater usage at LNP.

ER Section 5.2.2 stated that groundwater would be used for general plant operations. ER Section 5.2.1.4 stated that groundwater for operations would be obtained from on-site supply wells shown in ER Figure 4.2-1. During the site audit, the NRC staff became aware that the location of the supply wells had changed from those shown in ER Figure 4.2-1 and that PEF was using a groundwater model, DWRM2 TMR, to assess operational impacts of the groundwater withdrawal. Discuss implementation of the DWRM2 TMR groundwater model that is being used to assess impacts of LNP's groundwater withdrawals from the Floridan aquifer, including how surface recharge is implemented in the model and the impact associated with using projected future water use on a county-wide level (see ER Table 2.3-20) in the assessment. Discuss SWFWMD's process for managing groundwater resources.

Discuss the predicted impacts of LNP's groundwater usage on 1) the basin- or subbasin-scale water balance, 2) potentiometric heads within the aquifer, 3) wetlands, 4) discharge to springs and other surface water bodies, 5) other groundwater users, and 6) the potential for salt water intrusion.

**PGN RAI ID #:** L-0397

**PGN Response to NRC RAI:**

Under Chapter 373, Florida Statutes (F.S.), the Southwest Florida Water Management District (SWFWMD) regulates the withdrawal of groundwater to ensure that such withdrawals do not cause harm to the water resources or interference with legal users. The SWFMWD's regulations ensure that groundwater withdrawals, both individually and cumulatively, do not cause unacceptable impacts on wetlands and surface waters and do not result in saline water intrusion. The SWFWMD evaluated the LNP's proposed groundwater withdrawals against these criteria and concerns.

The SWFWMD developed the District Wide Regulation Model version 2 (DWRM2) and uses the DWRM2 model to evaluate groundwater behavior on a regional scale. The SWFWMD also recommended that a number of conditions be placed on the LNP State Certification to ensure that groundwater withdrawals are monitored and managed over the long term (see SWFWMD Agency Report in DEP Staff Analysis Report [January 12, 2009]). Finally, pursuant to section 373.0361, F.S., the SWFWMD conducts water supply planning for this area by evaluating projected groundwater needs over a 20-year horizon. Additional discussion of the SWFWMD's process for managing groundwater resources is provided in LNP ER NRC RAI 5.2.2-2 (NPD-NRC-2009-042, dated March 27, 2009).

The wellfield modeling was performed using information exported from the SWFWMD's DWRM2 and is described in Technical Memorandum (TM) 338884-TMEM-074, Rev. 1, "Revised Conceptual Wellfield Layout and Evaluation of Simulated Drawdown Impacts, Levy Nuclear Plant." The TM provides background information on the DWRM2 model and describes the general modeling procedures. A copy of this TM is available in the Progress Energy-provided Reading Room.

The groundwater model was developed by using the telescopic mesh refinement (TMR) process from the DWRM2 regional model. The TMR process was used to refine the model cell sizes around the proposed wellfield and extract an area from the DWRM2 model centered around the wellfield. A number of wellfield locations were evaluated to assess potential drawdown impacts. A wellfield located in the southern part of the LNP property resulted in less drawdown in the Upper Floridan aquifer and the surficial aquifer system than other locations considered.

The primary reason for the reduced drawdown in the Upper Floridan aquifer with the southern wellfield is the assumed higher transmissivity of that area in the TRM model. Attachment 5.2.2-3A (Figure 1 SWFWMD DWRM2 TMR Groundwater Model Transmissivity of Layer 4 – Upper Floridan Aquifer) shows that the transmissivity of the Upper Floridan aquifer varies from 20,184 to 81,809 square feet per day ($ft^2$/day) in the northern two thirds of the property up to 144,967 to 241,309 $ft^2$/day in the vicinity of the proposed wellfield along the southern edge of the property. The assumed higher transmissivity in the area of the proposed wellfield acts to reduce the magnitude of the cone of depression around the wells and subsequently there will be corresponding reductions in water level changes in the overlying surficial aquifer system. With less drawdown in the surficial aquifer system, any anticipated impacts to wetland areas would be minimized.

The TM predicts the simulated hydrologic impacts associated with the proposed normal daily withdrawal of 1.58 mgd and 5.8 mgd peak withdrawal of groundwater from the Upper Floridan aquifer, as stated in ER Subsection 5.2.2.3. No changes to the model parameters were made other than the following:

- Two springs (Little King and Big King) were added to the model.
- Model cells that used MODFLOW's River (RIV) package to represent wetlands were changed to variable-head cells (i.e., the River package was not used to represent wetlands). This change was made based on SWFWMD staff concerns that MODFLOW's River package could provide an infinite source of water to the model and artificially limit simulated drawdowns. Model cells that used the RIV package to represent Lake Rousseau and the Withlacoochee River were not modified.
- The length of model Stress Period 3 was increased to 60 years to represent the expected operating life of the facility.

The revised wellfield layout is presented as Attachment 5.2.2-3B (Figure 2 - Raw Water Supply Well Locations). The original wellfield layout that was shown in ER Figure 4.2-1 is described and illustrated in the TM. The revised layout includes four wells located on the southern portion of the LNP property. Two wells are located along County Road 40, with two wells located to the north on the east side of the heavy haul road. Exhibit 3 in the TM depicts the original and revised wellfield layouts.

Each well was simulated to pump at a constant rate of 0.395 mgd, for a total withdrawal of 1.58 mgd. The model simulation was run for the proposed 60-year operating life of the facility. The model includes three stress periods. Stress Period 1 is a steady-state stress period that represents pre-development conditions; there are no well withdrawals simulated from the model. Stress Period 2, also steady-state, includes all other users except LNP. It is intended to provide an assessment of currently permitted impacts. Stress Period 3 is the predictive phase of the simulation. In the SWFWMD's DWRM2 model, the default period length is 1 year. For this simulation, the stress period length was increased to 60 years to represent the expected life of the facility.

The model is constructed with 5 layers, each representing a regional aquifer system within the DWRM2 model domain. Vertical flow between each layer is represented by a leakance value in the model. Recharge is applied to the uppermost layer and is calculated as net recharge. The evapotranspiration (ET) function is not used. The model layers include:

- Layer 1 – Surficial aquifer system
- Layer 2 – Intermediate aquifer or confining bed (not present at the property)
- Layer 3 – Intermediate aquifer or confining bed (not present at the property)
- Layer 4 – Upper Floridan aquifer
- Layer 5 – Lower Floridan aquifer

Each layer in the DWRM2 model has boundary conditions that govern flow into and out of the layer. The surficial aquifer system is laterally bounded by constant head cells. The vertical boundary conditions vary in the surficial aquifer system using active, drain, and river cells to define the movement of water into the surficial aquifer system. The surficial aquifer system (Layer 1) varies from 30 to 70 feet thick in the TMR model domain. Attachment 5.2.2-3C (Figure 3 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 1 – Surficial Aquifer System) shows the boundary conditions in the surficial aquifer system.

Most of the Layer 1 cells in the TMR model domain are drain cells. These cells allow water to exit the model at a set elevation. Drain cells are used to represent the high water table and groundwater discharge to land surface such as in wetlands and springs. River cells function in the same manner as drain cells but also allow water to enter the model if the simulated water level in the aquifer falls below the head of the river. River cells are used to represent surface water bodies like Lake Rousseau and the Withlacoochee River.

Layer 2 and 3 represent intermediate aquifers or confining beds in the DWRM2 model. In other areas of the SWFWMD, additional formations are present between the surficial aquifer system and Upper Floridan aquifer that function in some areas as confining beds and in other areas as minor aquifers. The two layers are bounded laterally by constant head conditions and are active cells as shown in Attachment 5.2.2-3D (Figure 4 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 2 – Intermediate 1) and Attachment 5.2.2-3E (Figure 5 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 3 – Intermediate 2).

Layer 4 is the Upper Floridan aquifer, which will be used as the source of fresh water in the wellfield. The Upper Floridan aquifer is bounded by constant head cells and all cells are active. Attachment 5.2.2-3F (Figure 6 SWFWMD DWRM2 TMR Groundwater Model

Boundary Conditions Layer 4 – Upper Floridan Aquifer) shows the boundary conditions for the Upper Floridan aquifer.

Layer 5 is the Lower Floridan aquifer. This layer represents the deeper intervals of the Floridan and in nearly the entire TMR model domain is a no-flow boundary. Lower Floridan aquifer cells are active only in the northeastern corner of the TMR model. Attachment 5.2.2-3G (Figure 7 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 5 – Lower Floridan Aquifer) shows the Lower Floridan aquifer and boundary conditions. This layer is designated no-flow in this area to represent brackish groundwater.

The model parameters of Layer 1 (surficial aquifer system) and Layer 4 (Upper Floridan aquifer) were of particular interest during model development and review. The surficial aquifer system receives nearly all of the vertical recharge through rainfall and seepage from lakes and rivers. Attachment 5.2.2-3H (Figure 8 DWRM2 TMR Model Water Budget) is a summary of the TMR model Water Budget, with LNP withdrawing 1.58 mgd. The TMR water budget shows that a significant volume of water enters the surficial aquifer system via rainfall recharge. It also shows there is an even larger volume of water moving in and out of the river cells representing Lake Rousseau and the Withlacoochee River.

Attachment 5.2.2-3I (Figure 9 SWFWMD DWRM2 TMR Groundwater Model Recharge) shows the range of net recharge values in the TMR model domain. Over most of the property, net recharge ranges from 3.7 to 8.6 inches per year (in/yr). Higher recharge values occur in the southeastern corner of the property with 8.7 to 19.4 in/yr.

Attachment 5.2.2-3J (Figure 10 SWFWMD DWRM2 TMR Groundwater Model Hydraulic Conductivity of Surficial Aquifer) is the Layer 1 hydraulic conductivity array in the model. Note how the hydraulic conductivity is decreasing from northwest to southeast across the property, with 19 to 20 feet per day (ft/day) in the northwest to 15 to 16 ft/day in the southeast.

The model simulations of drawdown are presented in the referenced TM. Based on those simulations, the following was concluded:

- Simulated incremental and cumulative surficial aquifer system and Upper Floridan aquifer drawdown in the wellfield after 60 years of operation does not exceed 0.5 foot anywhere in the wellfield except in the immediate vicinity of some wells.
- There are no wetlands with either an incremental or cumulative drawdown of 0.5 foot or greater within the proposed wellfield's area of influence.
- Under Average Day conditions, the operation of the LNP wellfield was predicted to decrease the model-simulated surficial and Floridan aquifer discharge into river cells used to represent rivers and lakes by approximately 1.1 mgd or about 0.9 percent of the simulated total flux between the Floridan aquifer and river cells in the model.
- The simulated impacts to Lake Rousseau and the lower Withlacoochee River (measured at the Bypass Canal) of 1.1 mgd are insignificant compared with the 37-year recorded average daily discharge of 687 mgd through the Bypass Canal.
- Under Average Day conditions, the operation of the LNP wellfield decreased the model-simulated discharge from the drain cells representing Big King and Little King springs by approximately 0.01 mgd or about 0.2 percent of their total simulated flux.

- The operation of LNP's proposed wellfield is not expected to adversely impact adjacent permitted users of the Floridan aquifer. The model predicts less than 0.2 foot of additional drawdown at the location of the nearest other Upper Floridan aquifer user under Average Day conditions. The model simulation for Maximum Week withdrawals estimates an additional 0.1 to 0.2 foot of drawdown at the nearest Floridan aquifer well. Wetland impacts are not expected to occur during the short duration (1 week) of the maximum week withdrawal.
- Operation of the wellfield has a very low potential for causing lateral saltwater intrusion since the predicted drawdown from the wellfield is less than 0.3 foot beyond the property boundary. The Floridan aquifer gradient in the vicinity of the wellfield is toward the coast and the CFBC and remains virtually unchanged from pumping the LNP wellfield.
- The potential exists for vertical migration of saltwater from deeper intervals of the Floridan aquifer if present at the site. There is no direct information that identifies brackish water in deeper intervals but it can be expected to occur at some unknown depth. The potential for upward migration of lower quality water will be managed by wellfield operations that will rotate the use of the wells so no well is stressed for a long period of time. Water quality monitoring at the supply and monitoring wells will be designed to detect changes in water quality.

The TM also contains a discussion of projected incremental and cumulative pumping impacts on other groundwater users, lakes, and springs in the vicinity of the LNP property. As stated in the TM, the simulated future impacts to nearby water resources were evaluated for both daily average water use and maximum weekly water use. The projected average day pumping conditions decreased the model-simulated surficial and Floridan aquifer discharge into surface water cells representing nearby rivers and lakes by approximately 1.1 mgd or about 0.9 percent of the total flux. The model-simulated discharge from drain cells representing Little King and Big King springs decreased by approximately 0.01 mgd or about 0.2 percent of the total flux through those model cells. The model-simulated impacts to surface water bodies are insignificant.

As shown in Attachment 5.2.2-3H (Model Water Budget), the total inflow and outflow in the model is about 450 mgd. The model area covers only a small portion of the three-county area surrounding the property. Attachment 5.2.2-3H contains a summary of the TMR model Water Budget with LNP withdrawing 1.58 mgd. Each layer of the model is shown with the total flow into and out of the layer for the horizontal and vertical boundaries. Inflows are highlighted in blue; outflows are highlighted in yellow. Total inflows are about 450 mgd and total outflows are 450 mgd. The LNP withdrawal comprises only about 0.4 percent of the total flux through the model.

Regional water use was summarized in ER Subsection 2.3.2.4.1 for Levy County, Subsection 2.3.2.4.2 for Citrus County, and Subsection 2.3.2.4.3 for Marion County. The total groundwater use for the three counties was 59 mgd in 2005 and is projected to be about 80 mgd in 2025. As shown in Attachment 5.2.2-3H, the model groundwater budget, which includes only a small portion of the area of these three counties, is approximately 450 mgd. This is over 5.5 times the projected water use in these three counties. Therefore, the LNP withdrawal of 1.58 mgd is insignificant compared with the total model flux and the regional groundwater resources.

The NRC requested the following additional information during a conference call on April 29, 2009:

- Confirm that the last sentence of the description for Layer 5 is worded correctly. Based on Figure 7, the northeast corner of the model is designated as an active or constant head boundary condition, which would be consistent with implementing brackish groundwater upwelling at this boundary.
- The model uses 2001 data to define withdrawals for adjacent permitted users. The RAI response provides the projected usage increases for Levy, Citrus, and Marion Counties (combined) between 2005 and 2025, but it is unclear how these data should be used to project increased usage for wells within the TMR model domain. Can either of the following usage amounts be provided: 1) combined three county usage for 2001; or 2) well usage within the TMR model domain for 2005?

The SWFWMD's DWRM2 model (used to create the TMR model submitted with the application) is based on the United States Geological Survey's (USGS's) groundwater flow model (Reference RAI 5.2.2-3 01), known as the "Mega-Model" (Reference RAI 5.2.2-3 02). The Mega Model documentation states that:

> *Because this model is restricted to simulating the movement of freshwater within aquifers, areas where the intermediate aquifer system (IAS), the upper Floridan aquifer (UFA), and the lower Floridan aquifer (LFA)... contain water with chloride concentrations exceeding 5,000 mg/L are considered inactive, thus minimizing potential errors introduced by simulating aquifer areas containing water of variable density....*
>
> *... The saltwater part of the Floridan aquifer System (FAS) was not included in the model because the interface is relatively sharp and movement of the interface is assumed to have little or no effect on simulated heads.... The assumption was made that a sharp freshwater-saltwater interface occurs laterally and that flow across this interface is negligible. This sharp interface determined which model areas were considered active.*

Consequently, any portion of the LFA that is active in the TMR model is not considered to be salt water. For this reason, the statement that portions of Layer 5 are designated no-flow in the study area to represent brackish groundwater is correct.

Cumulative (permanent plus transient) population projections for the 16 km (10-mile) area surrounding the facility for the years 2000 through 2080 were compiled in Table 2.1.3-201 and Table 2.1.3-202 of the LNP FSAR. These data were used to interpolate population estimates for 2001, 2002, 2003, 2004 and 2071 through 2079 as shown in Table 1. The 10-mile radius encompasses the majority of the area covered by the extracted model (See Attachment 5.2.2-3K (Figure 11 - TMR Model Grid, Adjacent Users, and 10-Mile Buffer). The rate of population increase was used to specify the pumpage for wells in the TMR model domain as it is assumed that water demand will increase at the same rate as the population growth.

The LNP facility is expected to start up in 2018 and operate for 60 years, until 2078. The population increase between 2001 (the baseline agreed to on the May 14, 2009 teleconference with the NRC); and 2078, is 77,501; a 293 percent growth. Attachment 5.2.2-3L (Figure 12 - Simulated SAS and UFA 2078 Water Levels) depicts the simulated

2078 surficial aquifer system (SAS) and UFA water levels for currently permitted groundwater users.

**Table 1**
**Population Estimates in a 10-mile Radius of the LNP Site for the Period from 2000 through 2080**

| Year | Cumulative Population |
|---|---|
| 2000 | 25,793 |
| 2001[a] | 26,437 |
| 2002[a] | 27,082 |
| 2003[a] | 27,726 |
| 2004[a] | 28,371 |
| 2005 | 29,015 |
| 2010 | 32,526 |
| 2015 | 35,551 |
| 2020 | 38,749 |
| 2030 | 43,885 |
| 2040 | 52,370 |
| 2050 | 62,598 |
| 2060 | 74,906 |
| 2070 | 89,754 |
| 2071[1] | 91,527 |
| 2072[1] | 93,300 |
| 2073[1] | 95,073 |
| 2074[1] | 96,846 |
| 2075[1] | 98,620 |
| 2076[1] | 100,393 |
| 2077[1] | 102,166 |
| 2078[1] | 103,939 |
| 2079[1] | 105,712 |
| 2080 | 107,485 |

Notes:
1) Population estimates for these years were interpolated from estimates (5-year intervals) in ER Table 2.1.3-201 and Table 2.1.3-202.

**References**:

Reference RAI 5.2.2-3 01

Southwest Florida Water Management District, "Development of the District Wide Regulation Model for Southwest Florida Water Management District," Brooksville, FL., 2004.

Reference RAI 5.2.2-3 02

U.S. Geological Survey, "Simulation of Ground-Water Flow in the Intermediate and Floridan Aquifer Systems in Peninsular Florida," Tallahassee, FL., 2002.

**Associated LNP COL Application Revisions:**

The correct 2015 population estimate for the 10-mi radius is 35,551 instead of 37,482 as previously reported in the LNP ER and FSAR. FSAR Table 2.1.3-202 and ER Table 2.5-2 were not revised to match the revisions provided in the calculation, LNG-0000-X0C-001, Rev. 0, "Calculation of Population Distribution."

FSAR Table 2.1.3-202 and ER Table 2.5-2 will be revised to provide the most recent population estimates for the year 2015.

The year 2015 data in FSAR Table 2.1.3-202 and ER Table 2.5-2 will be revised from:

| **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** |

To read:

| **2015 Population** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Residential Total** | 18 | 99 | 398 | 2160 | 2266 | 19,192 | **24,133** |
| **Cumulative Total** (Residential plus Transient) | 82 | 265 | 638 | 2521 | 2805 | 29,240 | **35,551** |

**Attachments/Enclosures:**

- 003 Attachment 5.2.2-3A.pdf (Figure 1 SWFWMD DWRM2 TMR Groundwater Model Transmissivity of Layer 4 – Upper Floridan Aquifer)
- 004 Attachment 5.2.2-3B.pdf (Figure 2 Raw Water Supply Well Locations)
- 005 Attachment 5.2.2-3C.pdf (Figure 3 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 1 – Surficial Aquifer System)
- 006 Attachment 5.2.2-3D.pdf (Figure 4 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 2 – Intermediate 1)

- 007 Attachment 5.2.2-3E.pdf (Figure 5 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 3 – Intermediate 2)
- 008 Attachment 5.2.2-3F.pdf (Figure 6 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 4 – Upper Floridan Aquifer)
- 009 Attachment 5.2.2-3G.pdf (Figure 7 SWFWMD DWRM2 TMR Groundwater Model Boundary Conditions Layer 5 – Lower Floridan Aquifer)
- 010 Attachment 5.2.2-3H.pdf (Figure 8 DWRM2 TMR Model Water Budget with LNP Withdrawing 1.58 mgd)
- 011 Attachment 5.2.2-3I.pdf (Figure 9 SWFWMD DWRM2 TMR Groundwater Model Recharge)
- 012 Attachment 5.2.2-3J.pdf (Figure 10 SWFWMD DWRM2 TMR Hydraulic Conductivity of Surficial Aquifer)
- 013 Attachment 5.2.2-3K.pdf (Figure 11 TMR Model Grid, Adjacent Users, and 10-Mile Buffer)
- 014 Attachment 5.2.2-3L.pdf (Figure 12 Simulated SAS and UFA 2078 Water Levels)

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.3.1-1

**Text of NRC RAI:**

Clarify the 100-year floodplain map shown in ER Figure 2.3-11.

ER Figure 2.3-11 shows the 100-year floodplain near the LNP site and vicinity. It is unclear whether the LNP site is inside the 100-year floodplain in ER Figure 2.3-11 due to the poor quality of the figure. Provide a publication-quality figure that is clearly reproducible in black and white as well as an explanation, with references, as to how the 100-year floodplain was determined. Provide an estimate of loss of floodplains due to the construction of LNP facilities and the site grading. Describe how the floodplain loss would be mitigated.

**PGN RAI ID #:** L-0398

**PGN Response to NRC RAI:**

ER Figure 2.3-11 illustrates the 100-year floodplain, which are mapped as a Zone A by the Federal Emergency Management Agency (FEMA), as well as the LNP site boundary, the relative locations of LNP 1 and LNP 2, and the surrounding area within a 6-mile radius. Attachment 2.3.1-1A (Figure 1) and Attachment 2.3.1-1B (Figure 2) provide additional detail of the 100-year floodplain relative to the footprints of the structures associated with LNP 1 and LNP 2. Figure 1 is a revised version of ER Figure 2.3-11, that indicates that the flood zone is the *Existing* 100 Year Flood Zone at the Site prior to any construction activities.

The digital 100-year floodplain data used to develop ER Figure 2.3-11, Figure 1, and Figure 2 was obtained from FEMA's Draft *Q3 Flood Data Users Guide* dated March 1996 (see Attachment 2.3.1-1C). As described in the Q3 Flood Data Users Guide, the 1968 National Flood Insurance Act required the identification of all floodplain areas within the United States. Floodplain areas are identified through Flood Insurance Studies (FISs), which are hydrologic and hydraulic studies of flood risks developed by FEMA. Using the results of an FIS, FEMA prepares a Flood Insurance Rate Map (FIRM) that depicts the spatial extent of Special Flood Hazard Areas (SFHAs). SFHAs are areas subject to inundation by a flood having a 1-percent or greater probability of being equaled or exceeded during any given year (i.e., a 100-year flood). In addition to developing initial FISs, FEMA is responsible for maintaining the FIRMs as communities grow, as new or better scientific and technical data concerning flood risks becomes available, and as some FISs become outdated by the construction of flood control projects or the urbanization of rural watersheds. In 1992, FEMA began converting the FIRMs to digital format. To support disaster recovery operations, FEMA has developed specifications for a digital product known as the "Q3 Flood Data." This product is designed to allow rapid access to and distribution of digital FIRM data and it is compatible with all existing digital FIRM data already available or under development.

Q3 Flood Data are developed by scanning existing hardcopy FIRMs to create a raster product suitable for viewing or printing and vectorizing a thematic overlay of flood risks. Q3 Raster FIRM files contain all FIRM data in raster format, but only certain features are

contained in the vector Q3 Flood Data files. The 1-percent annual probability floodplain areas are contained in the vector Q3 Flood Data files. Each Q3 Flood Data file is accompanied by a metadata file that meets the Federal Geographic Data Committee's guidelines for metadata as contained in the Content Standards for Digital Geospatial Metadata. The metadata files are ASCII text files that describe the contents of and sources used for each Q3 Flood Data file. In addition, the metadata file provides information specific to the county, including the FIRMs that were digitized. The metadata file associated with the Q3 Flood Data used to develop ER Figure 2.3-11 and Figures 1 and 2 is attached to this response (see Attachment 2.3.1-1D).

The Q3 Flood Data files are distributed only after they have passed checking routines contained in FEMA's Q3QA Checking Software. The data are accompanied by documentation showing that the files have been evaluated and passed. FEMA has established a User Support mechanism through which any problems found with the data can be identified and channeled back to FEMA for resolution. The attribute accuracy of the Q3 Flood Data vector files is tested by manual comparison of source FIRM with hardcopy plots and a symbolized display on an interactive computer graphic system. Selected attributes that cannot be visually verified are queried individually. In addition, FEMA's Q3QA Checking Software program is applied to the dataset to test the attributes against a master set of valid attributes and attribute combinations.

FEMA's Q3 Flood Data for Citrus, Marion, and Levy counties were obtained from the Florida Geographic Data Library and are presented in Figures 1 and 2 in the vicinity of the footprints of LNP 1 and LNP 2 and the limits of disturbance. As can be seen on Figure 1, the footprints of LNP 1 and LNP 2 intersect the existing 100-year flood zone. Figure 2 shows the estimated limits of disturbance at the LNP site and includes both temporarily disturbed (i.e., construction limits) and permanently disturbed (i.e., building footprints) areas and a 50-foot buffer around these areas. The total estimated limit of disturbance at the LNP site and facilities from the site to the CFBC is approximately 1,190 acres (ac.), with approximately 64 percent, or 760 acres, affecting the 100-year flood zone. Much of the affected areas are expected to include only clearing, clearing with excavation, or clearing with fill related activities, to provide the LNP permanent facilities and stormwater ponds.

Fill will be required within a portion of the floodplain within the limits of disturbance as discussed in LNP ER Subsections 3.6.3.2, 4.1.1.1.2.1, 4.1.2.2.1, and 4.2.1. Specifically, the following items are discussed:

- The wet detention ponds are designed to retain a 25-year, 24-hour rainfall event; larger storm events, such as the 100-year rainfall, will be drained out of the ponds through broad-crested weir emergency spillways provided in each of the ponds. A minimum freeboard of 0.6 meter (2 feet) will be provided for each pond above the spillway elevation. Therefore, the ponds will set the actual floodplain elevation at the plant site.

- Pipes will maintain drainage patterns, which will equalize the water levels on each side of the site roads.

ER Table 1.2-1 summarizes the Federal, State, and Local requirements. State and local requirements will be incorporated into the Florida Site Certification for the project. The on-site floodplains are designated by the FIRM as Zone A, which is defined as "no base flood elevations determined". The Zone A FIRM mappings are based on wetland and soil features visible on aerial photographs, but do not have a base flood elevation modeled. Additional information regarding floodplain related requirements and compliance are as follows:

- Levy County Code of Ordinances Chapter 50 Article VI Flood Damage Protection specifies requirements for development within the floodplain, which includes approval from the Zoning Manager and a certificate of compliance with floodplain requirements of Southwest Florida Water Management District (SWFWMD). The County Code states approvals will not allow "fills, structures, or other features that will individually or collectively increase the flood elevations beyond the upstream property limits of the developer's property line." To meet the Levy County Code, the project must be consistent with SWFWMD Environmental Resource Permit (ERP) requirements discussed below to demonstrate no adverse off-site impact.
- FDEP will use the SWFWMD ERP Basis of Review (BOR) to evaluate work within the floodplain. The BOR requires no net encroachment into the 100-year floodplain that will adversely affect conveyance, storage, water quality, or adjacent lands. To meet the FDEP/SWFWMD criteria, one of the following will be required:
  - Provide 1:1 compensation storage for floodplain impact volumes;
  - Prepare pre/post-project computations without compensatory storage to define the existing floodplain base flood elevations and to demonstrate no adverse off-site rise from the project; or
  - Determine partial compensatory storage to ensure that the computations demonstrate no adverse off-site rise
- Title 10 Section 1022 CFR is to "identify, evaluate, and as appropriate, implement alternative actions that may avoid or mitigate adverse floodplain and wetland impacts." This is consistent with the ERP requirements discussed above; therefore, this federal requirement will be addressed as part of the ERP.

Progress Energy plans to conduct calculations by early 2010 to identify base flood elevations for existing conditions and to determine if any mitigation in the form of compensatory storage is necessary for the proposed conditions.

The following items are important relative to the floodplain evaluation that will be developed to meet local, state, and federal requirements:

- There are no creeks, streams, or other similar channels on the property. The native landscape has been severely altered by ridges and furrows used during past silviculture activities so overland flows are disrupted and slowed significantly.
- Pipes will direct conveyance under new roadways. No new channels or ditches will be constructed to convey stormwater off-site. Flow will be maintained as overland flow as much as possible at the project site boundaries and stormwater in the vicinity of developed areas will be collected in dedicated stormwater ponds.
- Storage capacity will be maintained in the on-site wetland sloughs to the greatest extent possible. Additional storage for the new facilities will be provided in the proposed wet detention ponds on-site and swales adjacent to roads. The need for compensatory storage as mitigation for floodplain fill will be assessed further during the ERP process, as described above.
- Water quality will be addressed by compliance with Chapter 5 of the SWFWMD BOR requirements.

- No impact to adjacent lands is expected because there are no streams or creeks leaving the property. Also there are no residential subdivisions or other developments adjacent to the site that would be affected by such a small increase in water depth across the site.

**Associated LNP COL Application Revisions:**

Revise ER Figure 2.3-11 as follows:

- Change the title to "Existing 100 Year Flood Zone at LNP Site."
- Include an inset that shows the 100-year floodplain in the vicinity of the structures associated with LNP 1 and LNP 2.

ER Table 1.2-1 will be revised as follows:

- In the sixth entry on page 1-10 (Levy County), change the reference to "Article VI Division 3 Section 50" to "Article VI."
- Add two new entries following the above entry, duplicating the above information for each column with the following modifications:
  - First duplicate: change "Levy County" to "FDEP" and change "Authority" to "Chapter 40B-4 F.A.C."
  - Second duplicate: change "Levy County" to "NRC" and "Authority" to "Executive Order 11988."
- Add new entry following the above entry with the following information: "Issuing Agency" to "FEMA", "Activity" to "Post-construction FIRM flood map change", "Permit/Authorization" to "Letter of Map Revision," and "Authority" to "44 CFR 65.5(a)."
- In the third entry on page 1-11 (FDEP ERP permit), change the reference to Chapter "40B-400" to "40D-4."
- In the seventh, eighth, and ninth entries on page 1-12 (WMD permits), change the reference to "40B" (B is Suwannee River WMD) to "40D" (SWFWMD).
- On page 1-16, add "FEMA" to the acronym list (Federal Emergency Management Agency).
- On page 1-16, add "FIRM" to the acronym list (Flood Insurance Rate Map).

**Attachments/Enclosures:**

- 015 Attachment 2.3.1-1A.pdf
- 016 Attachment 2.3.1-1B.pdf
- 017 Attachment 2.3.1-1C.pdf
- 018 Attachment 2.3.1-1D.pdf.

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.3.1-3

**Text of NRC RAI:**

Provide a publicly available reference regarding the Class III waters designation for the Crystal River Energy Complex (CREC) discharge canal and any requirements the LNP blowdown discharge into the CREC discharge canal would need to meet.

With respect to ER Section 2.3.3, provide a publicly available reference that documents the status of the CREC discharge canal as Florida Class III waters. Describe the requirements that the LNP blowdown, proposed to be discharged into the CREC discharge canal, would need to meet.

**PGN RAI ID #:** L-0399

**PGN Response to NRC RAI:**

The Crystal River Energy Complex (CREC) discharge canal is an existing "discrete conveyance" that is a part of the permitted point source and, therefore, is not jurisdictional waters. In accordance with Florida Rule 62-302.520(3)(g), F.A.C., the point of discharge for a thermal discharge is "that point at which the effluent physically leaves its carrying conduit (open or closed), and discharges into the waters of the state..." This rule indicates that the discharge canal, prior to the point of actual discharge to the Gulf of Mexico, is not considered to be jurisdictional waters.

The discharge requirements of the LNP blowdown are still under consideration by FDEP as part of the state-administered National Pollutant Discharge Elimination System (NPDES) permitting process. It is anticipated that the combined LNP discharge will be required to meet the federal 40 Code of Federal Regulations (CFR) 423 effluent criteria requirements for new steam electric power generating plants, which are incorporated by reference in Florida Rule 62-660.400, F.A.C. Typically, compliance with 40 CFR 423 requirements is required based on monitoring at an internal outfall prior to commingling with another waste stream. The combined LNP-CREC discharge will also be required to be compliant with water quality-based effluent limitations prior to its release into the Gulf of Mexico in accordance with Rule 62-650, F.A.C.

**Associated LNP COL Application Revisions:**

LNP ER Subsection 2.3.3.1 on page 2-105 will be revised from:

> "The water bodies near the LNP include the Withlacoochee River, Waccasassa River, Rainbow Springs, CFBC, and CREC discharge canal. These water bodies are classified by the FDEP as CLASS III (recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife) waters. Florida's surface water quality standards system is published in 62-302 (and 62-302.530) of the F.A.C.

Water samples were collected and analyzed for PEF quarterly during 2007 at sampling stations SS-1 and SS-2. PEF also collected samples at sampling stations along the CFBC and into the Gulf of Mexico from October through December 2007. The locations of these sample stations are shown on Figure 2.3-8. Historical USGS data were also reviewed. The analytical data from the PEF sampling events and from the historical USGS sampling are summarized in the following subsections."

To read (changes in bold typeface):

The water bodies near the LNP include the Withlacoochee River, Waccasassa River, Rainbow Springs, **and the** CFBC. These water bodies are classified by the FDEP as CLASS III (recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife) waters. Florida's surface water quality standards system is published in 62-302 (and 62-302.530) of the F.A.C.

"Water samples were collected and analyzed for PEF quarterly during 2007 at sampling stations SS-1 and SS-2. PEF also collected samples at sampling stations along the CFBC and into the Gulf of Mexico from October through December 2007. The locations of these sample stations are shown on Figure 2.3-8. Historical USGS data were also reviewed. The analytical data from the PEF sampling events and from the historical USGS sampling are summarized in the following subsections."

**Attachments/Enclosures:**

None

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 9.4.2-1

**Text of NRC RAI:**

Provide descriptions of: 1. all alternatives for the intake system, 2. how the additional LNP blowdown discharge may impact operational flexibility of CREC, and 3. how alternative water treatment systems were considered.

ER Section 9.4.2.1 describes the alternative intake systems for the LNP project. NRC staff needs the following additional information to have a complete understanding of all alternatives that PEF considered and the bases for why some alternatives were rejected:

1. Provide a description of all alternatives for the intake system considered for the proposed LNP facility. Also provide a description of the bases used to reject alternatives other than the proposed intake system.
2. ER Section 9.4.2.1.1.3 states: "There is the potential that NPDES permit compliance would be an issue with the blowdown to the CREC discharge canal. The CREC discharge canal receives discharge from the five CREC generating units, and additional loading of this system could limit operational flexibility. CREC has implemented helper cooling towers to meet thermal limits without cutting back on power generation." Provide a description of how the additional LNP blowdown to the CREC discharge canal may impact operational flexibility of CREC.
3. Provide a description of alternative water treatment systems considered. Also provide a description of the bases used to reject alternatives other than the proposed water treatment system.

**PGN RAI ID #:** L-0400

**PGN Response to NRC RAI:**

1. Several potential intake (makeup) water alternatives were identified based on a preliminary consideration of engineering, regulatory, and environmental factors. In evaluating these makeup water alternatives, a simple ranking system was employed, the intent of which was to allow the information associated with each alternative to be summarized and compared on a relative basis. Some of the factors used in the analysis involved subjective considerations based on a combination of available information and best professional judgment.

   Key environmental considerations in determining the viability of source water alternatives were the ability to route a pipeline to the source location, water quantity, the reliability of future supply, water quality, and environmental impacts. The overall feasibility of a given makeup water alternative included the consideration of a variety of factors, including the following:

- Quantity/Quality – Refers to the availability of water in sufficient quantity and of sufficient quality to support the proposed project.
- Engineering – Refers to the perceived degree of difficulty in implementing and constructing a given alternative.
- Natural Resources Impacts – Refers to the perceived potential effect of a given alternative on the natural environment.
- Regulatory Compliance – Refers to the perceived degree of difficulty in obtaining required regulatory permits and/or approvals.
- Cost – Evaluates the potential cost of a given alternative.

PEF identified and considered freshwater and saltwater alternatives for the source of LNP's makeup water, as set forth in Tables 9.4.2-1-001 and 9.4.2-1-002, respectively. The tables summarize each makeup water alternative evaluated by PEF.

Table 9.4.2-1-001
Summary of Freshwater Makeup Water Alternatives Considered for LNP

| Alternative | Description |
|---|---|
| **Surficial Aquifer** | **Generally extends to a depth of 6 to 12 m (20 to 40 ft.) below ground surface (bgs) . The limited size and capacity of the surficial aquifer would not supply sufficient makeup water to the LNP and therefore was not considered as a viable alternative.** |
| **Upper Floridan Aquifer** | **An unconfined or semi-confined aquifer extending from approximately 15 to 182.9 m (50 to 600 ft.) bgs and probably contains freshwater in the upper 61 to 91 m (200 to 300 ft.) bgs, and the water is expected to be more brackish with depth.** |
| **Lower Floridan Aquifer** | **Extends from approximately 243 m (800 ft.) to approximately 548 m (1800 ft.) bgs.** |
| **Fresh Surface Water** | **The Withlacoochee River and Lake Rousseau are the fresh surface waters within the LNP site vicinity. The Withlacoochee River is designated as an Outstanding Florida Water (OFW) and is therefore afforded a high degree of regulatory protection. The Withlacoochee River Basin Board has made the restoration of Lake Rousseau and the Lower Withlacoochee River a priority in their Fiscal Year 2006 Basin Priorities Statement.** |
| **Reuse Water** | **Generally, treated domestic or industrial wastewater used as an alternative supply to offset the demand of potable water. Because there is a relatively low population and little industry in the region, the review identified no sources of reuse water in the LNP site vicinity sufficient to support LNP requirements. Reuse of municipal wastewater, if it were available, is consistent with state policy and would be strongly supported by the regulatory agencies; however, challenges may occur when considering the concentration and disposal aspects of a reuse water source. Nutrient concentrations could be a significant issue, depending on the location of the blowdown discharge.** |

Table 9.4.2-1-002
Summary of Saltwater Makeup Water Alternatives Considered for LNP

| Alternative | Description |
|---|---|
| **CFBC near Inglis Lock** | **Makeup water pipeline would draw water from the CWIS located on the CFBC just below the Inglis Lock, near the upstream end of the CFBC.** |
| **Nearshore of Withlacoochee Bay** | **A makeup water pipeline would extend into Withlacoochee Bay, within 1.6 km (1 mi.) of the shoreline. The specific location and design would be selected to meet environmental and engineering criteria. The dredged portions of the CFBC extend into Withlacoochee Bay and beyond.** |
| **Offshore of Withlacoochee Bay** | **A makeup water pipeline would connect to the CWIS located in coastal waters at a distance 4.8 to 8 km (3 to 5 mi.) from the Withlacoochee Bay shore. The specific location would be selected to meet environmental and engineering criteria. The dredged portions of the CFBC extend into the Withlacoochee Bay and beyond.** |
| **CREC Intake Canal** | **Draw makeup water from the CREC intake canal.** |
| **CREC Discharge Canal** | **Draw makeup water from the CREC discharge canal.** |

A discussion of the freshwater and saltwater makeup source water alternatives is presented in ER Subsections 9.4.2.1.1.1 and 9.4.2.1.1.2, respectively. In addition, a detailed evaluation of potential sources of makeup water is presented in the Technical Memorandum 338884-TMEM-073, Rev. 0, "Environmental Review of Potential Cooling Tower Makeup Water Sources and Blowdown Alternatives, Levy Nuclear Plant (LNP), Levy County, Florida" (June 30, 2008). This TM is available in the Progress Energy-provided Reading Room. The basis for selecting the makeup water alternative is described in this technical memorandum.

2. The CREC discharge canal is currently permitted for discharge (Crystal River Plant Units 1, 2, and 3–Permit No. FL0000159; Crystal River Plant Units 4 and 5–Permit No. FL0036366). The CREC point of discharge is located at latitude 28°58'00" N, longitude 82°41'40" W. One of the CREC permits will be modified to include the LNP discharge. CREC Units 4 and 5 cooling towers discharge into a concrete-lined, open channel. This 0.7-mile open channel drains directly into the CREC discharge canal approximately 1.1 miles from the Gulf of Mexico. The LNP discharge pipeline (two 54-inch HDPE pipes, per the conceptual design) will discharge directly into the CREC discharge canal, just downstream of the culverts for Units 4 and 5. A headwall structure will have to be designed to terminate the LNP pipeline.

   The addition of LNP wastewater to the CREC discharge canal is projected to result in compliance with all regulatory requirements prior to release into the Gulf of Mexico via the final outfall. The LNP discharge could affect operational flexibility of CREC in the sense that it consumes a portion of the assimilative capacity of the existing CREC discharges.

3. A description of the proposed intake water treatment system (cooling water) is provided in LNP ER Subsection 3.3.2.

The LNP discharges may include, but are not limited to, cooling tower blowdown, liquid waste, and treated sanitary waste. These discharge streams are typically monitored for multiple constituents, such as the following:

- Temperature
- Flow
- pH
- Fecal coliform
- Free available chlorine
- Oxidants
- Total residual chlorine
- Total suspended solids
- Hydrazine
- Oil and grease
- Total nickel
- Total manganese
- Total chromium
- Total zinc
- Total copper
- Total nitrogen
- Total phosphorus
- Total mercury
- Total selenium
- Total iron

For wastes discharged to surface waters, PEF must comply with an NPDES permit issued by the FDEP. The chemicals that will be used will be subject to review and approval for use by the FDEP.

Sargent & Lundy performed an engineering evaluation to select water treatment chemicals for the Circulating Water System (CWS) as well as other systems in support of a COLA for Levy. In this evaluation, Sargent & Lundy considered various alternatives. In general, the specific types of treatment chemicals were selected based on an evaluation of water chemistry and treatment requirements, accepted industry practices, and relevant industry operating experience with similar waters.

A detailed discussion of the alternatives considered and the rationale for treatment chemical selection was described in "Evaluation of Oxygen Scavenger, pH Control Agent, Potable Water Biocide, and Cooling Water Chemicals" (see Attachment 9.4.2-1A). Evaporation of water from cooling towers leads to an increase in chemical and solids concentrations in the circulating water, which in turn increases scaling tendencies of the water. A water treatment system would be required at the LNP to minimize bio-fouling, prevent or minimize growth of bacteria (especially *Legionella*, in the case of cooling towers), and inhibit scale on system heat transfer surfaces. Water treatment will be required for both influent and effluent water streams. Considering that water sources for the LNP are nearly the same as those for the CREC, treatment methodologies used at the CREC should be representative of future requirements at LNP.

The proposed circulating water treatment system provides treated water for the cooling water system and consists of three phases: makeup treatment, internal circulating water

treatment, and blowdown treatment. Makeup treatment will consist of a biocide injected into makeup water influent during spring, summer, and fall months to minimize marine growth and to control fouling on surfaces of the heat exchangers. Treatment will improve the quality makeup water and will allow increased cycles of concentration in the cooling tower. Similar to the CREC, an environmental permit to operate this treatment system will be obtained from the State. For prevention of *Legionella*, treatment for internal circulating water components (that is, piping between the new intake structure and condensers) will include existing power-industry control techniques that consist of hyperchlorination (chlorine shock) in combination with intermittent chlorination at lower levels, biocide (for example, bromine), and scale-sludge inhibitor. Blowdown treatment will depend on water chemistry but is anticipated to include application of an acid, biocide, and scale inhibitor to control pH, biogrowth, and scaling, respectively.

The detailed design of the intake structure has not been completed at this time. Specific measures to be employed will be determined by the designer in consultation with PEF during detailed design. It is expected that measures being used at the CREC will be used for LNP cooling water intake structure. These CREC measures include:

- Use of Ameron ABC#3 (or similar) copper-based anti-fouling coating on items such as pump suction housings and sensor tubes.
- Mechanical scraping and high-pressure washing on a routine basis. (CREC physically removes the bar racks and mechanically cleans them away from the intake once per quarter).
- Use of divers to inspect and perform spot cleaning as needed. (CREC conducts these inspections twice per year.)
- As a bio-deterrent, PEF has been using ClamTrol (Spectrus CT1300) injections into the intake structure in accordance with the NPDES permit limitations. The CREC permit allows injection every 21 days for a maximum duration of 18 hours at a rate not to exceed 4.5 mg/L. Other facilities that PEF operates in Florida allow similar injections on a 14-day cycle.

No routine treatment is expected for the discharge structure, because none is used at CREC currently. The outlet piping is sized large enough that in all cases the small amount of growth occurring in the discharge piping will have no affect on system operation.

Sanitary systems installed for pre-construction activities include portable toilets, which will be supplied and serviced by an off-site vendor. During construction and operation of the LNP, sanitary system wastes will be treated and disposed of off-site in accordance with FDEP requirements. Sanitary system discharges as proposed during operations will be via the blowdown lines to the CREC discharge canal and then to the Gulf of Mexico. Modifications to any wastewater system at LNP will be addressed with FDEP via their NPDES permitting authority. Discharges will be controlled in compliance with an approved NPDES permit for the LNP, which will be issued by FDEP.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

019 Attachment 9.4.2-1A.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 7.1-1

**Text of NRC RAI:**

Provide source terms by isotope and release period for use in confirming the design basis accident dose calculations.

Provide source terms by isotope and release period for use in confirming the design basis accident (DBA) dose calculations. The confirmation of the DBA dose calculations is required because the NRC review of Revision 17 of the AP1000 design certification application has not been completed and the design is not yet certified.

Staff experience from similar situations (i.e., environmental review preceding design certification) has shown that the environmental review should not proceed without verifying the DBA dose calculations because of errors identified in previous applications.

The response to NRC RAI 7.1-1 provided in PGN RAI ID L-0080 contains isotopic source terms for design basis accident calculations. The response is incomplete and in at least one instance contains source terms that are not consistent with doses listed in ER and the AP1000 DCD. Consequently, staff has the following request:

a. Isotopic source terms were not provided for the worst 2-hr period for use in calculating EAB doses for 6 DBAs. Provide the worst 2-hr isotopic source terms for the following AP1000 design basis accidents:

   I. main steam line break with accident initiated iodine spike

   II. main steam line break with pre-existing iodine spike

   III. locked rotor accident with feedwater

   IV. rod ejection accident

   V. steam generator tube rupture with accident initiated iodine spike

   VI. steam generator tube rupture with pre-existing iodine spike

b. Isotopic source terms provided in the response for the rod ejection accident for the 8 to 24 hr period and the 24 to 96 hr period are not consistent with the DCD and Levy County LPZ doses for those periods. Provide correct source terms or correct the doses.

**PGN RAI ID #:** L-0401

**PGN Response to NRC RAI:**

The following tables provide the source terms by isotope and release period used in the AP1000 DBA dose calculations. Attachment 7.1-1A provides the response to the NRC Supplemental RAI issues.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

020 Attachment 7.1-1A.pdf

## AP1000 Loss of Coolant Accident (LOCA) Activity Releases (Ci)

| Isotope | (1.4 – 3.4 hr) | (0-2 hr) | (2 – 8 hr) | (8 – 24 hr) | (24 – 72 hr) | (72 – 96 hr) | (96 – 720 hr) |
|---|---|---|---|---|---|---|---|
| I-130 | 5.64E+01 | 3.24E+01 | 7.85E+01 | 6.21E+00 | 5.11E-01 | 1.17E-01 | 6.00E-03 |
| I-131 | 1.68E+03 | 9.19E+02 | 2.57E+03 | 2.56E+02 | 1.33E+02 | 5.84E+01 | 5.79E+02 |
| I-132 | 1.23E+03 | 8.79E+02 | 1.26E+03 | 1.62E+01 | 6.00E-03 | 0.00E+00 | 0.00E+00 |
| I-133 | 3.23E+03 | 1.82E+03 | 4.72E+03 | 3.71E+02 | 7.41E+01 | 9.90E+00 | 7.80E+00 |
| I-134 | 6.60E+02 | 7.09E+02 | 4.29E+02 | 3.07E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| I-135 | 2.56E+03 | 1.54E+03 | 3.36E+03 | 1.56E+02 | 4.79E+00 | 1.00E-02 | 0.00E+00 |
| Kr-85m | 1.42E+03 | 6.32E+02 | 3.14E+03 | 1.87E+03 | 8.60E+01 | 0.00E+00 | 0.00E+00 |
| Kr-85 | 8.31 E+01 | 3.22E+01 | 2.65E+02 | 7.06E+02 | 1 .06E+03 | 5.28E+02 | 1 .36E+04 |
| Kr-87 | 1.10E+03 | 6.88E+02 | 1.26E+03 | 5.00E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Kr-88 | 3.11 E+03 | 1 .50E+03 | 5.76E+03 | 1 .70E+03 | 1 .70E+01 | 0.00E+00 | 0.00E+00 |
| Xe-131m | 8.26E+01 | 3.21E+01 | 2.62E+02 | 6.79E+02 | 9.42E+02 | 4.31E+02 | 5.57E+03 |
| Xe-133m | 4.43E+02 | 1.74E+02 | 1.37E+03 | 3.15E+03 | 3.14E+03 | 9.65E+02 | 2.58E+03 |
| Xe-133 | 1.47E+04 | 5.71E+03 | 4.62E+04 | 1.16E+05 | 1.46E+05 | 5.97E+04 | 4.07E+05 |
| Xe-135m | 1.06E+01 | 3.33E+01 | 2.62E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xe-135 | 3.15E+03 | 1.31E+03 | 8.33E+03 | 1.01E+04 | 2.06E+03 | 4.00E+01 | 1.00E+01 |
| Xe-1 38 | 3.11 E+01 | 1.1 4E+02 | 6.90E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rb-86 | 3.04E+00 | 1 .72E+00 | 4.60E+00 | 2.80E-01 | 1 .00E-03 | 0.00E+00 | 8.00E-03 |
| Cs-134 | 2.58E+02 | 1.46E+02 | 3.92E+02 | 2.40E+01 | 1.00E-01 | 0.00E+00 | 1.20E+00 |
| Cs-136 | 7.33E+01 | 4.14E+01 | 1.11E+02 | 6.70E+00 | 0.00E+00 | 0.00E+00 | 2.00E-01 |
| Cs-137 | 1.51E+02 | 8.49E+01 | 2.28E+02 | 1.41E+01 | 0.00E+00 | 0.00E+00 | 7.00E-01 |
| Cs-138 | 1.50E+02 | 2.60E+02 | 6.96E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sb-127 | 2.42E+01 | 1.14E+01 | 3.67E+01 | 2.14E+00 | 1.00E-02 | 0.00E+00 | 1.00E-02 |
| Sb-129 | 5.10E+01 | 2.71E+01 | 6.23E+01 | 1.48E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Te-127m | 3.15E+00 | 1.47E+00 | 4.83E+00 | 2.95E-01 | 2.00E-03 | 0.00E+00 | 1.30E-02 |
| Te-127 | 2.05E+01 | 1.02E+01 | 2.81E+01 | 1.11E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Te-129m | 1.07E+01 | 5.01E+00 | 1.64E+01 | 1.00E+00 | 1.00E-02 | 0.00E+00 | 3.00E-02 |
| Te-129 | 1.88E+01 | 1.39E+01 | 1.45E+01 | 3.00E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Te-131 | 3.17E+01 | 1.51E+01 | 4.69E+01 | 2.51E+00 | 0.00E+00 | 0.00E+00 | 1.00E-02 |
| Te-132 | 3.23E+02 | 1.52E+02 | 4.89E+02 | 2.84E+01 | 1.00E-01 | 0.00E+00 | 1.00E-01 |
| Sr-89 | 9.23E+01 | 4.31 E+01 | 1 .45E+02 | 5.40E+00 | 1 .00E-01 | 0.00E+00 | 3.00E-01 |
| Sr-90 | 7.95E+00 | 3.71 E+00 | 1 .22E+01 | 7.50E-01 | 0.00E+00 | 0.00E+00 | 4.00E-02 |
| Sr-91 | 9.68E+01 | 4.79E+01 | 1 .33E+02 | 5.30E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

## AP1000 Loss of Coolant Accident (LOCA) Activity Releases (Ci)

| Isotope | (1.4 – 3.4 hr) | (0-2 hr) | (2 – 8 hr) | (8 – 24 hr) | (24 – 72 hr) | (72 – 96 hr) | (96 – 720 hr) |
|---|---|---|---|---|---|---|---|
| Sr-92 | 6.83E+01 | 3.91 E+01 | 7.40E+01 | 1 .00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ba-139 | 5.44E+01 | 3.74E+01 | 4.56E+01 | 1.50E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ba-140 | 1.63E+02 | 7.61E+01 | 2.49E+02 | 1.51E+01 | 0.00E+00 | 0.00E+00 | 4.00E-01 |
| Mo-99 | 2.15E+01 | 1.01E+01 | 3.24E+01 | 1.86E+00 | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| Tc-99m | 1 .47E+01 | 7.54E+00 | 1.91 E+01 | 5.90E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ru-103 | 1.73E+01 | 8.08E+00 | 2.65E+01 | 1.62E+00 | 0.00E+00 | 1.00E-02 | 6.00E-02 |
| Ru-105 | 8.18E+00 | 4.33E+00 | 1.00E+01 | 2.40E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ru-1 06 | 5.70E+00 | 2.66E+00 | 8.75E+00 | 5.40E-01 | 0.00E+00 | 0.00E+00 | 3.00E-02 |
| Rh-105 | 1.03E+01 | 4.88E+00 | 1.53E+01 | 8.30E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ce-141 | 3.89E+00 | 1 .82E+00 | 5.96E+00 | 3.64E-01 | 1 .00E-03 | 1 .00E-03 | 1 .20E-02 |
| Ce-143 | 3.46E+00 | 1.64E+00 | 5.14E+00 | 2.78E-01 | 1.00E-03 | 0.00E+00 | 0.00E+00 |
| Ce-144 | 2.94E+00 | 1.37E+00 | 4.51E+00 | 2.76E-01 | 1.00E-03 | 1.00E-03 | 1.30E-02 |
| Pu-238 | 9.16E-03 | 4.28E-03 | 1.41E-02 | 8.60E-04 | 0.00E+00 | 0.00E+00 | 4.00E-05 |
| Pu-239 | 8.06E-04 | 3.76E-04 | 1 .24E-03 | 7.60E-05 | 0.00E+00 | 1 .00E-06 | 3.00E-06 |
| Pu-240 | 1.1 8E-03 | 5.52E-04 | 1.81 E-03 | 1.11 E-04 | 1 .00E-06 | 0.00E+00 | 5.00E-06 |
| Pu-241 | 2.65E-01 | 1 .24E-01 | 4.08E-01 | 2.50E-02 | 1 .00E-04 | 0.00E+00 | 1 .20E-03 |
| Np-239 | 4.48E+01 | 2.12E+01 | 6.75E+01 | 3.84E+00 | 1.00E-02 | 1.00E-02 | 1.00E-02 |
| Y-90 | 8.08E-02 | 3.81 E-02 | 1 .22E-01 | 7.00E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Y-91 | 1.19E+00 | 5.54E-01 | 1.82E+00 | 1.11E-01 | 1.00E-03 | 0.00E+00 | 4.00E-03 |
| Y-92 | 7.89E-01 | 4.32E-01 | 9.19E-01 | 1.80E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Y-93 | 1.21E+00 | 6.00E-01 | 1.68E+00 | 6.80E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Nb-95 | 1 .59E+00 | 7.46E-01 | 2.44E+00 | 1 .49E-01 | 1 .00E-03 | 0.00E+00 | 5.00E-03 |
| Zr-95 | 1 .59E+00 | 7.41 E-01 | 2.43E+00 | 1 .49E-01 | 0.00E+00 | 0.00E+00 | 6.00E-03 |
| Zr-97 | 1 .43E+00 | 6.89E-01 | 2.05E+00 | 9.80E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| La-140 | 1 .67E+00 | 7.92E-01 | 2.50E+00 | 1 .39E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| La-141 | 1 .03E+00 | 5.54E-01 | 1 .23E+00 | 2.70E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| La-142 | 5.38E-01 | 3.57E-01 | 4.74E-01 | 2.00E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Nd-147 | 6.16E-01 | 2.89E-01 | 9.42E-01 | 5.70E-02 | 0.00E+00 | 0.00E+00 | 1.00E-03 |
| Pr-143 | 1.39E+00 | 6.50E-01 | 2.13E+00 | 1.28E-01 | 1.00E-03 | 0.00E+00 | 3.00E-03 |
| Am-241 | 1.20E-04 | 5.59E-05 | 1.84E-04 | 1.13E-05 | 0.00E+00 | 0.00E+00 | 6.00E-07 |
| Cm-242 | 2.82E-02 | 1 .32E-02 | 4.33E-02 | 2.65E-03 | 1 .00E-05 | 1 .00E-05 | 1 .20E-04 |
| Cm-244 | 3.46E-03 | 1 .62E-03 | 5.32E-03 | 3.26E-04 | 1 .00E-06 | 0.00E+00 | 1 .60E-05 |

## AP 1000 Main Steam Line Break (MSLB) with Accident-Initiated Iodine Spike Activity Releases (Ci)

| Isotope | (0-8 hr) | (8-24 hr) | (24-72 hr) |
|---|---|---|---|
| Kr-85m | 1.827E-01 | 6.796E-02 | 6.177E-03 |
| Kr-85 | 1.129E+00 | 2.250E+00 | 6.686E+00 |
| Kr-87 | 4.097E-02 | 5.291E-04 | 8.602E-08 |
| Kr-88 | 2.496E-01 | 4.037E-02 | 8.269E-04 |
| Xe-1 31 m | 5.068E-01 | 9.81 0E-01 | 2.700E+00 |
| Xe-133m | 6.091E-01 | 1.038E+00 | 2.054E+00 |
| Xe-133 | 4.632E+01 | 8.644E+01 | 2.161E+02 |
| Xe-135m | 3.056E-03 | 0.000E+00 | 0.000E+00 |
| Xe-1 35 | 9.994E-01 | 8.351 E-01 | 3.384E-01 |
| Xe-138 | 3.996E-03 | 0.000E+00 | 0.000E+00 |
| I-130 | 1.415E+00 | 1.583E+00 | 1.009E+00 |
| I-131 | 8.330E+01 | 1.558E+02 | 4.134E+02 |
| I-1 32 | 1 .436E+02 | 2.238E+01 | 1 .81 9E-01 |
| I-133 | 1.628E+02 | 2.269E+02 | 2.553E+02 |
| I-1 34 | 3.202E+01 | 2.651 E-01 | 8.41 5E-07 |
| I-135 | 1.097E+02 | 7.828E+01 | 1.772E+01 |
| Cs-134 | 1.918E+01 | 5.185E-01 | 1.540E+00 |
| Cs-1 36 | 2.851 E+01 | 7.428E-01 | 2.060E+00 |
| Cs-1 37 | 1 .380E+01 | 3.739E-01 | 1.11 2E+00 |
| Cs-138 | 1.012E+01 | 4.424E-07 | 0.000E+00 |
| Kr-85m | 1.827E-01 | 6.796E-02 | 6.177E-03 |
| Kr-85 | 1.129E+00 | 2.250E+00 | 6.686E+00 |
| Kr-87 | 4.097E-02 | 5.291E-04 | 8.602E-08 |
| Kr-88 | 2.496E-01 | 4.037E-02 | 8.269E-04 |
| Xe-1 31 m | 5.068E-01 | 9.81 0E-01 | 2.700E+00 |
| Xe-1 33m | 6.091 E-01 | 1 .038E+00 | 2.054E+00 |
| Xe-133 | 4.632E+01 | 8.644E+01 | 2.161E+02 |
| Xe-135m | 3.056E-03 | 0.000E+00 | 0.000E+00 |
| Xe-1 35 | 9.994E-01 | 8.351 E-01 | 3.384E-01 |
| Xe-138 | 3.996E-03 | 0.000E+00 | 0.000E+00 |

## AP 1000 Main Steam Line Break (MSLB) with Pre-Existing Iodine Spike Activity Releases (Ci)

| Isotope | (0-8 hr) | (8-24 hr) | (24-72 hr) |
|---|---|---|---|
| I-130 | 5.008E-01 | 2.093E-01 | 1.334E-01 |
| I-131 | 3.613E+01 | 3.096E+01 | 8.216E+01 |
| I-132 | 3.466E+01 | 8.061 E-01 | 6.552E-03 |
| I-133 | 6.233E+01 | 3.534E+01 | 3.976E+01 |
| I-134 | 6.905E+00 | 1.429E-03 | 4.535E-09 |
| I-135 | 3.416E+01 | 7.542E+00 | 1.707E+00 |
| Cs-134 | 1.918E+01 | 5.185E-01 | 1.540E+00 |
| Cs-1 36 | 2.851 E+01 | 7.428E-01 | 2.060E+00 |
| Cs-1 37 | 1 .380E+01 | 3.739E-01 | 1.11 2E+00 |
| Cs-138 | 1.012E+01 | 4.424E-07 | 0.000E+00 |

## AP1000 Locked Rotor Accident (LRA) Activity Releases (Ci)

| Isotope | No Feedwater (0-1.5 hr) | With Feedwater (0-8hr) |
|---|---|---|
| Kr-85m | 8.158E+01 | 2.792E+02 |
| Kr-85 | 7.576E+00 | 4.036E+01 |
| Kr-87 | 1.204E+02 | 2.128E+02 |
| Kr-88 | 2.078E+02 | 5.816E+02 |
| Xe-131m | 3.771E+00 | 1.995E+01 |
| Xe-133m | 2.021E+01 | 1.032E+02 |
| Xe-133 | 6.664E+02 | 3.488E+03 |
| Xe-135m | 3.240E+01 | 3.296E+01 |
| Xe-135 | 1.591E+02 | 6.717E+02 |
| Xe-138 | 1.288E+02 | 1.305E+02 |
| I-130 | 8.447E-01 | 1.446E+00 |
| I-131 | 3.774E+01 | 8.052E+01 |
| I-132 | 2.789E+01 | 1.829E+01 |
| I-133 | 4.855E+01 | 8.977E+01 |
| I-134 | 2.884E+01 | 5.740E+00 |
| I-135 | 4.188E+01 | 5.789E+01 |
| Cs-134 | 1.290E+00 | 2.585E+00 |
| Cs-136 | 5.634E-01 | 8.631E-01 |
| Cs-137 | 7.739E-01 | 1.521E+00 |
| Cs-138 | 6.080E+00 | 4.078E+00 |
| Rb-86 | 1.329E-02 | 2.913E-02 |

## AP1000 Rod Ejection Accident (REA) Activity Releases (Ci)

| Isotope | (0-8 hr) | (8-24 hr) | (24-96 hr) | (96-720 hr) |
|---|---|---|---|---|
| Kr-85m | 1.771 E+02 | 3.868E+01 | 1 .767E+00 | 2.511 E-05 |
| Kr-85 | 1.061 E+01 | 1 .492E+01 | 3.353E+01 | 2.877E+02 |
| Kr-87 | 2.083E+02 | 1 .025E+00 | 8.366E-05 | 0.000E+00 |
| Kr-88 | 4.096E+02 | 3.491E+01 | 3.589E-01 | 8.407E-09 |
| Xe-131m | 1.040E+01 | 1.416E+01 | 2.864E+01 | 1.162E+02 |
| Xe-133m | 5.475E+01 | 6.485E+01 | 8.450E+01 | 5.311E+01 |
| Xe-133 | 1.837E+03 | 2.404E+03 | 4.267E+03 | 8.446E+03 |
| Xe-135m | 7.346E+01 | 4.333E-09 | 0.000E+00 | 0.000E+00 |
| Xe-135 | 3.868E+02 | 2.088E+02 | 4.347E+01 | 1.793E-01 |
| Xe-138 | 2.988E+02 | 3.194E-09 | 0.000E+00 | 0.000E+00 |
| I-130 | 1.217E+01 | 4.321E+00 | 2.030E-01 | 2.946E-04 |
| I-131 | 3.810E+02 | 2.313E+02 | 3.101E+01 | 1.675E+01 |
| I-132 | 2.522E+02 | 9.852E+00 | 8.236E-03 | 0.000E+00 |
| I-133 | 7.118E+02 | 3.176E+02 | 2.280E+01 | 2.410E-01 |
| I-134 | 1.948E+02 | 1.367E-01 | 4.478E-08 | 0.000E+00 |
| I-135 | 5.361E+02 | 1.186E+02 | 2.393E+00 | 7.322E-05 |
| Cs-1 34 | 9.298E+01 | 6.030E+01 | 7.760E+00 | 5.1 64E+00 |
| Cs-1 36 | 2.630E+01 | 1 .666E+01 | 2.049E+00 | 6.584E-01 |
| Cs-1 37 | 5.409E+01 | 3.509E+01 | 4.520E+00 | 3.051 E+00 |
| Cs-1 38 | 1.1 56E+02 | 1 .682E-03 | 0.000E+00 | 0.000E+00 |
| Rb-86 | 1.090E+00 | 6.956E-01 | 8.674E-02 | 3.417E-02 |

**AP1000 Small Line Break (SLB) Outside Containment Activity Releases (Ci)**

| Isotope | (0-0.5 hr) |
|---|---|
| Kr-85m | 1.241E+01 |
| Kr-85 | 4.398E+01 |
| Kr-87 | 7.047E+00 |
| Kr-88 | 2.212E+01 |
| Xe-131m | 1.993E+01 |
| Xe-133m | 2.500E+01 |
| Xe-133 | 1.843E+03 |
| Xe-135m | 2.588E+00 |
| Xe-135 | 5.202E+01 |
| Xe-138 | 3.645E+00 |
| I-130 | 1.888E+00 |
| I-131 | 9.256E+01 |
| I-132 | 3.494E+02 |
| I-133 | 2.007E+02 |
| I-134 | 1.579E+02 |
| I-135 | 1.680E+02 |
| Cs-134 | 4.157E+00 |
| Cs-136 | 6.163E+00 |
| Cs-137 | 2.996E+00 |
| Cs-138 | 2.214E+00 |

**AP1000 Steam Generator Tube Rupture (SGTR) with Accident-Initiated Iodine Spike Activity Releases (Ci)**

| Isotope | (0-8 hr) | (8-24 hr) |
|---|---|---|
| Kr-85m | 7.459E+01 | 7.529E-03 |
| Kr-85 | 3.289E+02 | 1 .339E-01 |
| Kr-87 | 2.754E+01 | 9.1 19E-05 |
| Kr-88 | 1.1 87E+02 | 5.429E-03 |
| Xe-131m | 1.484E+02 | 5.909E-02 |
| Xe-133m | 1.829E+02 | 6.609E-02 |
| Xe-133 | 1.366E+04 | 5.291E+00 |
| Xe-135m | 3.449E+00 | 0.000E+00 |
| Xe-135 | 3.474E+02 | 7.101E-02 |
| Xe-138 | 4.565E+00 | 0.000E+00 |
| I-130 | 1.049E+00 | 8.238E-01 |
| I-131 | 5.505E+01 | 6.761E+01 |
| I-132 | 1.521E+02 | 1.291E+01 |
| I-133 | 1.133E+02 | 1.084E+02 |
| I-134 | 5.593E+01 | 5.942E-02 |
| I-135 | 8.602E+01 | 4.378E+01 |
| Cs-134 | 1.687E+00 | 2.163E-01 |
| Cs-136 | 2.506E+00 | 3.144E-01 |
| Cs-137 | 1.217E+00 | 1.560E-01 |
| Cs-138 | 5.639E-01 | 5.730E-07 |

**AP1000 Steam Generator Tube Rupture (SGTR) with Pre-Existing Iodine Spike Activity Releases (Ci)**

| Isotope | (0-8 hr) | (8-24 hr) |
|---|---|---|
| Kr-85m | 7.459E+01 | 7.529E-03 |
| Kr-85 | 3.289E+02 | 1 .339E-01 |
| Kr-87 | 2.754E+01 | 9.1 19E-05 |
| Kr-88 | 1.187E+02 | 5.429E-03 |
| Xe-131m | 1.484E+02 | 5.909E-02 |
| Xe-133m | 1.829E+02 | 6.609E-02 |
| Xe-133 | 1.366E+04 | 5.291E+00 |
| Xe-135m | 3.449E+00 | 0.000E+00 |
| Xe-135 | 3.474E+02 | 7.101E-02 |
| Xe-138 | 4.565E+00 | 0.000E+00 |
| I-130 | 1.848E+00 | 2.680E-01 |
| I-131 | 1.259E+02 | 3.063E+01 |
| I-132 | 1.423E+02 | 1.923E+00 |
| I-133 | 2.236E+02 | 4.062E+01 |
| I-134 | 2.741E+01 | 4.227E-03 |
| I-135 | 1.299E+02 | 1.165E+01 |
| Cs-134 | 1.687E+00 | 2.163E-01 |
| Cs-136 | 2.506E+00 | 3.144E-01 |
| Cs-137 | 1.217E+00 | 1.560E-01 |
| Cs-138 | 5.639E-01 | 5.730E-07 |

## AP1000 Fuel Handling Accident (FHA) Activity Releases (Ci)

| Isotope | (0-2 hr) |
|---|---|
| Kr-85m | 8.40E+00 |
| Kr-85 | 1.10E+03 |
| Kr-88 | 3.0E-01 |
| Xe-131m | 5.52E+02 |
| Xe-133m | 2.30E+03 |
| Xe-133 | 8.88E+04 |
| Xe-135m | 1.02E+03 |
| Xe-135 | 5.68E+03 |
| I-130 | 7.0E-01 |
| I-131 | 3.47E+02 |
| I-132 | 2.44E+02 |
| I-133 | 1.08E+02 |
| I-135 | 3.20E+00 |

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.4.1-1

**Text of NRC RAI:**

Provide additional information needed to complete the baseline characterization for terrestrial, wetland and wildlife resources.

ER section 2.4.1 provides a baseline characterization for terrestrial, wetland and wildlife resources. However, the following was not included in the baseline characterization:

- A master list of plant species observed over various field investigations at the site and vicinity.
- Notes on seasonal observations to the wildlife tables in ER Section 2.4 (ER Tables 2.4-2, 2.4-3, 2.4-4 and 2.4-5).
- A summary of previously conducted field studies to verify habitats, including wetlands, within the transmission corridors (up to the first substation).

**PGN RAI ID #:** L-0402

**PGN Response to NRC RAI:**

Updated tables (ER Tables 2.4.2, 2.4.3, 2.4.4, 2.4.5 and Table 2.4.1-1-001) with seasonal observations for wildlife and important species are provided at the end of this response. Table 2.4.1-1-001 is a master list of plant species observed at the site and vicinity. The locations of important species are shown on Attachment 2.4.1-1A. Between September 2006 and November 2008, pedestrian surveys were conducted by CH2M HILL botanists and wildlife ecologists of potentially impacted areas on the LNP site, south property, and the associated facility areas south to the CREC, with an emphasis on federally and state-listed species. These surveys were conducted in conjunction with habitat mapping and wetland delineation efforts, totaling several hundred individual field surveys on-site scheduled throughout the course of the year for seasonal characterization. Seasonal occurrences of observed species, along with a list of species likely to occur at the LNP site (including associated facility areas – south property to CREC), blowdown pipeline corridor, and transmission line corridors compiled from literature reviews, were used to generate the tables.

PEF conducted pedestrian and vehicular field reconnaissance within accessible areas of each proposed transmission corridor to verify/update vegetative habitat classifications, including wetland locations, type, and extent, and to document occurrences of listed species and their habitats. Once the rights-of-way (ROWs) are selected within the transmission line corridors, PEF will conduct more detailed surveys to verify the habitats and a detailed wetland delineation will be conducted.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

021 Attachment 2.4.1-1A.pdf

**Table 2.4-2 (Sheet 1 of 2)**
**Mammalian Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name | Observed on Site[a] | Season Observed[b, c] |
|---|---|---|---|
| Bobcat | *Lynx rufus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Cotton Mouse | *Peromyscus gossypinus* | N/A | N/A |
| Cottontail Rabbit | *Sylvilagus floridanus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Coyote | *Canis latrans* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| Eastern Gray Squirrel | *Sciurus carolinensis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Eastern Mole | *Scalopus aquaticus* | N/A | N/A |
| Feral Hog | *Sus scrofa* | LNP | F, W, Sp,S |
| | | South Site | F, W, Sp,S |
| | | Blowdown Pipeline Corridor | W |
| Southern Flying Squirrel | *Glaucomys volans* | N/A | N/A |
| Gray Fox | *Urocyon cinereoargenteus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |

**Table 2.4-2 (Sheet 2 of 2)**
**Mammalian Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name | Observed on Site[a] | Season Observed[b, c] |
|---|---|---|---|
| Hispid Cotton Rat | *Sigmodon hispidus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Marsh Rabbit | *Sylvilagus palustris* | N/A | N/A |
| Mink | *Mustela vison* | N/A | -- |
| Nine-banded Armadillo | *Dasypus novemcinctus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Raccoon | *Procyon lotor* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| River Otter | *Lutra canadensis* | Blowdown Pipeline Corridor | W |
| Striped Skunk | *Mephitis mephitis* | N/A | N/A |
| Virginia Opossum | *Didelphis virginiana* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| White-tail Deer | *Odocoileus virginianus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |

Notes:

LNP = Levy Nuclear Plant site
South Site = the PE-owned parcel immediately south of the LNP site

N/A Not directly observed.
a) The species not directly observed were based on ER Reference 2.4-009.
b) F = Fall, W = Winter, Sp = Spring, S = Summer
c) Observations along Blowdown Pipeline Corridor based on winter survey only.

**Table 2.4-3 (Sheet 1 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name | Observed On Site[a] | Season Observed[b, c] |
|---|---|---|---|
| Acadian Flycatcher | *Empidonax virescens* | N/A | N/A |
| American Kestrel | *Falco sparverius* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor© | W |
| Anhinga | *Anhinga anhinga* | LNP – flyover | F, W, Sp, S |
| | | South Site - flyover | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Bachman's Sparrow | *Aimophila aestivalis* | N/A | N/A |
| Bald Eagle | *Haliaeetus leucocephalus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Barn Swallow | *Hirundo rustica* | LNP | W |
| | | South Site | W |
| Barred Owl | *Strix varia* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Black Vulture | *Coragyps atratus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |

**Table 2.4-3 (Sheet 2 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Blue-Gray Gnatcatcher | *Polioptila caerulea* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Blue Jay | *Cyanocitta cristata* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Brown-headed Nuthatch | *Sitta pusilla* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Brown Pelican | *Pelecanus occidentalis* | N/A | N/A |
| Brown Thrasher | *Toxastoma rufa* | Blowdown Pipeline Corridor | W |
| | | LNP | Sp |
| Carolina Chickadee | *Parus carolinensis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Carolina Wren | *Thryothorus ludovicianus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Catbird | *Dumetella carolinensis* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Cattle Egret | *Bubulcus ibis* | Blowdown Pipeline Corridor | W |
| Cedar Waxwing | *Bombycilla cedrorum* | N/A | N/A |

**Table 2.4-3 (Sheet 3 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Common Crow | *Corvus brachyrhynchos* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Common Nighthawk | *Chordeiles minor* | LNP | Sp |
| | | South Site | Sp |
| Cooper's Hawk | *Accipiter cooperii* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Double-crested Cormorant | *Phalacrocorax auritus* | LNP – flyover | F, W, Sp, S |
| | | South Site - flyover | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Downy Woodpecker | *Picoides pubescens* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Eastern Bluebird | *Sialia sialis* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Eastern Kingbird | *Tyrannus tyrannus* | LNP | Sp |
| | | South Site | Sp |
| Eastern Meadowlark | *Sturnella magna* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |

**Table 2.4-3 (Sheet 4 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Eastern Phoebe | *Sayornis phoebe* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Eastern Screech Owl | *Otus asio* | LNP | W |
| Fish Crow | *Corvus ossifragus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Great Blue Heron | *Ardea herodias* | Blowdown Pipeline Corridor | W |
| Great-crested Flycatcher | *Miarchus crinitus* | LNP | Sp |
| | | South Site | Sp |
| Great Egret | *Ardea alba* | Blowdown Pipeline Corridor | W |
| | | LNP | W |
| Great-horned Owl | *Bubo virginianus* | N/A | N/A |
| Green Heron | *Butorides virescens* | Blowdown Pipeline Corridor | W |
| Hermit Thrush | *Catharus guttatus* | LNP | W |
| | | South Site | W |
| House Wren | *Troglodytes aedon* | LNP | W |
| | | South Site | W |
| | | Blowdown Pipeline Corridor | W |
| Indigo Bunting | *Passerina cyanea* | LNP | Sp |
| | | South Site | Sp |
| Little Blue Heron | *Egretta caerulea* | Blowdown Pipeline Corridor | W |

**Table 2.4-3 (Sheet 5 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Marsh Wren | *Cistothorus palustris* | LNP | W |
| | | South Site | W |
| | | Blowdown Pipeline Corridor | W |
| Mourning Dove | *Zenada macrona* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Northern Bobwhite | *Colinus virginianus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Northern Cardinal | *Cardinalis cardinalis* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Northern Mockingbird | *Mimus polyglottos* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Osprey | *Pandion haliaetus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Palm Warbler | *Dendroica palmarum* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Pileated Woodpecker | *Dryocopus pileatus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |

**Table 2.4-3 (Sheet 6 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Pine Warbler | *Dendroica pinus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Red-bellied Woodpecker | *Melanerpes carolinus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Red-eyed Vireo | *Vireo olivaceus* | LNP | Sp |
| | | South Site | Sp |
| Red-headed Woodpecker | *Melanerpes erythrocephalus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Red-shoulder Hawk | *Buteo lineatus* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Red-tailed Hawk | *Buteo jamaicensis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Redwing Blackbird | *Agelaius phoeniceus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Ring-billed Gull | *Larus delawarensis* | LNP – flyover | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Robin | *Turdus migratorius* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |

**Table 2.4-3 (Sheet 7 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Ruby-crowned Kinglet | *Regulus calendula* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Ruby-throated Hummingbird | *Archilochus colubris* | N/A | N/A |
| Rufous-sided Towhee | *Pipilo erythrophthalmus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Sandhill Crane | *Grus canadensis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Sharp-shinned Hawk | *Accipiter striatus* | LNP | W |
| | | South Site | W |
| | | Blowdown Pipeline Corridor | W |
| Snowy Egret | *Egretta thula* | Blowdown Pipeline Corridor | W |
| Solitary Vireo | *Vireo solitarius* | LNP | W |
| | | South Site | W |
| | | Blowdown Pipeline Corridor | W |
| Southeastern American Kestrel | *Falco sparverius paulus* | N/A | N/A |
| Summer Tanager | *Piranga rubra* | LNP | Sp |
| | | South Site | Sp |
| Swallow-tailed Kite | *Elanoides forficatus* | LNP | Sp |
| | | South Site | Sp |
| Tree Swallow | *Tachycineta bicolor* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |

**Table 2.4-3 (Sheet 8 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Tri-colored Heron | *Egretta tricolor* | Blowdown Pipeline Corridor | W |
| Tufted Titmouse | *Parus bicolor* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Turkey Vulture | *Cathartes aura* | LNP | F, W, Sp, S |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| White-eyed Vireo | *Vireo griseus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| White Ibis | *Eudocimus albus* | LNP | F, W, Sp, S |
| | | South Site | 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 |
| | | South Site | F, W, Sp, S |
| | | Blowdown Pipeline Corridor | W |
| Wood Duck | *Aix sponsa* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Wood Stork | *Mycteria americana* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |

**Table 2.4-3 (Sheet 9 of 9)**
**Bird Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Woodcock | *Scolopax minor* | LNP | W |
| | | South Site | W |
| Yellow-rumped Warbler | *Dendroica coronata* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Yellow-throated Vireo | *Vireo flavifrons* | LNP | Sp |
| | | South Site | Sp |
| Yellow-throated Warbler | *Dendroica dominica* | N/A | N/A |

Notes:

LNP = Levy Nuclear Plant site

South site = PE-owned parcel immediately south of the LNP site

N/A Not directly observed

a) The species not directly observed were based on ER Reference 2.4-009.
b) F = Fall, W = Winter, Sp = Spring, S = Summer
c) Blowdown Pipeline Corridor observations based on winter survey only.

**TABLE 2.4-4 (SHEET 1 OF 4)**
**REPTILE AND AMPHIBIAN SPECIES LIKELY TO OCCUR ON THE LNP, SOUTH, AND BLOWDOWN PIPELINE CORRIDOR SITES**

| COMMON NAME | SCIENTIFIC NAME | OBSERVED ON SITE[A] | SEASON OBSERVED[B, C] |
|---|---|---|---|
| Black Racer | *Coluber constrictor* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Pygmy Rattlesnake | *Sistrurus miliarius* | N/A | N/A |
| Eastern Coachwhip Snake | *Masticophis flagellum flagellum* | LNP | Sp |
| Eastern Cottonmouth | *Agkistrodon piscivorus* | LNP | Sp |
| | | South Site | Sp |
| Eastern Indigo Snake | *Drymarchon couperi* | N/A | N/A |
| Common Garter Snake | *Thamnophis sirtalis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Red Rat Snake | *Elaphe guttata guttata* | N/A | N/A |
| Yellow Rat Snake | *Elaphe obsoleta quadrivittata* | N/A | N/A |
| Ringneck Snake | *Diadophis punctatus punctatus* | N/A | N/A |
| Scarlet Kingsnake | *Lampropeltis triangulum elapsoides* | N/A | N/A |
| American Alligator | *Alligator mississippiensis* | LNP | Sp |
| | | South Site | Sp |
| Green Anole | *Anolis carolinensis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Fence Lizard | *Sceloporus undulatus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Oak Toad | *Bufo quercicus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Narrowmouth Toad | *Gastrophryne carolinensis* | N/A | N/A |

**TABLE 2.4-4 (SHEET 2 OF 4)**
**REPTILE AND AMPHIBIAN SPECIES LIKELY TO OCCUR ON THE LNP, SOUTH, AND BLOWDOWN PIPELINE CORRIDOR SITES**

| Common Name | Scientific Name | Observed on Site[a] | Season Observed[b, c] |
|---|---|---|---|
| Southern Toad | *Bufo terrestris* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Diamondback Rattlesnake | *Crotalus adamanteus* | LNP | Sp |
| | | South Site | Sp |
| Eastern Glass Lizard | *Ophisaurus ventralis* | N/A | N/A-- |
| Peninsula Ribbon Snake | *Thamnophis sauritus sackenii* | N/A | N/A |
| Ground Skink | *Scincella lateralis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Broadhead Skink | *Eumeces laticpes* | LNP | F |
| | | South Site | 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 |
| | | South Site | F |
| Box Turtle | *Terrapene carolina major* | LNP – shells | N/A[d] |
| | | South Site - shells | N/A[d] |
| | | Blowdown Pipeline Corridor - Shells | N/A[d] |
| Striped Mud Turtle | *Kinosternon bauri* | N/A | N/A |
| Gopher Tortoise | *Gopherus polyphemus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Snapping Turtle | *Chelydra serpentine* | LNP | W |
| | | South Site | W |

**Table 2.4-4 (Sheet 3 of 4)**
**Reptile and Amphibian Species Likely to Occur on the LNP, South, and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name | Observed on Site[a] | Season Observed[b, c] |
|---|---|---|---|
| Southern Leopard Frog | *Rana sphenocephala utricularia* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Little Grass Frog | *Pseudacris ocularis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Southern Cricket Frog | *Acris gryllus* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Southern Chorus Frog | *Pseudacris nigrita* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Pinewoods Treefrog | *Hyla femoralis* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Barking Treefrog | *Hyla gratiosa* | N/A | -- |
| Squirrel Treefrog | *Hyla squirella* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| Green Treefrog | *Hyla cinerea* | LNP | F, W, Sp |
| Greenhouse Frog | *Eleuthrodactylus planirostris* | LNP | F, W, Sp |
| | | South Site | F, W, Sp |
| | | Blowdown Pipeline Corridor | W |
| Ornate Chorus Frog | *Pseudacris ornata* | N/A | N/A |
| Eastern Spadefoot Toad | *Scaphiopus holbrooki holbrooki* | N/A | N/A |
| Gopher Frog | *Rana capito* | N/A | -- |

## TABLE 2.4-4 (SHEET 4 OF 4)
## REPTILE AND AMPHIBIAN SPECIES LIKELY TO OCCUR ON THE LNP, SOUTH, AND BLOWDOWN PIPELINE CORRIDOR SITES

Notes:

LNP = Levy Nuclear Plant site

South Site = PE-owned parcel immediated south of the LNP site

N/A Not directly observed.

a) The species not directly observed were based on ER Reference 2.4-009.
b) F = Fall, W = Winter, Sp = Spring, no survey conducted during Summer.
c) Observations along Blowdown Pipeline Corridor based on winter survey only.
d) Shells would not convey any information about season since they would have been on-site for an indeterminate amount of time, so season was disregarded.

**Table 2.4-5**
**Important Species Identified as Potentially Occurring on the LNP, South, and Blowdown Pipeline Corridor Sites**

| Species | Scientific Name | Importance Criteria | Observed on Site[a] | Season Observed[b, c] |
|---|---|---|---|---|
| American Alligator | *Alligator mississippiensis* | State-listed Species of Special Concern | LNP | Sp |
| Eastern Indigo Snake | *Drymarchon couperi* | Federally and State-listed Threatened | N/A | N/A |
| Florida Black Bear [d] | *Ursus americanus floridanus* | State-listed Threatened | N/A | N/A |
| Gopher Tortoise | *Gopherus polyphemus* | State-listed Threatened | LNP<br>South Site | F, W, Sp, S<br>F, W, Sp, S |
| White Ibis | *Eudocimus albus* | State-listed Species of Special Concern | LNP<br>South Site<br>Blowdown Pipeline Corridor | F, W, Sp, S<br>F, W, Sp, S<br>W |
| Wood Stork | *Mycteria americana* | Federally and State-listed Endangered | LNP<br>South Site<br>Blowdown Pipeline Corridor | F, W, Sp<br>F, W, Sp<br>W |
| Northern Bobwhite | *Colinus virginianus* | Recreationally important game species | LNP<br>South Site | F, W, Sp<br>F, W, Sp |
| White-tailed deer | *Odocoileus virginianus* | Recreationally important game species | LNP<br>South Site<br>Blowdown Pipeline Corridor | F, W, Sp, S<br>F, W, Sp, S<br>W |
| Wild Turkey | *Meleagris gallopavo* | Recreationally important game species | LNP<br>South Site<br>Blowdown Pipeline Corridor | F, W, Sp, S<br>F, W, Sp, S<br>W |

Notes:
LNP = Levy Nuclear Plant site
South Site = PE-owned parcel immediately south of LNP site

N/A Not directly observed.

a) The species not directly observed were based on ER Reference 2.4-009.
b) F = Fall, W = Winter, Sp = Spring, S = Summer
c) Observations along Blowdown Pipeline Corridor based on winter survey only.
d) Unconfirmed and anecdotal report of bear along northwestern property boundary in March 2007.

**Table 2.4.1-1-001 (Sheet 1 of 5)**
**Herbaceous, Shrub, Tree, and Woody Vine Species Commonly Observed at the LNP and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name |
|---|---|
| Boxelder | *Acer negundo* |
| Red maple | *Acer rubrum* |
| Oppositeleaf spotflower | *Acmella oppositifolia (syn. S. americana)* |
| Peppervine | *Ampelopsis arborea* |
| Blue maidencane | *Amphicarpum muhlenbergianum* |
| Bushy bluestem | *Andropogon glomeratus* |
| Purple bluestem | *Andropogon glomeratus var. glaucopis* |
| Broomsedge bluestem | *Andropogon virginicus* |
| Chalky bluestem | *Andropogon virginicus var. glaucus* |
| Wiregrass | *Aristida stricta var. beyrichiana* |
| Carpetgrasses | *Axonopus sp.* |
| Salt bush | *Baccharis halimifolia* |
| Rattan vine | *Berchemia scandens* |
| Marsh beggartick; small-fruit | *Bidens mitis* |
| Pineland rayless goldenrod | *Bigelowia nudata* |
| Crossvine | *Bignonia capreolata* |
| Trumpet vine | *Campsis radicans* |
| Golden canna | *Canna flaccida* |
| Caric sedges | *Carex sp.* |
| Sugarberry | *Celtis laevigata* |
| Spadeleaf | *Centella asiatica* |
| Buttonbush | *Cephalanthus occidentalis* |
| Sawgrass | *Cladium jamaicense* |
| Wild taro | *Colocasia esculenta* |
| Swamp dogwood | *Cornus foemina* |
| Sharp edge sedge | *Cyperus haspan* |
| Pinebarren flatsedge | *Cyperus retrorsus* |
| Flatsedges | *Cyperus sp.* |
| Witchgrass | *Dichanthelium sp.* |

**Table 2.4.1-1-001 (Sheet 2 of 5)**
**Herbaceous, Shrub, Tree, and Woody Vine Species Commonly Observed at the LNP and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name |
|---|---|
| Starrush | *Dichromena sp.* |
| Pink sundew | *Drosera capillaris* |
| Tenangle pipewort | *Eriocaulon decangulare* |
| Pipeworts | *Eriocaulon sp.* |
| Dogfennel | *Eupatorium capillifolium* |
| Mohr's thoroughwort | *Eupatorium mohrii* |
| Roundleaf thoroughwort; false horehound | *Eupatorium rotundifolium* |
| Slender flattop goldenrod | *Euthamia caroliniana* |
| Pop ash | *Fraxinus caroliniana* |
| Umbrellasedge | *Fuirena sp.* |
| Loblolly bay | *Gordonia lasianthus* |
| Hedgehyssop | *Gratiola sp.* |
| Sunflower | *Helianthus sp.* |
| Water pennywort | *Hydrocotyle sp.* |
| Roundpod St. John's wort | *Hypericum cistifolium* |
| Peelbark St. John's wort | *Hypericum fasciculatum* |
| Dwarf St. John's wort | *Hypericum mutilum* |
| Fourpetal St. John's wort | *Hypericum tetrapetalum* |
| Musky mint; clustered bushmint | *Hyptis alata* |
| Dahoon holly | *Ilex cassine* |
| Gallberry | *Ilex glabra* |
| Rushes | *Juncus sp.* |
| Soft rush | *Juncus effusus* |
| Shore rush | *Juncus marginatus (Syn. J. biflorus, J. aristulatus)* |
| Largeheaded rush | *Juncus megacephalus* |
| Redroot | *Lachnanthes caroliniana* |
| Bog buttons | *Lachnocaulon sp.* |
| Blazing star, dense gayfeather | *Liatris spicata* |
| Savannah false pimpernel | *Lindernia grandiflora* |
| Sweetgum | *Liquidambar styraciflua* |
| Lobelia | *Lobelia sp.* |

**Table 2.4.1-1-001 (Sheet 3 of 5)**
**Herbaceous, Shrub, Tree, and Woody Vine Species Commonly Observed at the LNP and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name |
|---|---|
| Water primrose, primrosewillow | *Ludwigia sp.* |
| Fetterbush | *Lyonia lucida* |
| Rusty staggerbush | *Lyonia ferruginea* |
| Coastalplain staggerbush | *Lyonia fruticosa* |
| Baby's-tears | *Micranthemum sp.* |
| Climbing hempweed | *Mikania scandens* |
| Southern bayberry; wax myrtle | *Myrica cerifera* |
| Swamp tupelo | *Nyssa sylvatica var. biflora* |
| Clustered mille graines | *Oldenlandia uniflora (syn. H. uniflora)* |
| Cinnamon fern | *Osmunda cinnamomea* |
| Royal fern | *Osmunda regalis* |
| Pink woodsorrel | *Oxalis sp.* |
| Fall panicgrass | *Panicum dichotomiflorum* |
| Maidencane | *Panicum hemitomon* |
| Woolly panicum | *Panicum scabriusculum (syn. Dichanthelium strigosum)* |
| Warty panicgrass | *Panicum verrucosum* |
| Panicgrasses | *Panicum sp.* |
| Virginia creeper | *Parthenocissus quinquefolia* |
| Paspalum | *Paspalum sp.* |
| Red bay | *Persea borbonia var. borbonia* |
| Swamp bay | *Persea palustris* |
| Red chokeberry | *Photinia pyrifolia ( syn. A. arbutifolia)* |
| Slash pine | *Pinus elliottii* |
| Resurrection fern | *Pleopeltis polypodioides (syn. Polypodium polypodioides)* |
| Sweetscent | *Pluchea odorata* |
| Knotweed | *Polygonum spp.* |
| Pickerelweed | *Pontederia cordata* |
| Marsh mermaidweed | *Proserpinaca palustris* |
| Combleaf mermaidweed | *Proserpinaca pectinata* |

**Table 2.4.1-1-001 (Sheet 4 of 5)**
**Herbaceous, Shrub, Tree, and Woody Vine Species Commonly Observed at the LNP and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name |
|---|---|
| Bracken fern | *Pteridium aquilinum.* |
| Laurel oak; diamond oak | *Quercus laurifolia* |
| Live oak | *Quercus virginiana* |
| Pale meadowbeauty | *Rhexia mariana* |
| Shortbristle horned beaksedge | *Rhynchospora corniculata* |
| Inundated beakrush | *Rhynchospora inundata* |
| Beakrushes, hornedrushes | *Rhynchospora sp.* |
| Swamp rose | *Rosa palustris* |
| Sawtooth blackberry | *Rubus argutus* |
| Blackberry | *Rubus sp.* |
| Sabal palm | *Sabal palmetto* |
| Giant plumegrass, sugarcane plumegrass | *Saccharum giganteum (syn. Erianthus giganteus)* |
| American cupscalegrass | *Sacciolepis striata* |
| Grassy arrowhead | *Sagittaria graminea* |
| Duck potato | *Sagittaria lancifolia* |
| Broadleaf arrowhead | *Sagittaria latifolia* |
| Carolina willow | *Salix caroliniana* |
| Water fern | *Salvinia minima* |
| Elderberry | *Sambucus nigra (syn. S. canadensis)* |
| Lizard's tail | *Saururus cernuus* |
| Yellow bristlegrass, knotroot foxtail | *Setaria parviflora (syn. S. geniculata)* |
| Earleaf greenbrier | *Smilax auriculata* |
| Laurel greenbrier | *Smilax laurifolia* |
| Goldenrod | *Solidago spp.* |
| Baker's cordgrass | *Spartina bakeri* |
| Rice button aster | *Symphyotrichum dumosum (syn. A. dumosus)* |
| Yellow hatpins | *Syngonanthus flavidulus* |

**Table 2.4.1-1-001 (Sheet 5 of 5)**
**Herbaceous, Shrub, Tree, and Woody Vine Species Commonly Observed at the LNP and Blowdown Pipeline Corridor Sites**

| Common Name | Scientific Name |
|---|---|
| Pond cypress | *Taxodium ascendens* |
| Bald cypress | *Taxodium distichum* |
| Woodsage; Canadian germander | *Teucrium canadense* |
| Eastern poison ivy | *Toxicodendron radicans* |
| St. John's wort | *Triadenum virginicum* |
| Eastern gamagrass, Fakahatcheegrass | *Tripsacum dactyloides* |
| Cattail | *Typha sp.* |
| American elm | *Ulmus americana* |
| Bog white violet | *Viola lanceolata* |
| Muscadine grape | *Vitis rotundifolia* |
| Summer grape | *Vitis aestivalis* |
| Netted chain fern | *Woodwardia areolata* |
| Virginia chain fern | *Woodwardia virginica* |
| Baldwin's yelloweyed grass | *Xyris baldwiniana* |
| Shortleaf yelloweyed grass | *Xyris brevifolia* |
| Elliott's yelloweyed grass | *Xyris elliottii* |
| Richard's yelloweyed grass | *Xyris jupicai* |
| Tall yelloweyed grass | *Xyris platylepis* |
| Yelloweyed grasses | *Xyris spp.* |

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.4.1-2

**Text of NRC RAI:** Provide additional information on waterfowl resources on-site and along the transmission corridor (up to the first substation).

No discussion of waterfowl resources is presented for either the Levy site or the associated facilities in ER Section 2.4.1. Provide a description of waterfowl concentration areas and habitats on-site and along the transmission corridors (up to the first substation).

**PGN RAI ID #:** L-0403

**PGN Response to NRC RAI:**

Based upon field investigations, no waterfowl concentration areas were identified at the LNP site or in the vicinity of the associated facilities. Wood Ducks (*Aix sponsa*) were infrequently observed in cypress swamps on the LNP site (see RAI 2.4.1-1, Table 2.4-3), and American Coot (*Fulica americana*) were occasionally seen in the Cross Florida Barge Canal (CFBC) during field surveys.

The Florida Fish and Wildlife Conservation Commission (FWCC) is part of the Atlantic Coast Joint Venture (ACJV) of the North American Waterfowl Management Plan. This plan includes the attached map (see Attachment 2.4.1-2A) showing the Florida Waterfowl Focus areas, including the Gulf Coast, Orange Creek/Ocklawaha Basin, Upper Everglades, and the Upper St. Johns and Adjacent Coast. The Gulf Coast focus area is just west of the corridor boundary for the Levy-Citrus Common Corridor. The boundary of this focus area is the inland extent of coastal salt marsh habitat, as identified by FWCC's Landsat TM data, out approximately 24.14 kilometers (15 miles) seaward, or the extent of the sea grass beds.

These focus areas are delineated based on the presence of coastal sea grass beds, the extent of salt marsh habitat, and emergent vegetation. Major wetland types of concern include estuarine subtidal unconsolidated, marine subtidal unconsolidated bottom, estuarine subtidal aquatic bed, estuarine intertidal emergent marsh, and palustrine scrub-shrub. This area is west of the proposed transmission line corridor.

Freshwater emergent wetlands are essential habitats for waterfowl. The remnant reach of the Withlacoochee River and the CFBC where crossed by the proposed transmission corridor do not provide this type of habitat. The CFBC has steep, rocky banks and relatively no littoral zone in the area of the proposed transmission line corridor. The remnant reach of the Withlacoochee River also has relatively high banks, adjacent forested wetlands, and a very narrow littoral zone in the area of the transmission line crossing. Periodic discharges from the Inglis Dam cause significant turbulence and velocity that introduce significant scouring of the waterway, thus reducing the occurrence of emergent and submergent vegetation. As a result, not enough suitable foraging areas are present to provide for waterfowl concentration areas.

As stated above, the remnant reach of the Withlacoochee River in the area of the proposed transmission line crossing provides little suitable habitat for waterfowl concentration. The

proposed Central Florida South transmission line crosses the Withlacoochee River a second time at the boundaries between Citrus and Marion counties. At this location, the proposed transmission line will be collocated with an existing PEF 500/230 kilovolt (kV) transmission line corridor. Just southwest of the river, there is a county road and existing development. Due to the development, limited opportunity exists for waterfowl concentration areas. The river bank in this area is steep, with limited vegetation and a limited to non-existent littoral zone. Outside the corridor, the primary habitat is wetland flatwood with heavy canopy cover, which is not primary habitat for waterfowl.

Many lakes and ponds in Florida serve as waterfowl concentration areas by providing critical foraging resources for large numbers of both resident and wintering migratory ducks. Generally, waterfowl hunting in Florida are permitted on any water body that has public access, unless it is closed for a specific reason, such as a location within a park or in an area where the discharge of firearms is prohibited. No waterfowl concentration areas are located within the proposed transmission corridors; however, descriptions of some of the adjacent areas that provide potential waterfowl concentration areas are outlined below.

- Lake Rousseau

  Lake Rousseau is a 12-mile-long, approximately 3700-ac. man-made impoundment in Citrus County that lies on the trace of the Withlacoochee River. It is part of the Marjorie Harris Carr Cross Florida Greenway and is fed by both the Rainbow River and Lake Panasoffkee to the east. The proposed transmission corridor lies immediately to the west of this 12-mile-long man-made impoundment. No impact to this regional waterfowl concentration area is anticipated.

- Lake Tsala Apopka

  Lake Tsala Apopka is an approximately19,000-ac. system of heavily vegetated, interconnected freshwater marshes and shallow lakes in Citrus County. The northern-most portion of the lake system (Hernando Pool) is located south of State Road 200 and approximately one-half mile south of the proposed transmission corridor. No impacts to this waterfowl concentration area are anticipated.

- Lake Panasoffkee

  Lake Panasoffkee and the Lake Panasoffkee Wildlife Management Area are located in Sumter County, south of State Road 44 and west of Interstate 75. This approximately 9000-ac. lake outfalls to the Withlacoochee River to the west. The proposed transmission corridor is located approximately 3 miles north of both Lake Panasoffkee and the management area; therefore, no impacts to this waterfowl concentration area are anticipated.

**Impact Avoidance, Minimization, and Mitigation**

In order to avoid and/or minimize impacts to waterfowl concentration areas, the transmission corridors have been selected to avoid significant surface water features. No structures, access roads, or aerial crossings of significant waterfowl concentration areas will occur. In order to minimize wetland impacts further, transmission lines will be collocated within existing ROWs whenever possible. Any unavoidable wetland impacts will be mitigated in consultation with the FDEP and USACE. Wetland mitigation will ensure that the loss of wetland functions associated with construction of the project, including wildlife habitat, are appropriately replaced through enhancement, restoration, and/or preservation of wetland

habitat or through the purchase of wetland mitigation credits from an agency-approved mitigation bank that will promote conservation of wetland resources within the Central Florida region. Through the project's avoidance, minimization, and mitigation efforts, no significant adverse impacts to waterfowl or waterfowl concentration areas are anticipated.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

022 Attachment 2.4.1-2A.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.4.1-3

**Text of NRC RAI:**

Provide additional information needed to update and complete the baseline characterization and impact assessment for wetland resources.

Wetlands descriptions in ER Section 2.4.1 were based on the Florida Land Use and Cover Classification System (FLUCCS), as interpreted and mapped by SWFWMD and field verified by PEF. Wetland delineations for the Levy site and verification by the U.S. Army Corps of Engineers is ongoing. Reference is made in ER Sections 5.2.1.5 and 5.2.2.3 to groundwater pumping that could adversely affect wetlands, but little detail is provided. Provide the following items:

- A new wetlands map (clearly reproducible in black-and-white) for the site and south of the site that includes jurisdictional and non-jurisdictional wetlands, as well as an overlay of the limits of ground disturbance. Identify the project facilities and features depicted on the map.
- A new table with the existing acreage of wetlands, including jurisdictional and non-jurisdictional wetlands.
- A new wetland impacts table with the acreage of jurisdictional and non-jurisdictional wetlands broken out by temporary and permanent impacts and by facilities (see ER Land Use Tables 4.1-4 and 4.1-5 for a breakdown of facilities).
- A discussion to explain the Unified Mitigation Assessment Method (UMAM) functional assessment for impact wetlands and for mitigation wetlands.
- A qualitative discussion on the effects of construction dewatering on wetlands, including the disposition of water during construction.
- Discussions addressing groundwater drawdown due to operations and any wetlands monitoring that would be implemented.
- Estimated groundwater drawdown isopleths (minimum 1-foot elevation interval) resulting from operational water withdrawal overlaid on the wetland delineation map (clearly reproducible in black-and-white).
- A discussion to describe and explain estimates of wetland loss due to the drawdown, as well as information on how impacts can be minimized and why impacts are unavoidable.
- Updated estimates of wetland and upland impacts along the transmission lines (up to the first substation).

**PGN RAI ID #:** L-0404

**PGN Response to NRC RAI:**

A new wetlands map (clearly reproducible in black and white) for the site and property south of the site that includes jurisdictional and non-jurisdictional wetlands (all wetlands are currently considered jurisdictional until wetland determinations are completed with USACE and FDEP), as well as an overlay of the limits of ground disturbance, is provided as Attachment 2.4.1-3A. The map includes Project facilities and features. Wetlands depicted on the map are based on field delineated wetland boundaries, except for a minor area outside the areas of impact where wetland boundaries are based on aerial photo-interpretation. These areas on the LNP site that have not been delineated to date are expected to be delineated this summer. The areas on the property south of the LNP site are one large contiguous area where no ground-disturbing activities are planed either as part of construction or mitigation.

Table 2.4.1-3-001 presents the existing acreage of wetlands on the LNP site and the Off-Site areas (all other project elements including the property south of the LNP site, and the blowdown corridor to the CREC) by general wetland types. Because the final jurisdictional determinations from the USACE and the FDEP have not yet been received, all wetlands on-site are at this time considered to be jurisdictional and the potential impact numbers are preliminary. PEF is expecting FDEP and USACE verification of these delineations by August 31, 2009.

**Table 2.4.1-3-001**
**Total Wetland Acreage on the LNP Site and Off-Site Areas**

| FLUCCS | LNP Site Acres | Off-Site Acres | Total |
|---|---|---|---|
| Mixed Wetland Hardwoods | 317.62 | 54.88 | **372.50** |
| Cypress | 402.61 | 325.03 | **727.64** |
| Wet Planted Pine | 812.65 | 458.16 | **1270.81** |
| Wetland Forested Mixed | 156.35 | 52.03 | **208.38** |
| Freshwater Marshes | 23.51 | 30.97 | **54.48** |
| Wet Prairies | 14.30 | 2.70 | **17.00** |
| Treeless Hydric Savannah | 274.37 | 5.81 | **280.17** |
| Saltwater Marshes | 0.00 | 4.42 | **4.42** |
| Reservoirs | 0.00 | 0.19 | **0.19** |
| Streams and Waterways | 0.00 | 0.75 | **0.75** |
| **Total** | **2001.41** | **934.94** | **2936.34** |

The temporary and permanent impacts associated with each facility at the LNP site (i.e., LNP building footprint) are summarized below including the LNP Pipeline to CFBC. Information that distinguishes between temporary and permanent impacts for the onsite transmission corridor is not available at this time. Therefore, all impacts associated with the transmission lines and the southernmost portion of the blowdown pipeline are depicted as permanent and are being mitigated in their entirety which overstates the amount of mitigation that may ultimately be required when final permanent impacts are delineated.

The temporary and permanent wetland impacts associated with the offsite transmission lines are presented in Table 2.4.1-3-003 and Table 2.4.1-3-004.

Table 2.4.1-3-002 presents the potential wetland and upland impact acreage by temporary and permanent impacts and by facilities.

**Table 2.4.1-3-002 (Sheet 1 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Heavy Haul Road | On-site | Permanent | 260 - Other open lands (rural) | 0.32 | 0.13 |
| | | | 440 - Tree Plantations | 5.88 | 2.35 |
| | | | 621 - Cypress | 1.07 | 0.43 |
| | | | 629 - Wet Planted Pine | 1.22 | 0.49 |
| | | | 630 - Wetland Forested Mixed | 0.55 | 0.22 |
| | | | 643 - Wet Prairies | 0.14 | 0.05 |
| Misc. Fill | On-site | Permanent | 260 - Other open lands (rural) | 3.66 | 1.46 |
| | | | 440 - Tree Plantations | 39.21 | 15.68 |
| | | | 621 - Cypress | 7.15 | 2.86 |
| | | | 629 - Wet Planted Pine | 19.23 | 7.69 |
| | | | 630 - Wetland Forested Mixed | 1.83 | 0.73 |
| | | | 641 - Freshwater Marshes | 0.09 | 0.04 |
| | | | 643 - Wet Prairies | 0.05 | 0.02 |
| | | | 646 - Treeless Hydric Savannah | 41.27 | 16.51 |
| Misc. Pipeline | On-site | Permanent | 260 - Other open lands (rural) | 0.65 | 0.26 |
| | | | 440 - Tree Plantations | 1.54 | 0.62 |
| | | | 621 - Cypress | 0.34 | 0.14 |
| | | | 629 - Wet Planted Pine | 0.29 | 0.11 |
| | | | 630 - Wetland Forested Mixed | 1.62 | 0.65 |
| | | | 643 - Wet Prairies | 0.04 | 0.02 |
| Misc. Structures | On-site | Permanent | 260 - Other open lands (rural) | 6.16 | 2.47 |
| | | | 440 - Tree Plantations | 30.21 | 12.08 |
| | | | 617 - Mixed Wetland Hardwoods | 0.72 | 0.29 |
| | | | 621 - Cypress | 1.73 | 0.69 |
| | | | 629 - Wet Planted Pine | 17.05 | 6.82 |
| | | | 630 - Wetland Forested Mixed | 4.85 | 1.94 |
| | | | 641 - Freshwater Marshes | 0.28 | 0.11 |
| | | | 643 - Wet Prairies | 0.02 | 0.01 |
| | | | 646 - Treeless Hydric Savannah | 13.06 | 5.22 |
| Pipeline LNP to CFBC | On-site | Perrmanent[2] | 260 - Other open lands (rural) | 0.99 | 0.40 |
| | | | 440 - Tree Plantations | 7.18 | 2.87 |
| | | | 621 - Cypress | 1.85 | 0.74 |
| | | | 629 - Wet Planted Pine | 1.24 | 0.49 |
| | | | 630 - Wetland Forested Mixed | 3.72 | 1.49 |
| | | | 643 - Wet Prairies | 0.33 | 0.13 |
| | | | 646 - Treeless Hydric Savannah | 0.44 | 0.18 |

**Table 2.4.1-3-002 (Sheet 2 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Pond A | On-site | Permanent | 440 - Tree Plantations | 19.55 | 7.82 |
| | | | 629 - Wet Planted Pine | 30.13 | 12.05 |
| | | | 630 - Wetland Forested Mixed | 6.27 | 2.51 |
| | | | 641 - Freshwater Marshes | 3.71 | 1.48 |
| | | | 646 - Treeless Hydric Savannah | 10.13 | 4.05 |
| Pond B | On-site | Permanent | 260 - Other open lands (rural) | 6.80 | 2.72 |
| | | | 621 - Cypress | 3.04 | 1.21 |
| | | | 629 - Wet Planted Pine | 0.01 | 0.00 |
| | | | 630 - Wetland Forested Mixed | 0.13 | 0.05 |
| | | | 643 - Wet Prairies | 4.04 | 1.61 |
| Pond C1 | On-site | Permanent | 440 - Tree Plantations | 4.02 | 1.61 |
| | | | 621 - Cypress | 1.11 | 0.44 |
| | | | 629 - Wet Planted Pine | 2.42 | 0.97 |
| Pond C2 | On-site | Permanent | 440 - Tree Plantations | 11.63 | 4.65 |
| | | | 621 - Cypress | 1.37 | 0.55 |
| | | | 629 - Wet Planted Pine | 3.65 | 1.46 |
| | | | 641 - Freshwater Marshes | 0.23 | 0.09 |
| Shooting Range | On-site | Permanent | 440 - Tree Plantations | 0.06 | 0.02 |
| Site Access Roads | On-site | Permanent | 260 - Other open lands (rural) | 1.54 | 0.62 |
| | | | 440 - Tree Plantations | 15.36 | 6.14 |
| | | | 621 - Cypress | 2.54 | 1.02 |
| | | | 629 - Wet Planted Pine | 8.11 | 3.24 |
| | | | 630 - Wetland Forested Mixed | 0.95 | 0.38 |
| | | | 646 - Treeless Hydric Savannah | 0.74 | 0.30 |
| Switchyard | On-site | Permanent | 440 - Tree Plantations | 28.40 | 11.36 |
| | | | 621 - Cypress | 5.26 | 2.10 |
| | | | 629 - Wet Planted Pine | 7.11 | 2.85 |
| Switchyard Connection | On-site | Permanent | 260 - Other open lands (rural) | 1.09 | 0.44 |
| | | | 440 - Tree Plantations | 11.02 | 4.41 |
| | | | 621 - Cypress | 4.19 | 1.68 |
| | | | 629 - Wet Planted Pine | 5.05 | 2.02 |
| | | | 641 - Freshwater Marshes | 0.02 | 0.01 |
| | | | 643 - Wet Prairies | 0.09 | 0.04 |
| | | | 646 - Treeless Hydric Savannah | 1.70 | 0.68 |

**Table 2.4.1-3-002 (Sheet 3 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Transmission Corridor | On-site | Permanent | 410 - Upland coniferous forests | 0.05 | 0.02 |
| | | | 440 - Tree Plantations | 100.49 | 40.20 |
| | | | 617 - Mixed Wetland Hardwoods | 9.48 | 3.79 |
| | | | 621 - Cypress | 24.10 | 9.64 |
| | | | 629 - Wet Planted Pine | 33.94 | 13.57 |
| | | | 630 - Wetland Forested Mixed | 8.35 | 3.34 |
| | | | 641 - Freshwater Marshes | 2.02 | 0.81 |
| | | | 643 - Wet Prairies | 0.29 | 0.12 |
| Unit 1 | On-site | Permanent | 260 - Other open lands (rural) | 5.52 | 2.21 |
| | | | 629 - Wet Planted Pine | 3.42 | 1.37 |
| | | | 630 - Wetland Forested Mixed | 0.71 | 0.28 |
| | | | 641 - Freshwater Marshes | 1.96 | 0.79 |
| | | | 646 - Treeless Hydric Savannah | 3.80 | 1.52 |
| Unit 2 | On-site | Permanent | 260 - Other open lands (rural) | 4.25 | 1.70 |
| | | | 440 - Tree Plantations | 2.91 | 1.16 |
| | | | 629 - Wet Planted Pine | 2.14 | 0.85 |
| | | | 630 - Wetland Forested Mixed | 0.03 | 0.01 |
| | | | 641 - Freshwater Marshes | 3.65 | 1.46 |
| | | | 643 - Wet Prairies | 0.12 | 0.05 |
| | | | 646 - Treeless Hydric Savannah | 2.31 | 0.93 |
| Heavy Haul Road | Off-site | Permanent | 260 - Other open lands (rural) | 0.61 | 0.24 |
| | | | 410 - Upland coniferous forests | 1.64 | 0.66 |
| | | | 434 - Hardwood - conifer mixed | 0.10 | 0.04 |
| | | | 440 - Tree Plantations | 20.98 | 8.39 |
| | | | 617 - Mixed Wetland Hardwoods | 2.05 | 0.82 |
| | | | 621 - Cypress | 1.20 | 0.48 |
| | | | 629 - Wet Planted Pine | 8.83 | 3.53 |
| | | | 630 - Wetland Forested Mixed | 2.02 | 0.81 |
| | | | 641 - Freshwater Marshes | 1.36 | 0.54 |
| | | | 643 - Wet Prairies | 0.23 | 0.09 |
| | | | 646 - Treeless Hydric Savannah | 0.33 | 0.13 |
| Misc. Pipeline | Off-site | Permanent | 434 - Hardwood - conifer mixed | 0.93 | 0.37 |
| | | | 440 - Tree Plantations | 4.59 | 1.83 |
| | | | 629 - Wet Planted Pine | 0.01 | 0.00 |
| | | | 646 - Treeless Hydric Savannah | 0.14 | 0.06 |

**Table 2.4.1-3-002 (Sheet 4 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Pipeline CFBC to CREC | Off-site | Permanent[2] | 510 – Streams and Waterways | 0.75 | 0.30 |
| | | | 530 – Reservoirs | 0.19 | 0.08 |
| | | | 629 – Wet Planted Pine | 24.58 | 9.83 |
| | | | 630 – Wetland Forested Mixed | 3.78 | 1.51 |
| | | | 641 – Freshwater Marshes | 4.66 | 1.86 |
| | | | 642 – Saltwater Marshes | 4.42 | 1.77 |
| Pipeline LNP to CFBC | Off-site | Permanent[2] | 260 - Other open lands (rural) | 0.07 | 0.03 |
| | | | 410 - Upland coniferous forests | 1.42 | 0.57 |
| | | | 434 - Hardwood - conifer mixed | 1.18 | 0.47 |
| | | | 440 - Tree Plantations | 25.83 | 10.33 |
| | | | 617 - Mixed Wetland Hardwoods | 1.73 | 0.69 |
| | | | 621 - Cypress | 0.00 | 0.00 |
| | | | 629 - Wet Planted Pine | 8.96 | 3.58 |
| | | | 630 - Wetland Forested Mixed | 3.44 | 1.38 |
| | | | 641 - Freshwater Marshes | 1.67 | 0.67 |
| | | | 643 - Wet Prairies | 0.00 | 0.00 |
| | | | 646 - Treeless Hydric Savannah | 1.66 | 0.66 |
| Site Access Roads | Off-site | Permanent | 434 - Hardwood - conifer mixed | 0.56 | 0.22 |
| | | | 440 - Tree Plantations | 2.22 | 0.89 |
| | | | 621 - Cypress | 0.00 | 0.00 |
| | | | 629 - Wet Planted Pine | 0.03 | 0.01 |
| | | | 641 - Freshwater Marshes | 0.08 | 0.03 |
| | | | 646 - Treeless Hydric Savannah | 0.26 | 0.10 |
| Transmission Corridor | Off-site | Permanent | 260 - Other open lands (rural) | 0.57 | 0.23 |
| | | | 410 - Upland coniferous forests | 8.57 | 3.43 |
| | | | 434 - Hardwood - conifer mixed | 5.70 | 2.28 |
| | | | 440 - Tree Plantations | 143.28 | 57.31 |
| | | | 617 - Mixed Wetland Hardwoods | 15.19 | 6.08 |
| | | | 621 - Cypress | 3.40 | 1.36 |
| | | | 629 - Wet Planted Pine | 52.80 | 21.12 |
| | | | 630 - Wetland Forested Mixed | 15.04 | 6.02 |
| | | | 641 - Freshwater Marshes | 19.39 | 7.76 |
| | | | 646 - Treeless Hydric Savannah | 2.73 | 1.09 |

**Table 2.4.1-3-002 (Sheet 5 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| 50' Buffer to CFBC | On-site | Temporary | 260 - Other open lands (rural) | 9.10 | 3.64 |
| | | | 410 - Upland coniferous forests | 0.00 | 0.00 |
| | | | 440 - Tree Plantations | 56.57 | 22.63 |
| | | | 617 - Mixed Wetland Hardwoods | 2.67 | 1.07 |
| | | | 621 - Cypress | 13.19 | 5.28 |
| | | | 629 - Wet Planted Pine | 39.46 | 15.78 |
| | | | 630 - Wetland Forested Mixed | 7.35 | 2.94 |
| | | | 641 - Freshwater Marshes | 0.59 | 0.23 |
| | | | 643 - Wet Prairies | 1.54 | 0.61 |
| | | | 646 - Treeless Hydric Savannah | 19.05 | 7.62 |
| | | | | 0.00 | 0.00 |
| | Off-site | Temporary | 410 - Upland coniferous forests | 0.52 | 0.21 |
| | | | 434 - Hardwood - conifer mixed | 1.20 | 0.48 |
| | | | 440 - Tree Plantations | 14.22 | 5.69 |
| | | | 617 - Mixed Wetland Hardwoods | 1.37 | 0.55 |
| | | | 621 - Cypress | 1.44 | 0.58 |
| | | | 629 - Wet Planted Pine | 5.39 | 2.16 |
| | | | 630 - Wetland Forested Mixed | 1.34 | 0.54 |
| | | | 641 - Freshwater Marshes | 0.79 | 0.32 |
| | | | 643 - Wet Prairies | 0.05 | 0.02 |
| | | | 646 - Treeless Hydric Savannah | 0.01 | 0.01 |
| | | **On-site** | | **626.97** | **250.79** |
| | | **Off-site** | | **399.18** | **159.68** |
| | | Subtotal | | 1026.15 | 410.47 |
| | **50' Buffer (Temporary) On-site** | | | **149.51** | **59.80** |
| | **50' Buffer (Temporary) Off-site** | | | **26.32** | **10.53** |
| | | Subtotal | | 175.83 | 70.33 |
| | | TOTAL | | 1201.98 | 480.80 |

Notes:
1) Please note areas noted above are in various stages of delineation. The most up to date information has been utilized in area calculations, including formal JDS, field verified lines by DEP, consultant established lines, and SWFWMD land use lines.
2) For impacts that could be considered both permanent and temporary, the calculations of total impacts have assumed these areas to be permanent in order to provide the most conservative estimate.

The 50-foot (ft.) buffer to the CFBC is outside the direct impact area (footprint) of the project but may be temporarily impacted through construction activities, such as temporary placement of construction materials and roadway. Currently, this area consists of spoil material placed during the original dredging of the canal and is vegetated largely by bahia grass and ruderal species. Silt fencing will be placed prior to any land disturbance activities to minimize the potential for sedimentation into the canal. Following construction, any temporary impacts within the buffer area will be restored by grading to pre-existing contours and seeding in accordance with the project's sedimentation and erosion control plan.

Although some portions of the hydric pine plantation are not historical wetlands, they have been accounted for as wetlands. The areas of pine plantation designated as uplands have been identified separately as FLUCCS 440, whereas FLUCCS 629 was used to identify hydric pine plantation. Therefore, impacts to hydric pine plantation (FLUCCS 629) were originally lumped together with the impacts proposed for native wetland systems (i.e., FLUCCS 617, 621, 630, 641, 643, 646).

**Uniform Mitigation Assessment Method (UMAM)**

The Uniform Mitigation Assessment Method (UMAM), developed by the FDEP and contained in Chapter 62-345, F.A.C., was used to evaluate the function of uplands and wetlands identified within the study area in regards to expected wildlife species in accordance with guidelines set forth in Chapter 62-345, F.A.C. (Attachment 2.4.1-3B). The intent of UMAM is to provide a standardized procedure for assessing wetland functions, the degree of functional loss due to an impact, and the amount of mitigation needed to offset those losses. UMAM has been used as the quantitative tool for determining wetland mitigation requirements in a wide range of projects permitted through the USACE in Florida and has been adopted by USACE for use in Florida by a Public Notice issued on July 18, 2005. There is a minor difference between the way the State of Florida and the USACE calculate the timing associated with mitigation maturity using UMAM.

Three main parameters are assessed under the UMAM protocol. Each parameter is given a score between 0 (lowest) and 10 (highest) in increments of 1.0, with specific scoring considerations and criteria described in the FDEP guidance to ensure consistency. The final score is a weighted average. UMAM variables considered for each wetland include: Location and Landscape, Water Environment, and Community Structure. Assessment areas were scored based on the current condition ("Without Project" scenario) and compared with proposed impact or mitigation ("With Project" scenario) scores to determine the Relative Functional Gain for the project. UMAM calculations also provide for quantitative consideration of the likelihood of success of the proposed mitigation ("risk") and the time expected to attain the desired conditions ("temporal factor"). Under UMAM, a project must result in at least a balance between the functional loss from impacts and the functional gain from mitigative actions.

UMAM results for on-site impact and proposed mitigation wetlands are summarized in the Wetland Mitigation Plan, which is included as Attachment 2.4.1-3C to this response.

**Wetland Impact Areas**

Without Project – Assessment areas were generally given a 4 for the Location and Landscape Support category due to limited habitat availability in surrounding landscapes, wildlife access being limited by distance and barriers, area land uses having adverse effects on wildlife, and hydrologic impediments that limit assessment areas from providing benefits downstream. Water Environment scores ranged from 2 to 10 and were based on the differences in land management practices, including ditching, bedding, haul roads, and their effects on the habitat. Community Structure scores ranged from 2 to 9 and were based on

the degree of regeneration/recruitment, cover of desirable species, species diversity, and the quality of structure available to wildlife. Wetland areas typically scored toward the higher range of the category.

With Project – Impacts to assessment areas are considered to be direct and permanent resulting in a total loss of function according to UMAM and receiving a score of zero.

**Potential Mitigation Areas**

Without Project – In general, conditions at mitigation areas were similar to impact areas as described above. Mitigation areas were generally given a 4 for the Location and Landscape Support based on ongoing land management practices and support to wildlife as described above. Water Environment scores ranged from 4 to 10 and Community Structure scores ranged from 3 to 10.

With Project – Mitigation areas were scored under optimal conditions based on identified restoration, enhancement, or preservation opportunities. Location and Landscape Support scores for wetland mitigation areas were 9 for increased optimal habitat availability and removal of current land uses (silviculture). Water Environment scores were only slightly greater than the "Without Project" scenario due to few hydrologic enhancement opportunities. The exception was in planted pine wetland areas, which scored a 9 based on improvements to the habitat once silviculture activities end. Community Structure scored a 9 based on removal of slash pine from wetlands and natural regeneration/recruitment particularly in transition communities, along with changes in current land use such as logging. Uplands mitigation areas scored a 9 based on optimal structural habitat, regeneration/recruitment potential, and typical age/size distribution of vegetation species once desired land management plans are implemented.

The amount of time for mitigation implementation to maturity between the "Without Project" and "With Project" scenarios was based on forested wetlands and ranged from 5 to 15 years. Herbaceous wetlands were assigned 5 years to reach maturity. Risk factors ranged from 1.5 (high) for planted pine wetlands to 1.25 (low) for all other wetlands and upland assessment areas.

**Effects of Construction Dewatering on Wetlands**

Dewatering during construction will be conducted so as to minimize potential impacts to adjacent wetlands. For the foundation of each nuclear island, the underlying bedrock will be sealed by drilling and pressure grouting and the area will be excavated. Reinforced diaphragm walls will be installed around each nuclear island perimeter so that only the interior of the excavation will require dewatering. This technique thus creates a "bathtub" effect. The reinforced diaphragm walls will prevent significant drawdowns from occurring in the surficial aquifer system outside of the excavation area. Thus, the reinforced diaphragm walls will prevent the construction dewatering from impacting wetlands outside the footprint of the nuclear islands. Pumped water will be discharged to an infiltration basin sized for the estimated flow rate. The groundwater drawdown inside and outside the nuclear island foundation design was simulated during dewatering pumping from inside the diaphragm wall. The model included nine observation wells, two wells on each of the cardinal axis located at 12.5 and 62.5 ft. away from the diaphragm wall, and one well at the center of the nuclear island. The change in head was modeled comparing pre-development water levels to the dewatering water levels. The average change in water level resulting from dewatering in the wells located 12.5 ft. outside of the diaphragm wall was 0.6 to 0.7 ft. The average change in water level resulting from dewatering in the wells located 62.5 ft. outside of the diaphragm wall was 0.5 to 0.6 ft. The drawdown in groundwater levels are estimated to

diminish rapidly with distance from the diaphragm wall and are not expected to cause wetland impacts in any of the nearby wetlands.

Construction-related dewatering activities will be evaluated and approved by FDEP and the SWFWMD as part of the post-certification review period, following submittal of final construction designs. A construction dewatering plan will be provided to the SWFWMD for approval prior to dewatering. The plan will include details of the dewatering system, discharge quantities and location, a monitoring plan, and other details as appropriate to demonstrate that the plans meet the SWFWMD proposed Conditions of Certification, and comply with all applicable Environmental Resource Permit construction dewatering requirements. Preliminary dewatering details are found in the Preliminary Sitewide Dewatering Plan, a copy of which is available in the Progress Energy-provided Reading Room.

**Operational Groundwater Withdrawal**

The use of brackish water from the CFBC for cooling, instead of groundwater, drastically reduces the LNP's use of fresh water. Additionally, PEF worked closely with the SWFWMD in designing and modeling the wellfield to avoid and minimize potential impacts resulting from groundwater withdrawal. Based on revised modeling results, as discussed in the SWFWMD Staff Recommendations on Certification, the wellfield was relocated from the northeast portion of the site to higher transmissivity areas of the Floridan aquifer in the southern portion of the property. A figure depicting modeled groundwater drawdown isopleths resulting from operational water pumpage is attached as Attachment 2.4.1-3D.

Drawdown of the water table resulting from wellfield pumpage has potential to adversely affect adjacent wetlands. As previously discussed, the location of the onsite wellfield and the pumpage schedule were changed to minimize potential impacts to wetlands. While a predicted 1-foot decline in water levels has been suggested as the drawdown level that will cause adverse impacts to seasonally to semi-permanently flooded wetlands in Florida (Reference 2.4.1-3 01), it is possible that lower drawdown values may result in adverse changes to wetland composition and functions. The predicted surficial aquifer drawdown depicted in Technical Memorandum 338884-TMEM-074, Rev. 1, in the vicinity of the Levy nuclear plant wellfield are not expected to adversely impact wetlands because the predicted drawdown is primarily limited to an area close around the well points and the predicted drawdown is below the threshold that is expected to cause any kind of impacts in the types of wetland systems present on the site. (Durbin, SCA Testimony, p. 328-29, 2009). However, given the potential model variability associated with groundwater modeling, PEF has agreed as part of the proposed Conditions of State of Florida Certification to monitor wetlands in areas potentially affected by groundwater withdrawals. Groundwater withdrawal cannot cause unacceptable adverse impacts to wetlands or other surface waters, in accordance with the SWFWMD review criteria for WUPs and SWFWMD proposed Conditions on the State of Florida Certification. The following SWFWMD performance standards apply to the review of potential impacts to wetlands:

- Wet season water levels shall not deviate from their normal range.
- Wetland hydroperiods shall not deviate from their normal range and duration to the extent that wetlands plant species composition and community zonation are adversely impacted.

- Wetland habitat functions, such as providing cover, breeding, and feeding areas for obligate and facultative wetland animals shall be temporally and spatially maintained, and not adversely impacted as a result of withdrawals.
- Habitat for threatened or endangered species shall not be altered to the extent that use by those species is impaired.

To confirm that water use associated with operations of the LNP does not cause adverse environmental impacts, PEF has agreed as part of the proposed Conditions of the State of Florida Certification to develop and implement an environmental monitoring plan (based on the SWFWMD Wetland Assessment Procedure) to evaluate the relative condition of surface waters and wetlands in areas potentially affected by groundwater withdrawals. Monitoring will continue for a minimum of 5 years after groundwater withdrawals reach 1.25 mgd on an annual average basis.

A table of updated estimates of wetland and upland impacts along the transmission lines (up to the first substation) is provided below. A map showing the locations of transmission line segments is provided in Attachment 2.4.1-3E.

**Table 2.4.1-3-003**
**Estimates of Upland Impacts along Transmission Lines from LNP Site to First Substation**

| Segment | Land Use (FLUCCS) | Wetland Type | Area (ac.) |
|---|---|---|---|
| Segment 1 | 411 | PINE FLATWOODS | 16.1 |
| | 434 | HARDWOOD - CONIFER MIXED | 48.2 |
| | 441 | CONIFEROUS PLANTATIONS | 138.9 |
| | | **Subtotal** | **203.3** |
| Segment 2 | 412 | LONGLEAF PINE - XERIC OAK | 82.1 |
| | 434 | HARDWOOD - CONIFER MIXED | 102.4 |
| | | **Subtotal** | **184.5** |
| Segment 3 | 412 | LONGLEAF PINE - XERIC OAK | 0.9 |
| | 434 | HARDWOOD - CONIFER MIXED | 45.9 |
| | | **Subtotal** | **46.8** |
| Segment 4 | 411 | PINE FLATWOODS | 6.2 |
| | 412 | LONGLEAF PINE - XERIC OAK | 14.1 |
| | 413 | SAND PINE | 31.3 |
| | 421 | XERIC OAK | 56.4 |
| | 427 | LIVE OAK | 6.7 |
| | 434 | HARDWOOD - CONIFER MIXED | 109.8 |
| | 441 | CONIFEROUS PLANTATIONS | 62.3 |
| | | **Subtotal** | **286.9** |
| **Total** | | | **721.4** |

Notes:
Segment 1 – North Levy Nuclear Plant to Levy/Citrus County Line
Segment 2 – Levy/Citrus County Line to Citrus Substation
Segment 3 – Citrus Substation to Crystal River Energy Complex
Segment 4 – Citrus Substation to Proposed Central Florida South Substation

**Table 2.4.1-3-004**
**Estimated Wetland Impact by Type to First Substation**

| Segment | Land Use | Wetland Type | Total Impacts D/F (ac) | Estimated Clearing (ac.) [1] |
|---|---|---|---|---|
| Segment 1 | 510 | Streams and Waterways | 1.2 | 0.0 |
| | 615 | Stream and Lake Swamps (Bottomland) | 0.0 | 0.0 |
| | 621 | Cypress | 34.7 | 150.5 |
| | 624 | Cypress-Pine-Cabbage Palm | 2.6 | 0.0 |
| | 630 | Wetland Forested Mixed | 11.0 | 12.0 |
| | 641 | Freshwater Marshes | 0.0 | 0.0 |
| | 643 | Wet Prairies | 0.6 | 0.0 |
| | | Subtotal | 50.1 | 162.4 |
| Segment 2 | 510 | Streams and Waterways | 0.1 | 0.0 |
| | 530 | Reservoirs | 0.2 | 0.0 |
| | 615 | Stream and Lake Swamps (Bottomland) | 5.0 | 6.6 |
| | 621 | Cypress | 1.9 | 0.8 |
| | 630 | Wetland Forested Mixed | 1.8 | 0.6 |
| | 641 | Freshwater Marshes | 10.3 | 0.0 |
| | | Subtotal | 19.3 | 8.0 |
| Segment 3 | 615 | Stream and Lake Swamps (Bottomland) | 0.4 | 0.9 |
| | 621 | Cypress | 0.5 | 0.5 |
| | 630 | Wetland Forested Mixed | 0.4 | 0.9 |
| | 641 | Freshwater Marshes | 5.9 | 0.0 |
| | 653 | Intermittent Ponds | 0.0 | 0.0 |
| | | Subtotal | 7.2 | 2.3 |
| Segment 4 | 510 | Streams and Waterways | 0.2 | 0.0 |
| | 520 | Lakes | 0.9 | 0.0 |
| | 530 | Reservoirs | 0.1 | 0.0 |
| | 615 | Stream and Lake Swamps (Bottomland) | 7.8 | 17.9 |
| | 621 | Cypress | 0.0 | 0.4 |
| | 630 | Wetland Forested Mixed | 0.0 | 0.1 |
| | 641 | Freshwater Marshes | 9.6 | 0.0 |
| | 643 | Wet Prairies | 3.9 | 0.0 |
| | 653 | Intermittent Ponds | 0.0 | 0.0 |
| | | Subtotal | 22.5 | 18.4 |

Notes:
Segment 1 - LNP to Levy/Citrus County Line (includes the conceptual ROW that includes 4 500-kV lines between LNP and the Citrus County Line).
Segment 2 - Levy/Citrus County Line to Proposed Citrus Substation (remainder of LPC)
Segment 3 - CREC Switchyard to Proposed Citrus Substation (remainder of LCR)
Segment 4 - Proposed Citrus Substation to Proposed Central Florida South Substation (remainder of LCFS)

**Reference:**

Reference RAI 2.4.1-3 01:

Mortellaro, S., S. Krupa, L. Fink, and J. VanArman, "Literature Review on the Effects of Groundwater Drawdowns on Isolated Wetlands," Technical Publication 96-01, WRE #330, South Florida Water Management District, West Palm Beach, Florida, November 1995.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 023 Attachment 2.4.1-3A.pdf
- 024 Attachment 2.4.1-3B.pdf
- 025 Attachment 2.4.1-3C Part 1 of 2.pdf
- 026 Attachment 2.4.1-3C Part 2 of 2.pdf
- 027 Attachment 2.4.1-3D.pdf
- 028 Attachment 2.4.1-3E.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.4.1-4

**Text of NRC RAI:**

Provide additional information on the value and utility of retained forest buffers on the project site as future wildlife habitat.

No discussion is presented in ER Section 5.1 on the potential future wildlife use of retained forest buffers on the LNP site. Depending on how these buffers are managed, they could provide suitable habitat for many wildlife species, including important species. Discuss how preserved forest buffers would be managed, including both forest and general land management practices, and how these practices could benefit wildlife. Provide a copy of the Timber Management and Mitigation Plan for the site, when available.

**PGN RAI ID #:** L-0405

**PGN Response to NRC RAI:**

As discussed in ER Subsection 4.3.1.1, most of the LNP site will remain undeveloped as vegetated buffer following construction of the LNP. Some or all of this area may be enhanced and restored as part of the project's wetland mitigation program. Land management details will be provided in the final Mitigation Plan, expected approximately 6 months after final State Certification, and the Forest Management Plan, Attachment 2.4.1-4A. The Forest Management Plan is a proposed strategy on how to manage the property for timber on an ongoing basis and does not include details on mitigation activities that will be included as part of the final Mitigation Plan. Land management activities are expected to include thinning of planted pine, controlled burns, and limited earthwork to restore historical hydrologic connections and native communities.

As discussed in ER Subsection 2.4.1, conversion of the historical mosaic of pine flatwoods, wet prairie and cypress swamp to monospecific stands of short-rotation slash pine have reduced the suitability of the property for many wildlife species. Restoration back to pine flatwoods, wet prairie, and cypress swamp has the potential to enhance the habitat value for a greater diversity of native wildlife species.

A copy of the initial Wetland Mitigation Plan is provided as Attachment 2.4.1-3C. A copy of the Forest Management Plan will be provided when available.

During conference calls with the NRC in May 2009, several aspects of the mitigation plan were discussed. A summary of the items discussed follows, with additional clarification provided.

**Herbaceous Wetland Success Criteria**

Typically herbaceous wetlands that are created from uplands meet success criteria within the first 3 years after planting. State and federal agencies such as the Florida Department of Environmental Protection (FDEP), Water Management Districts, and the U.S. Army Corps of Engineers (USACE) will typically require mitigation monitoring for a period of 3 years until

the mitigation areas reach success and are released from monitoring. These success criteria vary among regulating agencies; however, they typically require that an area support a diverse assemblage of native species, with a minimum of 85 percent coverage of desirable plant species and no more than 5 to 10 percent coverage by upland and undesirable or exotic species.

Although meeting success criteria does not necessarily imply that a wetland has achieved maturity (or the proposed Uniform Mitigation Assessment Method [UMAM] score), BRA's extensive experience in wetland mitigation creation has shown that maximum structural density in the herbaceous layer is commonly achieved within 3 to 5 years. Also, nearly all areas proposed for mitigation have an existing herbaceous layer, intact soils, and presumably a seed bank of native vegetation.

In cases where success criteria are not met within this timeframe, often two common factors are to blame: (1) poor soil conditions, and (2) the failure of a site to achieve design hydropatterns. The herbaceous wetlands that will be enhanced already have established hydric soil conditions, and in most cases, relatively normal wetland hydropatterns. When necessary, altered drainage patterns will be corrected during the enhancement process to re-establish normal hydropatterns.

Where cover and diversity of desirable wetland species already exists, enhancement goals are anticipated to be easily achieved within the first 3 years. The herbaceous mitigation areas occur within the historical footprint of herbaceous marshes and wet prairie systems. These areas already have a seed source and existing coverage of desirable native herbaceous species, although coverage by native herbaceous species varies relative to the extent silviculture impacts associated with dewatering from ditching or furrowing and the bedding of pines. Existing coverage by planted pines (to be selectively logged) will dictate the timeframes for herbaceous systems to reach maturity. Some areas that have been bedded heavily have shaded out a lot of herbaceous species. Also, dewatering from furrows have virtually eliminated hydrology in some areas needed to support herbaceous wetland vegetation. Areas with significant silviculture impacts (dense pine coverage and poor hydrology from dewatering associated with furrows) may require a full 5 years to reach maturity to allow more time for natural recruitment to occur. If within the first 6 months the systems are not showing trends towards success, supplemental planting will be implemented where necessary to ensure that enhancement and restoration goals are met within 5 years.

It is also likely that restoration efforts associated with the mitigation areas will be initiated before all proposed impacts occur. Anticipated timeframes for maturity of the mitigation areas (also known as time lag) may be significantly less by the time wetland impacts occur from construction. Also, nearly all areas proposed for mitigation have an existing herbaceous layer, intact soil, and presumably a seed bank of native vegetation. The grant of Site Certification is anticipated by September 2009. Once appropriate authorizations are obtained from regulatory agencies, construction of the facility and supporting infrastructure will be initiated well in advance of operation start dates targeted for 2016 (or later). Following Site Certification, environmental permitting must be completed to obtain construction authorization from various agencies, including the FDEP, USACE, and local governments. Construction cannot be initiated in jurisdictional areas until appropriate authorizations are obtained (that is, FDEP Environmental Resource Review, USACE dredge and fill permits, construction authorizations); however, mitigation efforts may be initiated in advance of environmental permitting efforts so long as they are consistent with the mitigation proposal approved under the Site Certification. Also, any mitigation efforts that are initiated prior to

construction authorization will be limited to selective logging and thinning of trees and the removal of nuisance and exotic species. Any restoration efforts that require dredging and/or filling to restore hydrology (including ditch blocking, placement of low water crossings, culvert replacements, removal of roadways) will not be conducted until appropriate construction authorizations are obtained. Therefore, enhancement and restoration efforts (logging and thinning) will likely be initiated in advance of construction and all enhancement and restoration goals for herbaceous systems should be met well within the 5-year period.

**Planted Pine Wetland Success Criteria**

Historically, the accepted minimum monitoring period for forested wetlands created from uplands was 5 years. The USCAE has recently increased the minimum monitoring period to 10 years. However, most success criteria applied to forested wetlands are typically met in the first 5 or 6 years. While a mature canopy is not typically necessary to achieve success, evidence that the conditions are trending toward maturity are required. These criteria usually include minimum cover requirements (for example, overall cover by desirable species or specific canopy cover of 30 to 85 percent), growth measures to demonstrate consistent tree growth (such as height and diameter at breast height [DBH]), minimum tree height requirements (typically 12 feet), and maximum cover by upland and exotic species.

Most of the forested wetlands that will be enhanced through pine removal (enhanced pine wetlands) already have small native trees that appear to be between 5 and 10 years of age. As discussed above, many of these wetlands already have good soil conditions and normal hydropatterns, so enhancement goals should be achieved more quickly than in newly constructed wetlands. Coverage by native trees such as cypress varies depending on the extent of logging activities commonly within historical cypress swamps on-site. Native tree coverage also varies relative to the degree of silviculture impacts associated with dewatering from ditching/furrowing and the bedding of pines. The time lag for these forested systems to reach success is dictated by the existing coverage of pines to be removed or thinned, the extent of impacts from logging cypress, and the age and size distribution of existing native trees that are recruiting back. Systems that are significantly impacted by the bedding of pines and logging activities could take roughly 10 to 15 years to reach success criteria, whereas systems that are more intact with fair coverage of mature native trees may only take 5 to 10 years to reach success. Following pine removal, the existing recruits are anticipated to be mature trees within 5 to 10 years. These trees, along with newer recruits or supplemental plantings (where necessary), should form a mature canopy, with a diverse age class structure, within 15 years. If within the first 5 years the forested systems are not showing trends towards success, supplemental plantings will be implemented where necessary to ensure that enhancement/restoration goals are met within 10 to 15 years.

Also, as stated in the response to 8c.(j), enhancement and restoration efforts involving thinning and logging of pines will likely be initiated in advance of construction, which will allow for regeneration to start before wetland impacts occur. Also, logging of cypress will be prohibited to allow natural recruitment to take place before wetland impacts occur.

**Logging and Thinning Operations**

Pines will be thinned or logged within 5 years of initial impacts, regardless of their maturity and merchantability. The pines must be removed to restore groundcover and hydrology (through removal of bedding) and to create a landscape that can be more readily controlled through prescribed burning. Native species will not begin to successfully regenerate until selective tree removal and thinning activities are initiated as part of the enhancement and restoration efforts. Therefore, if harvesting is postponed until pines reach full maturity,

regeneration will not start for another 10 years, leading to a significant increase in time lag. Therefore, logging and thinning measures will be initiated at the beginning of the project and completed within 5 years to ensure that the mitigation areas reach success criteria within the targeted timeframes (see time lag assigned pursuant to the UMAM).

PEF recognizes that harvesting pines before full maturity will result in economic loss; however, mitigation monitoring has significant costs that can increase significantly if prolonged over time. Therefore, any delays that prolong the success timeframes for mitigation areas will result in increased monitoring costs. Initiating restoration efforts to stimulate vegetative regeneration and natural recruitment will minimize monitoring timeframes and costs associated with it. Therefore, any potential gain from timber sales will be reduced by increased mitigation cost.

**Controlled Burning**

Prescribed fire on the LNP site and the PEF-owned property south of the LNP site will not be restricted by the location of the LNP. PEF currently uses prescribed fire as a management tool at their Crystal River Nuclear Plant. Additionally, the LNP site is adjacent to Goethe State Forest to the north, which also employs fire as a part of their park management plan. Fire prescriptions will follow guidelines mandated by the State Division of Forestry pursuant to Chapter 5I-2, Florida Administrative Code (F.A.C.) and Section 590.125, Florida Statutes (F.S.), as well as silviculture best management practices (BMPs). Prescribed burning will be used only following completion of the timber logging and thinning activities to create a more controlled landscape in which to apply burning applications. Firebreaks will also be installed around the prescribed areas to create a control barrier to prevent the spreading of fires. Pursuant to these standards, prescribed burning will be re-introduced in optimal conditions--non-drought conditions--with care given to wind direction and dispersion. Fire will be conducted only by a certified prescribed burn boss with experience in landscape level fire ecology. Without the use of prescribed burning, potential fire safety hazards for the LNP may increase if vegetative fuels are not controlled.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 029 Attachment 2.4.1-4A.pdf
- 025 Attachment 2.4.1-3C Part 1 of 2.pdf
- 026 Attachment 2.4.1-3C Part 2 of 2.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 4.3.1-1

**Text of NRC RAI:** Provide additional information needed to complete the impact assessment for terrestrial and wildlife resources.

ER Section 4.3.1 provides an impact assessment for terrestrial resources. However, several important pieces of information were missing and some project features have since been modified or dropped (e.g., rail line). Provide the following information:

- An updated habitat impacts table (Tables 4.3-1 and 4.3-2) with the acreage of temporary and permanent impacts broken out by facility (see ER Land Use Tables 4.1-4 and 4.1-5 for a breakdown of facilities).
- A figure (clearly reproducible in black-and-white) showing the limits of construction disturbance overlaid onto habitats. Identify the project facilities and features depicted on the figure.
- The proposed best management practices (BMPs) for restoration of temporary impacts on the Levy site, including information on seed mixtures for erosion control, and on invasive species monitoring and control.
- An approximate quantitative assessment of the proportion of habitats on-site that would be impacted compared to availability of similar habitats in the vicinity (6-mile radius).
- A qualitative discussion of the relative abundance of habitats along the transmission corridors (up to the first substation) compared to the ½-mile buffer.
- A qualitative assessment of potential wildlife impacts (including important species) resulting from new roads and traffic associated with plant construction and operation.
- A qualitative discussion of the potential for the three stormwater retention ponds to provide habitat for waterfowl, shorebirds, amphibians and other wildlife.

**PGN RAI ID #:** L-0406

**PGN Response to NRC RAI:**

**Update habitat impacts tables (Tables 4.3-1 and 4.3-2) with the acreage of temporary and permanent impacts broken out by facility (see ER Land Use Tables 4.1-4 and 4.1-5 for a breakdown of facilities):**

Table 4.3.1-1-001 is an updated habitat impacts table with the acreage of potential wetland impacts (temporary and permanent) by facility.

**Table 4.3.1-1-001 (Sheet 1 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Heavy Haul Road | On-site | Permanent | 260 - Other open lands (rural) | 0.32 | 0.13 |
| | | | 440 - Tree Plantations | 5.88 | 2.35 |
| | | | 621 - Cypress | 1.07 | 0.43 |
| | | | 629 - Wet Planted Pine | 1.22 | 0.49 |
| | | | 630 - Wetland Forested Mixed | 0.55 | 0.22 |
| | | | 643 - Wet Prairies | 0.14 | 0.05 |
| Misc. Fill | On-site | Permanent | 260 - Other open lands (rural) | 3.66 | 1.46 |
| | | | 440 - Tree Plantations | 39.21 | 15.68 |
| | | | 621 - Cypress | 7.15 | 2.86 |
| | | | 629 - Wet Planted Pine | 19.23 | 7.69 |
| | | | 630 - Wetland Forested Mixed | 1.83 | 0.73 |
| | | | 641 - Freshwater Marshes | 0.09 | 0.04 |
| | | | 643 - Wet Prairies | 0.05 | 0.02 |
| | | | 646 - Treeless Hydric Savannah | 41.27 | 16.51 |
| Misc. Pipeline | On-site | Permanent | 260 - Other open lands (rural) | 0.65 | 0.26 |
| | | | 440 - Tree Plantations | 1.54 | 0.62 |
| | | | 621 - Cypress | 0.34 | 0.14 |
| | | | 629 - Wet Planted Pine | 0.29 | 0.11 |
| | | | 630 - Wetland Forested Mixed | 1.62 | 0.65 |
| | | | 643 - Wet Prairies | 0.04 | 0.02 |
| Misc. Structures | On-site | Permanent | 260 - Other open lands (rural) | 6.16 | 2.47 |
| | | | 440 - Tree Plantations | 30.21 | 12.08 |
| | | | 617 - Mixed Wetland Hardwoods | 0.72 | 0.29 |
| | | | 621 - Cypress | 1.73 | 0.69 |
| | | | 629 - Wet Planted Pine | 17.05 | 6.82 |
| | | | 630 - Wetland Forested Mixed | 4.85 | 1.94 |
| | | | 641 - Freshwater Marshes | 0.28 | 0.11 |
| | | | 643 - Wet Prairies | 0.02 | 0.01 |
| | | | 646 - Treeless Hydric Savannah | 13.06 | 5.22 |
| Pipeline LNP to CFBC | On-site | Perrmanent[2] | 260 - Other open lands (rural) | 0.99 | 0.40 |
| | | | 440 - Tree Plantations | 7.18 | 2.87 |
| | | | 621 - Cypress | 1.85 | 0.74 |
| | | | 629 - Wet Planted Pine | 1.24 | 0.49 |
| | | | 630 - Wetland Forested Mixed | 3.72 | 1.49 |
| | | | 643 - Wet Prairies | 0.33 | 0.13 |
| | | | 646 - Treeless Hydric Savannah | 0.44 | 0.18 |

**Table 4.3.1-1-001 (Sheet 2 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Pond A | On-site | Permanent | 440 - Tree Plantations | 19.55 | 7.82 |
| | | | 629 - Wet Planted Pine | 30.13 | 12.05 |
| | | | 630 - Wetland Forested Mixed | 6.27 | 2.51 |
| | | | 641 - Freshwater Marshes | 3.71 | 1.48 |
| | | | 646 - Treeless Hydric Savannah | 10.13 | 4.05 |
| Pond B | On-site | Permanent | 260 - Other open lands (rural) | 6.80 | 2.72 |
| | | | 621 - Cypress | 3.04 | 1.21 |
| | | | 629 - Wet Planted Pine | 0.01 | 0.00 |
| | | | 630 - Wetland Forested Mixed | 0.13 | 0.05 |
| | | | 643 - Wet Prairies | 4.04 | 1.61 |
| Pond C1 | On-site | Permanent | 440 - Tree Plantations | 4.02 | 1.61 |
| | | | 621 - Cypress | 1.11 | 0.44 |
| | | | 629 - Wet Planted Pine | 2.42 | 0.97 |
| Pond C2 | On-site | Permanent | 440 - Tree Plantations | 11.63 | 4.65 |
| | | | 621 - Cypress | 1.37 | 0.55 |
| | | | 629 - Wet Planted Pine | 3.65 | 1.46 |
| | | | 641 - Freshwater Marshes | 0.23 | 0.09 |
| Shooting Range | On-site | Permanent | 440 - Tree Plantations | 0.06 | 0.02 |
| Site Access Roads | On-site | Permanent | 260 - Other open lands (rural) | 1.54 | 0.62 |
| | | | 440 - Tree Plantations | 15.36 | 6.14 |
| | | | 621 - Cypress | 2.54 | 1.02 |
| | | | 629 - Wet Planted Pine | 8.11 | 3.24 |
| | | | 630 - Wetland Forested Mixed | 0.95 | 0.38 |
| | | | 646 - Treeless Hydric Savannah | 0.74 | 0.30 |
| Switchyard | On-site | Permanent | 440 - Tree Plantations | 28.40 | 11.36 |
| | | | 621 - Cypress | 5.26 | 2.10 |
| | | | 629 - Wet Planted Pine | 7.11 | 2.85 |
| Switchyard Connection | On-site | Permanent | 260 - Other open lands (rural) | 1.09 | 0.44 |
| | | | 440 - Tree Plantations | 11.02 | 4.41 |
| | | | 621 - Cypress | 4.19 | 1.68 |
| | | | 629 - Wet Planted Pine | 5.05 | 2.02 |
| | | | 641 - Freshwater Marshes | 0.02 | 0.01 |
| | | | 643 - Wet Prairies | 0.09 | 0.04 |
| | | | 646 - Treeless Hydric Savannah | 1.70 | 0.68 |

**Table 4.3.1-1-001 (Sheet 3 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Transmission Corridor | On-site | Permanent | 410 - Upland coniferous forests | 0.05 | 0.02 |
| | | | 440 - Tree Plantations | 100.49 | 40.20 |
| | | | 617 - Mixed Wetland Hardwoods | 9.48 | 3.79 |
| | | | 621 - Cypress | 24.10 | 9.64 |
| | | | 629 - Wet Planted Pine | 33.94 | 13.57 |
| | | | 630 - Wetland Forested Mixed | 8.35 | 3.34 |
| | | | 641 - Freshwater Marshes | 2.02 | 0.81 |
| | | | 643 - Wet Prairies | 0.29 | 0.12 |
| Unit 1 | On-site | Permanent | 260 - Other open lands (rural) | 5.52 | 2.21 |
| | | | 629 - Wet Planted Pine | 3.42 | 1.37 |
| | | | 630 - Wetland Forested Mixed | 0.71 | 0.28 |
| | | | 641 - Freshwater Marshes | 1.96 | 0.79 |
| | | | 646 - Treeless Hydric Savannah | 3.80 | 1.52 |
| Unit 2 | On-site | Permanent | 260 - Other open lands (rural) | 4.25 | 1.70 |
| | | | 440 - Tree Plantations | 2.91 | 1.16 |
| | | | 629 - Wet Planted Pine | 2.14 | 0.85 |
| | | | 630 - Wetland Forested Mixed | 0.03 | 0.01 |
| | | | 641 - Freshwater Marshes | 3.65 | 1.46 |
| | | | 643 - Wet Prairies | 0.12 | 0.05 |
| | | | 646 - Treeless Hydric Savannah | 2.31 | 0.93 |
| Heavy Haul Road | Off-site | Permanent | 260 - Other open lands (rural) | 0.61 | 0.24 |
| | | | 410 - Upland coniferous forests | 1.64 | 0.66 |
| | | | 434 - Hardwood - conifer mixed | 0.10 | 0.04 |
| | | | 440 - Tree Plantations | 20.98 | 8.39 |
| | | | 617 - Mixed Wetland Hardwoods | 2.05 | 0.82 |
| | | | 621 - Cypress | 1.20 | 0.48 |
| | | | 629 - Wet Planted Pine | 8.83 | 3.53 |
| | | | 630 - Wetland Forested Mixed | 2.02 | 0.81 |
| | | | 641 - Freshwater Marshes | 1.36 | 0.54 |
| | | | 643 - Wet Prairies | 0.23 | 0.09 |
| | | | 646 - Treeless Hydric Savannah | 0.33 | 0.13 |
| Misc. Pipeline | Off-site | Permanent | 434 - Hardwood - conifer mixed | 0.93 | 0.37 |
| | | | 440 - Tree Plantations | 4.59 | 1.83 |
| | | | 629 - Wet Planted Pine | 0.01 | 0.00 |
| | | | 646 - Treeless Hydric Savannah | 0.14 | 0.06 |

**Table 4.3.1-1-001 (Sheet 4 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| Pipeline CFBC to CREC | Off-site | Permanent[2] | 510 – Streams and Waterways | 0.75 | 0.30 |
| | | | 530 – Reservoirs | 0.19 | 0.08 |
| | | | 629 – Wet Planted Pine | 24.58 | 9.83 |
| | | | 630 – Wetland Forested Mixed | 3.78 | 1.51 |
| | | | 641 – Freshwater Marshes | 4.66 | 1.86 |
| | | | 642 – Saltwater Marshes | 4.42 | 1.77 |
| Pipeline LNP to CFBC | Off-site | Permanent[2] | 260 - Other open lands (rural) | 0.07 | 0.03 |
| | | | 410 - Upland coniferous forests | 1.42 | 0.57 |
| | | | 434 - Hardwood - conifer mixed | 1.18 | 0.47 |
| | | | 440 - Tree Plantations | 25.83 | 10.33 |
| | | | 617 - Mixed Wetland Hardwoods | 1.73 | 0.69 |
| | | | 621 - Cypress | 0.00 | 0.00 |
| | | | 629 - Wet Planted Pine | 8.96 | 3.58 |
| | | | 630 - Wetland Forested Mixed | 3.44 | 1.38 |
| | | | 641 - Freshwater Marshes | 1.67 | 0.67 |
| | | | 643 - Wet Prairies | 0.00 | 0.00 |
| | | | 646 - Treeless Hydric Savannah | 1.66 | 0.66 |
| Site Access Roads | Off-site | Permanent | 434 - Hardwood - conifer mixed | 0.56 | 0.22 |
| | | | 440 - Tree Plantations | 2.22 | 0.89 |
| | | | 621 - Cypress | 0.00 | 0.00 |
| | | | 629 - Wet Planted Pine | 0.03 | 0.01 |
| | | | 641 - Freshwater Marshes | 0.08 | 0.03 |
| | | | 646 - Treeless Hydric Savannah | 0.26 | 0.10 |
| Transmission Corridor | Off-site | Permanent | 260 - Other open lands (rural) | 0.57 | 0.23 |
| | | | 410 - Upland coniferous forests | 8.57 | 3.43 |
| | | | 434 - Hardwood - conifer mixed | 5.70 | 2.28 |
| | | | 440 - Tree Plantations | 143.28 | 57.31 |
| | | | 617 - Mixed Wetland Hardwoods | 15.19 | 6.08 |
| | | | 621 - Cypress | 3.40 | 1.36 |
| | | | 629 - Wet Planted Pine | 52.80 | 21.12 |
| | | | 630 - Wetland Forested Mixed | 15.04 | 6.02 |
| | | | 641 - Freshwater Marshes | 19.39 | 7.76 |
| | | | 646 - Treeless Hydric Savannah | 2.73 | 1.09 |

**Table 4.3.1-1-001 (Sheet 5 of 5)**
**Total Project Impacts by Facility (Wetland and Upland)**

| Facility | Location | Impact | Land Use Type | Impact Area (ac.) | Impact Area (ha.) |
|---|---|---|---|---|---|
| 50' Buffer to CFBC | On-site | Temporary | 260 - Other open lands (rural) | 9.10 | 3.64 |
| | | | 410 - Upland coniferous forests | 0.00 | 0.00 |
| | | | 440 - Tree Plantations | 56.57 | 22.63 |
| | | | 617 - Mixed Wetland Hardwoods | 2.67 | 1.07 |
| | | | 621 - Cypress | 13.19 | 5.28 |
| | | | 629 - Wet Planted Pine | 39.46 | 15.78 |
| | | | 630 - Wetland Forested Mixed | 7.35 | 2.94 |
| | | | 641 - Freshwater Marshes | 0.59 | 0.23 |
| | | | 643 - Wet Prairies | 1.54 | 0.61 |
| | | | 646 - Treeless Hydric Savannah | 19.05 | 7.62 |
| | | | | 0.00 | 0.00 |
| | Off-site | Temporary | 410 - Upland coniferous forests | 0.52 | 0.21 |
| | | | 434 - Hardwood - conifer mixed | 1.20 | 0.48 |
| | | | 440 - Tree Plantations | 14.22 | 5.69 |
| | | | 617 - Mixed Wetland Hardwoods | 1.37 | 0.55 |
| | | | 621 - Cypress | 1.44 | 0.58 |
| | | | 629 - Wet Planted Pine | 5.39 | 2.16 |
| | | | 630 - Wetland Forested Mixed | 1.34 | 0.54 |
| | | | 641 - Freshwater Marshes | 0.79 | 0.32 |
| | | | 643 - Wet Prairies | 0.05 | 0.02 |
| | | | 646 - Treeless Hydric Savannah | 0.01 | 0.01 |
| On-site | | | | 626.97 | 250.79 |
| Off-site | | | | 399.18 | 159.68 |
| **Subtotal** | | | | **1026.15** | **410.47** |
| 50' Buffer (Temporary) On-site | | | | 149.51 | 59.80 |
| 50' Buffer (Temporary) Off-site | | | | 26.32 | 10.53 |
| **Subtotal** | | | | **175.83** | **70.33** |
| **TOTAL** | | | | **1201.98** | **480.80** |

Notes:

1) Please note areas noted above are in various stages of delineation. The most up to date information has been utilized in area calculations, including formal JDS, field verified lines by DEP, consultant established lines, and SWFWMD land use lines.

2) For impacts that could be considered both permanent and temporary, the calculations of total impacts have assumed these areas to be permanent in order to provide the most conservative estimate.

**A figure (clearly reproducible in black-and-white) showing the limits of construction disturbance overlaid onto habitats. Identify the project facilities and features depicted on the figure.**

Attachment 4.3.1-1A depicts the limits of construction disturbance overlaid onto habitats.

**The proposed best management practices (BMPs) for restoration of temporary impacts on the Levy site, including information on seed mixtures for erosion control, and on invasive species monitoring and control.**

On areas of the site and associated facilities, including transmission corridors, where temporary impacts will occur, PEF will analyze the potentially impacted habitats and develop best management practices (BMPs) to minimize impacts to terrestrial, wetland, and wildlife resources. These BMPs could include the use of sedimentation and erosion control measures to limit erosion into wetland areas. Typical BMPs include the placement of silt fencing around disturbed areas and using temporary silt fencing or hay bales as energy dissipators in the roadway ditches during construction. These same, or similar, sediment and erosion control measures can be used to limit vehicle access into sensitive areas (for example, wildlife habitat or wetland areas). PEF may also limit construction activities to non-nesting seasons for certain wildlife species, or if construction must occur during these periods, monitor the nesting wildlife and reduce the duration of the construction. PEF will also use existing access roads in wetland areas to the greatest extent practicable to reduce the amount of wetlands impacted by the project. In accordance with provisions of Florida Statute (FS) 163.3209, vegetation management will be supervised by PEF or qualified licensed or certified contractors under control of the utility.

In temporarily impacted wetland areas, both on-site and within transmission corridors, PEF does not generally plant a specific seed mixture. PEF allows the seed bank already present to revegetate these areas. This method is extremely effective due to the 365-day growing season in Florida. The success of wetland restoration will be monitored on a regular basis; generally semi-annually or annually. If required to promote restoration to desired conditions, exotic species may be culled either manually or through the use of herbicides registered with the EPA and selectively applied by a licensed contractor to targeted vegetation.

In purchasing the ROWs for the construction of transmission lines, PEF will often purchase only an easement that grants the right to construct, operate, and maintain the transmission line. The remaining land rights remain with the underlying fee owner of the property. To address temporary impacts in upland areas, PEF works with the underlying fee owner to restore the ROW for their approval. PEF also employs this method where the ROWs may cross public lands. PEF will work with the land manager of that parcel to restore the ROW to their specifications. In addition, PEF may not have the right to conduct wildlife management or enhancement practices within the ROWs. In portions of the transmission system where PEF is the fee owner of the property or where the ROWs may cross public lands, PEF has worked with the public land manager and/or the National Wild Turkey Federation to enhance wildlife management by planting feed plots for wildlife.

**An approximate quantitative assessment of the proportion of habitats on-site that would be impacted compared to availability of similar habitats in the vicinity (6-mile radius).**

Potential impacts to habitats on the LNP site were compared with the availability of similar habitats in the vicinity (6-mile radius), and the ratio of the two was determined. Land uses (FLUCCS) within a 6-mile radius of the project site are presented in Attachment 4.3.1-1B.

Please note that while the total acreage of the on-site impacts is the same in Tables 4.3.1-1-001 and 4.3.1-1-002, differences within the land use categories exist due to the site-specific field work used to delineate the wetland areas in Table 4.3.1-1-001. Areas of potentially impacted habitats on-site were less than 1 percent of the available similar habitat areas in the vicinity for all major FLUCCS classifications. The impacts to habitats on-site will not significantly reduce the availability of those habitats in the vicinity of the LNP. This determination does not include the enhancement to a variety of habitats on and near the LNP site expected to result from implementation of the wetland mitigation program. A summary table is provided below.

**Table 4.3.1-1-002 (Sheet 1 of 2)**
**Onsite Impacts and Availability of Similar Land Uses in the Vicinity of the LNP**

| FLUCCS | | Onsite Impacts (ac.) | *Vicinity Totals (ac.) | Impact / Vicinity (%) |
|---|---|---|---|---|
| 170 | Institutional | 0.00 | 60.29 | 0.0% |
| 180 | Recreational | 0.00 | 121.67 | 0.0% |
| 190 | Open Land | 0.00 | 2,771.42 | 0.0% |
| 210 | Cropland And Pastureland | 0.00 | 2,730.31 | 0.0% |
| 214 | Row Crops | 0.00 | 69.85 | 0.0% |
| 250 | Specialty Farms | 0.00 | 345.94 | 0.0% |
| 260 | Other Open Lands <Rural> | 63.12 | 4,431.64 | 1.4% |
| 320 | Shrub And Brushland | 0.00 | 908.29 | 0.0% |
| 330 | Mixed Rangeland | 0.00 | 68.32 | 0.0% |
| 410 | Upland Coniferous Forest | 0.82 | 8,157.96 | 0.0% |
| 411 | Pine Flatwoods | 0.00 | 848.04 | 0.0% |
| 412 | Longleaf Pine - Xeric Oak | 0.00 | 1,507.85 | 0.0% |
| 420 | Upland Hardwood Forests | 0.00 | 5.53 | 0.0% |
| 434 | Hardwood Conifer Mixed | 0.00 | 3,839.44 | 0.0% |
| 440 | Tree Plantations | 394.42 | 18,257.16 | 2.2% |
| 510 | Streams And Waterways | 0.00 | 309.03 | 0.0% |
| 520 | Lakes | 0.00 | 120.66 | 0.0% |
| 530 | Reservoirs | 0.00 | 2,459.36 | 0.0% |
| 540 | Bays And Estuaries | 0.00 | 0.31 | 0.0% |
| 610 | Wetland Hardwood Forests | 0.00 | 201.10 | 0.0% |
| 615 | Stream and Lake Swamps (Bottomland) | 21.51 | 1,369.38 | 1.6% |
| 617 | Mixed Wetland Hardwoods | 0.00 | 438.53 | 0.0% |

**Table 4.3.1-1-002 (Sheet 2 of 2)**
**Onsite Impacts and Availability of Similar Land Uses in the Vicinity of the LNP**

| FLUCCS | | Onsite Impacts (ac.) | *Vicinity Totals (ac.) | Impact / Vicinity (%) |
|---|---|---|---|---|
| 620 | Wetland Coniferous Forests | 0.00 | 81.29 | 0.0% |
| 621 | Cypress | 125.50 | 6,751.25 | 1.9% |
| 624 | Cypress-Pine-Cabbage Palm | 0.00 | 30.06 | 0.0% |
| 630 | Wetland Forested Mixed | 15.77 | 4,665.35 | 0.34% |
| 641 | Freshwater Marshes | 5.79 | 1,893.64 | 0.31% |
| 642 | Saltwater Marshes | 0.00 | 2.78 | 0.0% |
| 643 | Wet Prairies | 0.00 | 434.04 | 0.0% |
| 644 | Emergent Aquatic Vegetation | 0.00 | 236.94 | 0.0% |
| 653 | Intermittent Ponds | 0.00 | 12.96 | 0.0% |
| 740 | Disturbed Land | 0.00 | 54.26 | 0.0% |
| 810 | Transportation | 0.00 | 285.81 | 0.0% |
| 830 | Utilities | 0.00 | 311.39 | 0.0% |

Notes:
*Vicinity includes up to a 6-mile radius of the LNP site.

**A qualitative discussion of the relative abundance of habitats along the transmission corridors (up to the first substation) compared to the ½-mile buffer.**

The ecological review of the preliminary candidate corridors used existing land use/land cover GIS data and Florida Natural Areas Inventory (FNAI)-listed species occurrence data for the study areas. Protected species (flora and fauna), eagle nests, upland forests, forested wetland areas, and herbaceous wetland areas were mapped and entered into the GIS database. Listed species that were not directly observed or identified in the FNAI database but considered likely to occur based upon available habitat within the corridors were described and their protective status identified.

A comprehensive evaluation was conducted on quantitatively high ranked candidate corridors to determine the most suitable candidate corridors based on the environmental and land use considerations, suitability for construction, operation and maintenance, safety, public acceptance, cost, and electric system needs. Emphasis was placed on avoiding cultural resources and minimizing impacts to wetlands. Additionally, other important corridor selection criteria that avoided and minimized wetland impacts included the following:

- Maximize co-location with existing PEF transmission lines.
- Maximize co-location with other linear features including arterial and collector roads, major canals, and railroads.

- Maximize following previously disturbed alignments (roads, trails, canals, ditches, etc.) through Florida Managed Areas (FMA), wetlands and upland forested areas.
- Minimize river and canal crossings where no crossing (road, railroad, transmission or other utility crossing) already exists.
- Encourage location close to existing industrial and extractive land uses.

The result of the quantitative evaluation was the selection of the corridors listed below, which were selected to maximize inclusion of previously disturbed habitats. For each corridor, the vegetative communities and listed species habitat located within the ½-mile buffer area of these segments are of higher quality when compared with areas within the chosen corridors. The corridors follow existing linear features, which allow for reduction in the amount of new ROW clearing and access road construction, thereby minimizing impacts to undisturbed habitat.

- LNP to Proposed Citrus Substation (LPC)

Habitats outside of the Levy/Citrus Common corridor are generally either of higher quality, contain greater concentration of residential land uses, or include greater amounts of wetland habitat. Significant nearby features within a ½-mile buffer of the corridor include Lake Rousseau, which lies approximately ¼ mile to the east.

- LNP to Crystal River Energy Complex Switchyard (LCR)

Continuing west from the proposed Citrus Substation area, the LCR corridor is collocated with existing transmission line rights-of-way, maximizing utilization of previously disturbed areas. Significant areas within the ½-mile buffer surrounding the LCR corridor west of the Citrus Substation include large areas of high quality forested wetlands associated with the Crystal River Preserve State Park.

- LNP to Proposed Central Florida South Substation (LCFS)

The LCFS corridor follows the Common Corridor from the LNP to the area of the proposed Citrus Substation, then traverses east to the proposed Central Florida South Substation. The LCFS corridor is collocated with existing linear features, specifically the existing PEF 500/230-kV transmission line ROW that extends eastward from the CREC and the Florida Turnpike. Maximizing inclusion of these existing disturbed areas reduces impacts to higher-quality upland and wetland habitats adjacent to the corridor. Significant areas within the ½-mile buffer around the corridor include large areas of wetlands associated with the Withlacoochee River, the Withlacoochee State Forest Twomile Preserve, Ross Prairie State Forest, and the floodplain of Lake Panasoffkee, which provide high value wildlife habitat when compared with the habitat within the LCFS corridor.

**A qualitative assessment of potential wildlife impacts (including important species) resulting from new roads and traffic associated with plant construction and operation.**

Construction of new roads and traffic associated with plant construction and operation may increase mortality in some local wildlife species as a result of vehicular strikes. The elevated risk is expected to correlate with construction and subsequent operational activity levels at the LNP site. The level of human disturbance during construction will likely discourage wildlife from using the areas; however, some wildlife mortality resulting from construction traffic may be unavoidable.

Construction workers will be advised about the potential presence and appearance of listed species (e.g., the gopher tortoise and eastern indigo snake) and instructed to observe caution in areas where listed species may occur to minimize the potential for accidental vehicular strikes. If such areas are identified, additional mitigative measures may be implemented, such as road signs or temporary barriers.

**A qualitative discussion of the potential for the three stormwater retention ponds to provide habitat for waterfowl, shorebirds, amphibians and other wildlife.**

The stormwater ponds on the LNP site will be constructed in accordance with the SWFWMD Basis of Review for Environmental Resource Permitting, which requires a shallow littoral zone component. This littoral zone will be seeded or planted in native hydrophytic species, which will support the development of a biotic community. Given the absence of permanent open water features on the LNP site, the stormwater ponds are expected to be environmental amenities, potentially providing foraging habitat for waterfowl and wading birds through the creation of habitat for invertebrates, fish, and amphibians.

Stormwater Pond A will encompass 27.37 acres (ac.), and Ponds B and C will encompass a total of 33.35 ac. They are designed as wet ponds with a permanent pool elevation of 42 feet above mean sea level. The littoral zone will extend in a 12-foot-wide shelf around the perimeter of each pond, with slopes ranging from 6:1 to 10:1. The littoral zones will be planted with a variety of emergent wetland vegetation, such as pickerel weed (*Pontedaria cordata*), fireflag (*Thalia geniculata*), and bulrush *(Scirpus spp*).

The FLUCCS cover types presented in the updated tables below were refined based on field surveys conducted since the ER was submitted.

Temporary and permanent impacts are summarized below. The impacts associated with the LNP site to the north and the south property are identified separately. Wetland and upland impacts are also clearly distinguished.

**Table 4.3.1-1-003**
**Summary of Permanent and Temporary Impacts[1]**

| Site | Temporary Wetland Impacts | Permanent Wetland Impacts | Temporary Upland Impact | Permanent Upland Impacts | Totals |
|---|---|---|---|---|---|
| LNP Site (north) | 83.84 ac. | 318.50 ac. | 65.67 ac. | 308.48 ac. | **776.49 ac.** |
| Off-Site | 10.39 ac. | 180.94 ac. | 15.93 ac. | 218.24 ac. | **425.50 ac.** |
| **Total** | **34.23 ac.** | **499.44 ac.** | **81.60 ac.** | **526.72 ac.** | **1201.99 ac.[2]** |

Notes:
1) The table represents cumulative on-site impacts including plant site, on-site transmission corridors, and on-site blowdown pipe.
2) Acreages totals may be slightly different due to rounding

**Associated LNP COL Application Revisions:**

Revise ER Sections 4.1 and 4.3 to incorporate information provided in the response.

**Attachments/Enclosures:**

- 030 Attachment 4.3.1-1A.pdf
- 031 Attachment 4.3.1-1B.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 4.3.1-2

**Text of NRC RAI:** Provide additional information on the potential for bird collisions with elevated construction equipment, cooling towers and transmission towers.

ER Section 4.3.1 states that the use of elevated construction equipment will be managed to reduce the potential for avian collisions during project construction, but no discussion on the likelihood of avian collisions with project structures is provided and no measures to minimize avian collisions are described. Provide the following items to assess the potential for bird collisions with elevated construction equipment, cooling towers, and transmission towers:

- A qualitative discussion of the potential for bird collisions with project structures and mitigation measures that would be taken to avoid or reduce bird collisions.
- A description of the avian protection plan for the transmission line corridors being negotiated by PEF with the Florida Fish and Wildlife Conservation Commission (FFWCC).
- A copy of the agency report issued by the Florida Department of Environmental Protection (FDEP) for the transmission line corridor.

**PGN RAI ID #:** L-0407

**PGN Response to NRC RAI:**

Avian mortality from collisions with transmission structures and transmission lines has become more of a common occurrence (Reference RAI 4.3.1-2 01) as such facilities become more common. This reference is available in the Progress Energy-provided Reading Room. Avian collisions with man-made structures are the result of numerous factors related to species characteristics, such as flight behavior, age, habitat use, seasonal and diurnal habitats, and to environmental characteristics, such as weather, topography, land use, and orientation of the structures. Avian collisions with transmission structures cannot be ruled out, but collisions are not expected to be a significant source of mortality for most species. Avian collisions with transmission lines and related structures during construction are expected to pose little threat to migrating birds, due to the project details as described in this response.

As stated in ER Subsection 4.3.1.1, the use of elevated construction equipment, such as cranes, will be restricted only to the area and duration necessary thereby minimizing the potential for avian collisions. Although the activity associated with the use of elevated construction equipment activity at LNP will be considerable at some point, this activity will likely be short-lived. Bird collisions with elevated construction equipment during operation would likely be minimal because of the slow speeds the equipment will operate in the area and the noise associated with operation. To reduce collisions during non-operation time periods, some form of deterrent device, such as colored tape, bird flappers, or diverters to make the construction equipment more visible to birds, could be used.

As discussed in ER Subsection 5.3.3.1.1, the mechanical draft cooling towers associated with LNP 1 and LNP 2 will be 56 feet high; therefore, the proposed cooling towers are not expected to cause substantial bird mortality due to collisions. Although natural draft cooling towers have been associated with bird kills, the relatively low height of mechanical draft cooling towers pose little threat to bird mortality. Therefore, impacts to bird species from collisions with the cooling towers are expected to be SMALL and would not warrant mitigation.

The construction of overhead transmission lines could injure birds if they collide with the new conductors or poles. Regularly occurring noise from human activity during construction will also discourage frequent visitation by birds. Avian mortality resulting from collisions with transmission lines was evaluated in NUREG-1437. The impacts were found to be of small significance at operating nuclear power plants. Although avian collisions with transmission lines are recognized as a cause of bird species mortality, overall impacts are anticipated to be SMALL.

The review of literature shows that there are many accepted mitigation measures used to reduce bird collisions with transmission lines. These measures include the following:

- Marking transmission lines with some form of deterrent devices, such as colored balls or tape, bird flappers, or diverters to make transmission lines more visible to birds.
- Scheduling construction activities during periods of least impact to wildlife (e.g., avoid nesting season).
- Setting up buffer zones between the transmission line and areas of ecological importance to reduce disturbance, and diverting birds over or away from the transmission line.
- Following existing transmission corridors and routes.
- Placing the power line parallel rather than perpendicular to predominant lines of flight.
- Following natural and existing barriers.
- Locating conductors parallel to prevailing winds.
- Limiting the use of guy wires.

Over 90 percent of the new transmission lines to be constructed to integrate the LNP to the existing grid are collocated with existing transmission lines, which will reduce the risk of collisions. In order to identify the transmission line corridors for the LNP project, PEF retained a project team consisting of specialists in engineering, environmental science, land use planning, construction, maintenance, electrical system planning, real estate, public relations, cultural resources, and corporate communications. This team was responsible for conducting the comprehensive process that evaluated environmental, land use, engineering, safety and cost criteria in a quantitative and qualitative manner. The environmental criteria included the acreage of wetland impacts and the location of threatened and endangered species, as well as species of special concern. Avian issues were included as part of this review. The collocation land use criteria for the collocation of new transmission lines with existing transmission lines was an important criteria to the PEF team and to the stakeholders whom PEF involved throughout the process. Locating new transmission lines adjacent to existing lines can reduce the potential for avian impacts by having one right-of-way (ROW)that avian species need to cross as opposed to multiple ROWs.

For the LNP project, PEF has proposed to collocate approximately 90 percent of the new transmission lines with existing lines, either immediately adjacent to existing ROWs or totally within existing ROWs. PEF also has determined that collocating the four new 500-kV lines exiting the LNP site, as opposed to having four separate ROWs will reduce impacts to the environment and reduce the possibility of avian collisions.

PEF expects certification of the project by the Florida Siting Board by September 2009. Proposed Conditions of Certification (XXIX.A and XXXIX.F) with the State of Florida requires PEF to develop Avian Protection Plans (APPs) for the facilities and transmission lines being constructed to support the LNP. PEF will develop these plans to address the design and construction of these facilities. The development of the APPs will include the analysis of transmission lines to be constructed and address the issues raised above.

PEF is unable to identify specific measures to minimize bird collisions with the new transmission lines constructed for the LNP. The measures to be used will be a direct result of the design of the transmission lines. These lines have not been designed at this time and in some cases the final ROW has not been selected. The detailed design of the line will be conducted once the final ROW has been selected. The specific measures to be employed will be determined by the design of the line and the structure locations. The Avian Protection Plan required by the State will be developed during the design period of line. The determination of mitigation measures to reduce avian collisions with the transmission lines will be made at that time. PEF has made a decision that the structure type for the 500-kV lines will be an H-frame structure and not a single pole. This will reduce the height of the structures, thus reducing the risk for collisions.

A copy of the agency report issued by the FDEP for the transmission line corridor, "Staff Analysis Report, Levy Nuclear Power Plant Units 1 and 2 Site Certification, Transmission Line Portion, Progress Energy Florida," is provided as Attachment 4.3.1-2A to this response.

**Reference:**

Reference RAI 4.3.1-2 01:

U.S. Fish and Wildlife Service. 2002. "Migratory Bird Mortality: Many Human-Caused Threats Afflict our Bird Populations" January.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 032 Attachment 4.3.1-2A Part 1 of 8.pdf
- 033 Attachment 4.3.1-2A Part 2 of 8.pdf
- 034 Attachment 4.3.1-2A Part 3 of 8.pdf
- 035 Attachment 4.3.1-2A Part 4 of 8.pdf
- 036 Attachment 4.3.1-2A Part 5 of 8.pdf
- 037 Attachment 4.3.1-2A Part 6 of 8.pdf
- 038 Attachment 4.3.1-2A Part 7 of 8.pdf
- 039 Attachment 4.3.1-2A Part 8 of 8.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 4.3.1-5

**Text of NRC RAI:** Provide additional information on the fate of displaced wildlife and on the potential for invasive species introduction.

ER Sections 4.3.1 and 5.6.1 suggest that displaced wildlife, particularly more mobile species, could avoid impacts associated with project construction and operation by moving to adjacent suitable habitats. Because adjacent suitable habitats are likely occupied by wildlife at carrying capacity, the fate of displaced wildlife is questionable. The extensive land disturbance that would occur with project construction would provide conditions suitable for the establishment and spread of invasive species. However, there is limited discussion on this potential issue in ER Section 4.3.1. NRC staff requests an expanded qualitative discussion on the fate of wildlife displaced by the project (with focus on important species) and on the potential for introduction of invasive plants.

**PGN RAI ID #:** L-0408

**PGN Response to NRC RAI:**

Construction and operation of the LNP will require the displacement of wildlife habitat and animals currently occupying the development footprint. This displacement may temporarily disrupt some local wildlife populations and habitats that may be already at carrying capacity. No significant long-term impacts to regional populations of wildlife species are expected as a result of the LNP project, partly because of the small area of disturbance relative to the abundance of similar habitat, both on-site and regionally, but also as a result of the overall ecological improvements to be affected through mitigation activities. The initial Mitigation Plan provides for habitat improvement within wetland boundaries as well as in surrounding upland areas, increasing carrying capacity for at least some species.

Additionally, the Project has the potential to establish a wildlife corridor extending from the Goethe State Forest to the property south of the LNP site as part of the mitigation activities. A buffer within the LNP site approximately 1000 feet wide along the eastern LNP property boundary is proposed to be enhanced as part of the Wetland Mitigation Plan, representing a contiguous, undeveloped corridor extending from the Goethe State Forest to the Withlacoochee River floodplain. Proposed enhancements include preservation, cessation of silviculture practices, thinning of pines, and prescribed burns. In addition, Levy County's land use approval ordinance (Special Exception Zoning Approval –SE2-08, September 2. 2008) requires the maintenance of a 100-foot natural vegetative buffer along the perimeter of the PEF property.

As discussed in ER Subsection 4.3.1.1, approximately 21 percent of the total LNP property will be developed. The areas that will be developed have been disturbed previously through silviculture, and the land use categories, such as pine plantation and mixed forest, are common in the region (see ER Table 2.2-2). Human presence associated with site investigations is likely to have already altered wildlife use patterns in the central portion of the site. Over the long term, cessation of silviculture and the improvement and maintenance

of vegetative conditions on undeveloped portions of the site will improve overall habitat quality (see ER Subsection 4.3.1.1.2).

Land disturbance associated with project construction increases the potential for establishment and spread of invasive species. The following types of BMPs will be implemented during construction to minimize this potential:

- Minimizing soil disturbance and retaining desirable vegetation to the extent possible.
- Use of weed-free mulch and hay.
- Use of local, native material, including seed mixes, plugs, and sods where appropriate and available.
- Monitor and evaluate the success of revegetation, as appropriate.

As discussed in RAI 4.3.1-1, seed mixes are generally not applied initially because the existing seed bank is usually adequate to revegetate disturbed areas. If revegetation is inadequate or dominated by invasive species, seed mixes, plugs, and sods will be used where appropriate.

Success criteria for the Wetland Mitigation Plan will include an invasive species component, and the vegetative composition of mitigation areas on the LNP site will be monitored for timely identification and control of invasive species. The success criteria will be developed in coordination with the state and federal agencies as part of the final Mitigation Plan. Invasive plants will be removed (either hand-pulled or herbicided) from wetland mitigation areas. Nuisance species are required to be not more than 10 percent of the vegetation present in the mitigation wetland. Where necessary, native plants will be installed where invasive plants have been removed. Damaging wildlife will be controlled through trapping, hunting, or both. Feral hog populations must be maintained at very low levels (or completely eradicated) for long-term mitigation success

**Associated LNP COL Application Revisions:**
None

**Attachments/Enclosures:**

None

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 4.3.1-7

**Text of NRC RAI:**

Provide additional information on the potential effects of off-site fill procurement on terrestrial and wildlife resources.

No discussion of the impacts associated with the acquisition of project fill is presented in ER Section 4.3.1. PEF indicated in its response to Information Need TE-A that fill generated from on-site activities would provide much of the needed fill, that as much as 1,200,000 cubic yards of fill would be purchased off-site and hauled to the site, and that material stockpiled by the State of Florida from construction of the CFBC would be the likely source of purchased fill. NRC staff requests a general, qualitative evaluation of the effects of off-site fill procurement on terrestrial and wildlife resources.

**PGN RAI ID #:** L-0409

**PGN Response to NRC RAI:**

Fill is required for the building pads and roadway construction on-site. The onsite excavations only yield about two-thirds of the fill needed under the current design plan. The source of the off-site fill has not been determined. A qualitative evaluation of the effects of off-site fill procurement on terrestrial resources, including wildlife, will be provided when the source information is available. However, as indicated in response to Information Need TE-A, it is expected that if off-site fill material is required, it could come from existing stockpiled material, such as the sidecast of the CFBC. These materials were dumped in place and never graded. They are specified as FDOT clean fill and are vegetated largely with ruderal plant species and provide minimal wildlife habitat, with the exception of certain areas identified as containing gopher tortoise burrows. No fill material will be collected from areas containing gopher tortoises, unless these areas are also within the permitted barge slip area. All gopher tortoises in the permitted barge slip area will be relocated to a certified habitat in accordance with current Florida Fish and Wildlife Conservation Commission guidelines prior to land disturbance.

The height of the existing spoil piles is irregular and the slopes range from vertical to approximately 1:1. This property is owned by FDEP and PEF has discussed using this material in the vicinity of the barge slip for fill material. The area remaining would be graded for soccer fields or ball fields that the FDEP would like to build in this area.

If existing stockpiled material can be used, then no new borrow pits off-site would be needed, thus minimizing off-site impacts. Once the final amount and source of off-site material is known, these impacts can be further described.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

None

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 5.3.3.2-1

**Text of NRC RAI:**

Provide additional information needed to assess the potential effects of salt deposition from the cooling tower operation on terrestrial, wetland and wildlife resources.

ER Section 5.3.3.2 describes the results of modeling for particle drift from the cooling tower. However, no isopleth maps of salt drift are provided, and discussion regarding the potential effects to biota from salt accumulation over time is limited. NRC staff requests the following items to assess the potential for impacts from cooling tower operation on terrestrial habitats:

- Isopleth maps of seasonal high projected salt drift and deposition (in kilogram per hectare per month [kg/ha/mo]) for the project site and vicinity.
- A discussion of potential impacts to flora and fauna from salt deposition or accumulation over the license period.
- Any studies on the impacts of salt accumulation on wetlands, plants, and wildlife (if such studies are available).
- The final report prepared for the salt deposition study at CREC.

**PGN RAI ID #:** L-0410

**PGN Response to NRC RAI:**

Isopleths depicting the maximum predicted monthly average deposition rate (in grams/m$^2$/month [g/m$^2$/mo]) are provided in Attachment 5.3.3.2-1A (Figures 1 through 5). The isopleths depict the maximum predicted monthly average deposition rates, relative to the locations of the cooling towers and the LNP site boundary, for each of the 5 years that were modeled (2001 through 2005), as described in ER Subsections 5.3.3.1 and 5.3.3.2. Deposition rates shown in the figures are based on 1.0 cycles of concentration in the cooling tower circulating water. Since normal operation of the cooling towers will be 1.5 cycles of concentration, isopleths of deposition during normal operation can easily be determined by multiplying the contour values by 1.5. The deposition rates in each figure are in units of g/m$^2$/mo. To convert to kilogram/hectare/month (kg/ha/mo), the isopleth values should be multiplied by 10.

As discussed in ER Subsection 5.3.3.2.1, results of a deposition analysis predicted a maximum predicted off-site deposition rate of 6.81 kilogram per hectare per month (kg/ha/mo) of total solids at the nearest property boundary (Figure 2, 2002 data year), below the NUREG-1555 threshold limit of 10 kg/ha/mo. This threshold limit is the value above which an adverse impact to vegetation may occur. The maximum predicted on-site deposition (during normal plant operation) is 10.75 kg/ha/mo, slightly above the NRC-assigned threshold. The maximum on-site deposition was predicted for the 2004 data year (Figure 4).

With regard to the salt deposition study that was performed at CREC, the study was performed at the request of FDEP as a condition of the facility's site certification, as well as its NPDES and PSD permits. The study was conducted from 1981 through 1995 to evaluate the physical impacts of salt deposition from that facility's natural and mechanical draft cooling towers on vegetation surrounding the CREC. The results of the study demonstrated that there were no significant impacts to vegetation in the area surrounding the plant resulting from cooling tower operation. In 1994 Florida Power Corp. (FPC, now PEF) requested approval to terminate the study. In March 1996, the FDEP concluded, based on the results of the study, that there were no significant impacts to vegetation due to salt drift from the plant and authorized FPC to discontinue the study. Attachment 5.3.3.2-1B contains a copy of FPC's April 25, 1994 letter to FDEP requesting approval to terminate the study, FDEP's March 20, 1996 response granting the request, and the final annual report that was submitted to FDEP for the 1992 – 1993 study year.

Long-term effects of salt drift on terrestrial habitats are not well documented, with only a limited number of studies reported in the public domain. Precipitation, humidity, species composition and photoperiod are known to influence salt tolerance, and extrapolating experimental salt deposition effects on vegetation to natural conditions is somewhat speculative due to the complexities of a natural habitat response.

As previously discussed, results of the 14-year CREC field study evaluating the effects of cooling tower drift on communities in the vicinity of the CREC show no significant impacts to the vegetative communities of maritime hammock, salt marsh, and pine flatwoods. Results of the CREC salt deposition study may be applicable to the LNP pine plantations, which shares common vegetative assemblages with the CREC.

Adverse impacts of salt drift on vegetation generally decrease with increasing distance from the cooling tower. Most areas in the immediate vicinity of the LNP cooling towers will be impacted as part of plant development. Many of the vegetative communities on the LNP site but beyond the immediate plant area are proposed for enhancement or restoration as part of the wetland mitigation program and will be monitored in accordance with the Conditions of Certification and Section 404 Permitting Guidelines.

Literature evaluating the long-term effects of salt accumulation on wetlands, plants, and wildlife is limited. Available studies that address the effects of salt drift and/or salt tolerance on terrestrial biota are the Salt Deposition Study at CREC, which is attached to this response as Attachment 5.3.3.2-1B, and "Review of Potential Biological Impacts of Cooling Tower Salt Drift" and "Effect of Photoperiod, Temperature, and Relative Humidity on Chloride Uptake of Plants Exposed to Salt Spray," both of which are available in the Progress Energy-provided Reading Room.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 040 Attachment 5.3.3.2-1A.pdf
- 041 Attachment 5.3.3.2-1B Part 1 of 2.pdf
- 042 Attachment 5.3.3.2-1B Part 2 of 2.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 4.4.2-1

**Text of NRC RAI:**
Provide data regarding the availability of construction workers, disaggregated by craft.

ER Section 2.5 provides information about available workers in the construction industry as a whole. Supplement the data in ER Table 2.5-9 by disaggregating construction workers by craft, as provided in Bureau of Labor statistics. These data are will enable NRC staff to estimate how many of the required craft workers would come from outside the region.

**PGN RAI ID #:** L-0411

**PGN Response to NRC RAI:**

This RAI response builds on the PGN Response to Information Need SE-7 to enable NRC staff to estimate how many of the required craft workers would come from outside of the region and to further support the ER analysis on the origin of the construction workforce for LNP. The summary table included with this response is based on the same data as ER Table 2.5-9: References 2.5-009, 2.5-010, 2.5-011, and 2.5-012. The tables included in the SE-7 response were generated by querying the 2006 U.S. Census Bureau's County Business Patterns data, published in June 2008. The tables summarize the number of workers, establishments, and payroll for each of the eight counties in the LNP region for the following construction categories: 237 Heavy and Civil Engineering Construction, 23713 Power and Communication Line and Related Structures Construction and 2371 Utility System Construction. This information can be accessed by using the following steps:

1. Start with the 2006 Geography Quick Search at http://factfinder.census.gov/servlet/GQRGeoSearchByListServlet?
2. Select County as the "Geographic Area"; select Florida as the "State"; select the appropriate counties; and click "Next".
3. At the top of the next screen under "NAICS Detail," select "Table 4: Geography Selected at the 2-thru 6 digit NAICS code levels" and click "Go".

This RAI response supplements ER Table 2.5-9 by disaggregating construction workers by craft, as provided in Bureau of Labor statistics' May 2007 National Industry-Specific Occupational Employment and Wage Estimates. These national industry-specific occupational employment and wage estimates are calculated with data collected from employers of all sizes, in metropolitan and non-metropolitan areas for North American Industry Classification System (NAICS) 237000 - Heavy and Civil Engineering Construction. NAICS 237000 consists of jobs related to:

- NAICS 237100 - Utility System Construction
- NAICS 237200 - Land Subdivision

- NAICS 237300 - Highway, Street, and Bridge Construction
- NAICS 237900 - Other Heavy and Civil Engineering Construction

NAICS 237000, Heavy and Civil Engineering Construction, includes 20 Major Groups, of which the following were selected to be summarized in Table 4.4.2-1-001 of this RAI and listed by craft in the attachment (Attachment 4.4.2-1A) as most representative of the trades that could be directly employed in the construction of the LNP:

- 17-0000 Architecture and Engineering Occupations
- 47-0000 Construction and Extraction Occupations
- 49-0000 Installation, Maintenance, and Repair Occupations
- 51-0000 Production Occupations
- 53-0000 Transportation and Material Moving Occupations

Table 4.4.2-1-001 summarizes the workforce for all occupations as compared with these five Major Groups for the Gainesville, FL Metropolitan Statistical Area (MSA), the Ocala, FL MSA, the Tampa-St. Petersburg-Clearwater, FL MSA, and the Northeast Florida Non-Metropolitan Statistical Areas (Non-MSA). Employment for these areas is provided in total to capture all eight counties with a majority of their land area within the LNP region; Table 4.4.2-1-001 notes which of the LNP counties are within which MSA or Non-MSA. The total employment was summed to represent the total heavy construction employment in the LNP region, as well as the percent of workers per MSA and Non-MSA.

Attachment 4.4.2-1A summarizes all occupations (desegregated by craft) for these five Major Groups, the occupation code (OCC-code), and total employment for each of these MSAs and Non-MSA.

Attachment 4.4.2-1B provides employment, establishment and payroll data for Standard Industrial Code 23, Construction, and its subcategories, for Levy, Marion, and Citrus counties for 1990, 2000, and 2005 from the corresponding U.S. Census Bureau County Business Patterns (NAICS) for these years.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 043 Attachment 4.4.2-1A.pdf
- 044 Attachment 4.4.2-1B.pdf

**Table 4.4.2-1-001**
**Summary of Representative Employment by Major Trade Groups within NAICS 237000, Heavy and Civil Engineering Construction**

| MSA | OCC Code | Gainesville, FL | Northeast Florida nonmetropolitan area | Ocala, FL | Tampa-St. Petersburg-Clearwater, FL | Total Workers |
|---|---|---|---|---|---|---|
| Counties in MSA | | Alachua and Gilchrist | Bradford, Citrus, Columbia, Dixie, Flagler, Hamilton, Lafayette, Levy, Madison, Putnam, Sumter, Suwannee, Taylor, and Union | Marion | Hernando, Hillborough, Pasco, Pinellas | |
| Counties with a Majority of their Area within the LNP Region | | Alachua and Gilchrist | Citrus, Dixie, Levy, Sumter | Marion | Hernando | |
| *All Occupations* | 00-0000 | 121,080 | 159,940 | 102,200 | 1,252,430 | 1,635,650 |
| Architecture and engineering occupations | 17-0000 | 1790 | 1900 | 1450 | 19,660 | 24,800 |
| Construction and extraction occupations | 47-0000 | 4790 | 11,960 | 7650 | 75,760 | 100,160 |
| Installation, maintenance, and repair occupations | 49-0000 | 4760 | 7460 | 4410 | 50,710 | 67,340 |
| Production occupations | 51-0000 | 4290 | 9960 | 7850 | 62,230 | 84,330 |
| Transportation and material moving occupations | 53-0000 | 4640 | 10,830 | 6800 | 74,870 | 97,140 |
| **Total** | | **20,270** | **42,110** | **28,160** | **283,230** | **373,770** |
| **Percent of Total Workers** | | **5%** | **11%** | **8%** | **76%** | |

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.5.2-1

**Text of NRC RAI:**
Provide a more complete description of communities around project site.

ER Section 2.5 describes community socioeconomic characteristics at the county level and provides some data for some specific communities in additional detail. However, integrated data are not provided for individual communities. To enable NRC staff to evaluate social impacts on surrounding communities, especially those closest to the site and access routes, provide a more complete description of Inglis, Yankeetown, Crystal River, and Dunnellon. For each community, provide an integrated discussion of variables such as size, population, public services and infrastructure, major sources of income and employment, and governance. Include data on housing availability, school capacity, availability of water, and wastewater treatment.

**PGN RAI ID #:** L-0412

**PGN Response to NRC RAI:**

Technical Memorandum 338884-TMEM-080, Rev. 0, "Assessment of Community Services near Proposed Levy Nuclear Plant, Florida," which is available in the Progress Energy-provided Reading Room, provides an integrated discussion of variables such as size, population, public services and infrastructure, major sources of income and employment, and governance for the communities of Inglis, Yankeetown, Crystal River, and Dunnellon. ER Subsection 2.5.2.1.2, Tax Structure and Distribution, which describes community characteristics, is further supported by the citation of an additional reference for the Levy County budget information, also presented in Table 2.5-12. Reference 2.5-169 will be added to the ER and NRC reading room.

**Associated LNP COL Application Revisions:**

Reference 2.5-169 will be added at the end of the second paragraph under ER Subsection 2.5.2.1.2, Tax Structure and Distribution, as shown below.

> The largest expenditure category in Levy County in 2006 is public safety, with spending exceeding $15 million. It is followed by the general government expenditure category, which totaled over $7 million. Third on the list is transportation, with over $5 million in expenditures. (Reference 2.5-169)

Reference 2.5-169 will be added to the bottom of ER Table 2.5-12 (Sheet 3 of 3) Citrus, Levy, and Marion County Expenditures and Revenues by Category, as shown below.

> Sources: References 2.5-017, 2.5-018 and 2.5-169.

Reference 2.5-169 will be added to ER Subsection 2.5.5, References, as shown below.

2.5-169 Levy County Clerk of Court, Statement of Revenues, Expenditures and Changes in Fund Balances. Government Funds. For the Year ending September 30, 2006. Facsimile provided on January 3, 2008.

**Attachments/Enclosures:**

None

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.5.4-1

**Text of NRC RAI:**
Provide locations of block groups with specific minority populations of more than 20 percent above the state average.

Provide locations for each minority group that is found in one or more block groups within the region at a population density more than 20 percent above the state average. This will supplement data on ER Figure 2.5-14 that lumps multiple categories into a single "minority population." These data will enable NRC staff to assess potential environmental justice effects on specific minority populations.

**PGN RAI ID #:** L-0413

**PGN Response to NRC RAI:**

The attached figures (Attachment 2.5.4-1A and Attachment 2.5.4-1B) show the respective block group locations for African-American and Hispanic populations of more than 20 percent above the state average found in the region based on the methodology described in ER Subsection 2.5.4. Minority populations are considered significant if the block group's minority population is at least 20 percentage points higher than the minority population of the geographic area chosen for comparison. The State of Florida has been chosen as the geographic comparison area for this study. Therefore, the criteria for identifying significant minority populations will be any block groups in which the minority populations exceed 20 percent above the state population of 0.3 percent of the population as American Indian or Alaskan Native; 1.7 percent Asian; 0.05 percent Native Hawaiian or other Pacific Islander; 14.6 percent African-American; 3.0 percent all other single minorities; 2.4 percent multi-racial; 22.1 percent aggregate of minority races; and 16.8 percent Hispanic ethnicity, or 20.3, 21.7, 20.05, 34.6, 23.0, 22.4, 42.1, and 36.8 percent, respectively.

The attached figures (Attachment 2.5.4-1A and Attachment 2.5.4-1B) present the census block groups for each county from within the 80-km (50-mi.) radius that exceed the threshold for the African-American and Hispanic minority populations. The block groups shaded peach represent the minority population greater than 20 percent above the state average. There were no census block groups whose minority populations of American Indian or Alaska Native, Asian, Hawaiian or other Pacific Islander, other single race, or multi-racial exceeded 20 percent greater than the state averages or the 50 percent criteria; therefore, figures for these ethnic groups were not provided in this response.

Sixty block groups within the 80-km (50-mi.) radius have African-American populations that are 20 percent greater than the state average (or greater than 34.6 percent). Of those 60 block groups, 41 have African-American populations of 50 percent or more. There are no block groups that exceed this threshold within a 6-mile radius, with the closest block group being located slightly south and east of the LNP in Citrus County between Dunnellon and Citrus Springs. Additionally, Attachment 2.5.2-1C further illustrates these census block

groups by differentiating between those in which the African-American population is less than 34.6 percent, between 34.6 to 50 percent, and greater than 50 percent.

One census block group within the 80-km (50-mi.) radius, located in the far southeastern sector of the region near the Pasco and Hernando county lines, has Hispanic ethnicity populations that are 20 percent greater than the state average (or greater than 36.8 percent) and exceed the 50 percent criteria.

Fifty-six census block groups within the 80-km (50-mi.) radius have aggregate minority populations (includes the small populations of American Indian or Alaska Native, Asian, Hawaiian or other Pacific Islander, other single race, or multi-racial) that are 20 percent greater than the state average (or greater than 42.1 percent). Of those 56 block groups, 44 have aggregate minority populations of greater than 50 percent.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

- 045 Attachment 2.5.4-1A.pdf
- 046 Attachment 2.5.4-1B.pdf
- 047 Attachment 2.5.4-1C.pdf

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 2.7.5-1

**Text of NRC RAI:**
Provide a second year of meteorological data (February 1, 2008 - January 31, 2009).

Provide a second year of meteorological data (February 1, 2008-January 31, 2009). 10 CFR 50.34 requires an analysis and evaluation of the amount of exposure to routine operation from the facility. Regulatory Guide 4.2, "Preparation of Environmental Reports for Nuclear Power Stations," states that two annual cycles of meteorological data should be provided for an operating license. Only one year of data was provided.

**PGN RAI ID #:** L-0414

**PGN Response to NRC RAI:**

A second year of meteorological data for the period of February 1, 2008 to January 31, 2009, has been submitted to the NRC as a separate transmittal (letter dated March 17, 2009; Serial NPD-NRC-2009-036). The following information has been provided:

- One year of hourly on-site data (February 1, 2008 to January 31, 2009) in a formatted, sequential access, ASCII text data file, pursuant to the guidance in Appendix A of Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," Revision 1. The same information was also provided in "pdf" format.

In addition to NRC's original RAI as stated above, additional information was also requested during a conference call on April 29, 2009, regarding the PAVAN runs. Revised input and output files for PAVAN runs with 2-year dataset will be sent under separate cover with an expected date of submittal to be July 1, 2009. A supplemental response explaining the update in more detail will be provided in the latter part of July 2009.

**Associated LNP COL Application Revisions:**

None

**Attachments/Enclosures:**

None

**NRC Letter No.:** ER-NRC

**NRC Letter Date:** February 24, 2009

**NRC Review of Environmental Report**

**NRC RAI #:** 4.4.2-9

**Text of NRC RAI:**
Quantify projected sales tax revenues.

The ER concludes in Section 4.4.2.2.1 that construction-related sales tax will be less than 1 percent of state sales tax revenue. The ER provides no estimate of sales tax for operations-related expenditures. To provide input to NRC staff's benefit-cost analysis, quantify the expected project-related sales tax revenues discussed in ER Sections 4.4.2.2.1 and 5.8.2.2.1 and explain the basis for the figures provided, specifying contributions from in-migrant worker expenditures and from owner purchase of local materials.

**PGN RAI ID #:** L-0416

**PGN Response to NRC RAI:**

The project-related sales tax revenues reflect the assumption that, as stated in ER Subsection 4.4.2.2.1, "Most of these purchases of equipment and materials will qualify for Florida's steam production and pollution control sales tax exemption." This means that there might not be a quantifiable increase in Florida sales tax revenue as a result of the owner's purchase of local materials. This assumption is based on Florida Statutes 212.08(5)(c) and 212.051. The following paragraphs discuss PEF Tax Department's interpretation of the statutes.

> Production of Electrical or Steam Energy Exemption
>
> The purchase of machinery and equipment for use at a fixed location which machinery and equipment are necessary in the production of electrical or steam energy resulting from the burning of boiler fuels other than residual oil is exempt from the tax imposed by this chapter. Such electrical or steam energy must be primarily for use in manufacturing, processing, compounding, or producing for sale items of tangible personal property in this state. Use of a de minimis amount of residual fuel to facilitate the burning of nonresidual fuel shall not reduce the exemption otherwise available under this paragraph. Purchasers of machinery and equipment qualifying for the exemption provided in this paragraph shall furnish the vendor with an affidavit stating that the item or items to be exempted are for the use designated herein. Any person furnishing a false affidavit to the vendor for the purpose of evading payment of any tax imposed under this chapter shall be subject to the penalty set forth in s. 212.085 and as otherwise provided by law.

§212.08(5)(c), Fla. Stat.

Control or Abatement of Pollution Exemption

Sales, use, or privilege taxes shall not be collected with respect to any facility, device, fixture, equipment, machinery, specialty chemical, or bioaugmentation product used primarily for the control or abatement of pollution or contaminants in manufacturing, processing, compounding, or producing for sale items of tangible personal property at a fixed location, or any structure, machinery, or equipment installed in the reconstruction or replacement of such facility, device, fixture, equipment, or machinery. To qualify, such facility, device, fixture, equipment, structure, specialty chemical, or bioaugmentation product must be used, installed, or constructed to meet a law implemented by, or a condition of a permit issued by, the Department of Environmental Protection; however, such exemption shall not be allowed unless the purchaser signs a certificate stating that the facility, device, fixture, equipment, structure, specialty chemical, or bioaugmentation product to be exempted is required to meet such law or condition.

§ 212.051, Fla. Stat.

According to PEF Tax Department staff, it is important to note that the equipment exemption does not depend on the type of customer to whom the electricity is sold. Florida exempts equipment from sales tax that is used to produce steam or electricity. This steam or electricity must be used to produce tangible personal property for sale. PEF's production equipment qualifies for this exemption because it is used to produce steam that is used to produce electricity for sale. Florida considers electricity to be tangible personal property. Florida provides, with certain qualifications, exemptions from sales tax on sales of electricity to residential and commercial customers; references to the corresponding Florida Department of Revenue Rules for residential exemptions are provided below. Please note that before PEF exempts a customer from paying sales tax on a sale of electricity, that customer must present an exemption certificate or other qualifying documentation to PEF.

12A-1.053 F.A.C, Electric Power and Energy

(1)(a) The sale of electric power or energy by an electric utility is taxable. The sale of electric power or energy for use in residential households, to owners of residential models, or to licensed family day care homes by utilities who are required to pay the gross receipts tax imposed by Chapter 203, F.S., is exempt. Also exempt is electric power or energy sold by such utilities and used in the common areas of apartment houses, cooperatives, and condominiums, in residential facilities enumerated in Chapters 400 and 429, F.S., and in other residential facilities. However, if any part of the electric power or energy is used for a non-exempt purpose, the entire sale is subject to tax.

(1)(b) An electric utility is not obligated to collect and remit tax on any sale of electric power or energy when:

1. The electric power or energy is sold at a rate based on the utility's "residential schedule," under tariffs filed by the utility with the Public Service Commission; or

2. The utility has on file a writing or document evidencing a representation of the utility's customer that the electric power or energy is being purchased for residential household use, including licensed family day care homes and other facilities identified in paragraph (a). The writing or document may be a customer application or a certificate that identifies the customer as purchasing the electric power or energy for a residential purpose. A "customer application" includes a record of information obtained electronically or orally from the customer in the ordinary course of business. The electric utility must have acted in good faith in accepting the representation of the customer.

(1)(c) Tax is due on electric power or energy purchased by a customer tax exempt for the claimed purposes of residential household use that does not qualify for such exemption. In such instances, if the electric utility complies with the requirements of paragraph (b), the Department will look to the customer for any applicable tax, penalty, or interest due. The Department will look to the utility for any applicable tax, penalty, or interest due when the electric utility's books and records indicate a failure to comply with the requirements of paragraph (b).

To characterize the additional sales tax receipts generated by the in-migrant portion of the construction workforce, the calculations in ER Subsection 4.4.2.1.2 were revised to reflect an updated peak construction workforce estimate of 3300 (see LNP ER NRC RAI 4.4.2-3). This resulted in a total earnings estimate of $119 million during the peak construction year. Only a portion of these earnings are available as disposable income and not all of the disposable income would be spent on goods and services in the region. Assuming 25 percent of the $119 million, or about $30 million of the expenditures, is subject to state and local sales taxes, total sales tax receipts could increase by about $2 million during the peak construction year and less during the non-peak years. Based on the calculations below, approximately $0.29 million would go to the counties in rough proportion to the distribution of the construction workforce, as presented in ER Table 4.4-1.

- $119,000,000 (total earnings estimate) X .25 (assumed % of earnings spent within the region and, therefore, subject to state and local sales taxes) = $29,750,000, LNP associated sales taxable earnings.
- $29,750,000 (sales taxable earnings) X .07 (total sales tax for Levy County) = $2,082,500, LNP associated total sales tax revenue.
- $2,082,500 (additional sales tax revenue) X .14 (1% local sales tax) = $297,500, LNP associated local sales tax revenue.
- $2,082,500 - $297,500 = $1,785,000, LNP associated State sales tax revenue.

The remaining $1.79 million would go to the State, which would send some of the funds (0.5 percent) back to the local areas (counties and towns/cities) to fund local services. Please refer to page 788 of Reference 4.4-009, indicating the 0.5 percent returned to local governments. For the purposes of the ER, "local area" refers to counties since the analysis is performed at the county level, however page 788 of Reference 4.4-009 confirms that this 0.5 percent is returned to both county and city governments. These incremental increases in sales tax revenue represent a small benefit to the region and the State. The results are

similar for the sales tax receipts from the operations phase of the project. The increase in earnings amounts to less than 1 percent of total earnings within the region. Thus, the increase in sales tax receipts would also be less than 1 percent of total sales tax receipts in the region. This represents a small benefit to the region and the State.

In order to further support the NRC staff's efforts to calculate the property tax revenue potential from operation of the LNP, the following discussion from the PGN's Tax Department provides clarification (with applicable references to Florida statutes) for the assertions in ER Subsection 4.4.2.2.2 that tax valuation would be based on the cost of construction, less the pollution control components, and for the February 2008 statement that the LNP will be assessed at 100 percent and the estimates reflect "a reduction in value for pollution control property estimated at 25% of value. This rate is statutorily provided and is not negotiated."

The value of regulated utility property is generally determined by the Unit Method. The Unit Method looks at cost, income and market approach – generally the three approaches are weighted to determine overall value. The total value is then allocated to the tax jurisdiction, that is, the county. The allocation is usually based on a ratio of cost in the county to total cost. See Florida Statute 193.011 below. In Florida, pollution control property is valued at salvage value. Most all of the Florida counties assume that salvage value is 10 percent of cost. Below are the applicable Florida statutes.

Assessment of pollution control devices (Section 193.621, Florida Statutes):

> If it becomes necessary for any person, firm or corporation owning or operating a manufacturing or industrial plant or installation to construct or install a facility, as is hereinafter defined, in order to eliminate or reduce industrial air or water pollution, any such facility or facilities shall be deemed to have value for purposes of assessment for ad valorem property taxes no greater than its market value as salvage. Any facility as herein defined heretofore constructed shall be assessed in accordance with this section.

§ 193.621, Fla. Stat.

Factors to consider in deriving just valuation (Section 193.011, Fla. Stat.):

> In arriving at just valuation as required under s. 4, Art. VII of the State Constitution, the property appraiser shall take into consideration the following factors:

1. The present cash value of the property, which is the amount a willing purchaser would pay a willing seller, exclusive of reasonable fees and costs of purchase, in cash or the immediate equivalent thereof in a transaction at arm's length;

2. The highest and best use to which the property can be expected to be put in the immediate future and the present use of the property, taking into consideration the legally permissible use of the property, including any applicable judicial limitation, local or state land use regulation, or historic preservation ordinance, and any zoning changes, concurrency requirements, and permits necessary to achieve the highest and best use, and considering any moratorium imposed by executive order, law, ordinance, regulation, resolution, or proclamation adopted by any governmental body or agency or the Governor when the moratorium or

judicial limitation prohibits or restricts the development or improvement of property as otherwise authorized by applicable law. The applicable governmental body or agency or the Governor shall notify the property appraiser in writing of any executive order, ordinance, regulation, resolution, or proclamation it adopts imposing any such limitation, regulation, or moratorium;

3. The location of said property;

4. The quantity or size of said property;

5. The cost of said property and the present replacement value of any improvements thereon;

6. The condition of said property;

7. The income from said property; and

8. The net proceeds of the sale of the property, as received by the seller, after deduction of all of the usual and reasonable fees and costs of the sale, including the costs and expenses of financing, and allowance for unconventional or atypical terms of financing arrangements. When the net proceeds of the sale of any property are utilized, directly or indirectly, in the determination of just valuation of realty of the sold parcel or any other parcel under the provisions of this section, the property appraiser, for the purposes of such determination, shall exclude any portion of such net proceeds attributable to payments for household furnishings or other items of personal property.

§ 193.011, Fla. Stat.

Clarification of PGN's February 2008 statement that the LNP will be assessed at 100 percent and the estimates reflect "a reduction in value for pollution control property estimated at 25% of value." This 25 percent reflects an estimate of the amount of pollution control property and not value, so PEF is approximating 25 percent of costs equal pollution control property. Per Florida statutes, pollution control property is valued at salvage value. As noted above, since most of the county property assessors assume a salvage value of 10 percent, the calculated value reduction would be 90 percent X 25 percent.

**Associated LNP COL Application Revisions:**

Revise the first paragraph of ER Subsection 4.4.2.1.2 from:

> An estimate of $62 million (45,919 multiplied by 1350) in peak earnings will be generated from construction. Along with direct earnings, there would be additional indirect earnings over the construction period through the multiplier effect. The RIMS II earnings multiplier for the construction sector is 1.57 (Reference 4.4-005). Therefore, the total earnings would increase by $97.3 million ($62 million multiplied by 1.57) during the peak construction year. The earnings would be lower in the nonpeak years.

To:

> An estimate of $75.8 million (45,919 multiplied by 1650) in peak earnings will be generated from construction. Along with direct earnings, there would be additional

induced earnings over the construction period through the multiplier effect. The RIMS II earnings multiplier for the construction sector is 1.57 (Reference 4.4-005). Therefore, the total earnings would increase by $119.0 million ($75.8 million multiplied by 1.57) during the peak construction year. The earnings would be lower in the non-peak years.

**Attachments/Enclosures:**

None

# Listing of Files Included on CD Provided as Attachment 1

| Filename | Description |
|---|---|
| 001_Attachment 5.2.2-1A.pdf | TMEM-079, Estimated Salinity Changes in the Cross Florida Barge Canal and Old Withlacoochee River Channels after LNP Intake Operation |
| 002_Attachment 5.2.2-1B.pdf | TMEM-090, Historical Flow Data Analysis at Inglis Dam, Citrus County, Florida |
| 003_Attachment 5.2.2-3A.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 1 |
| 004_Attachment 5.2.2-3B.pdf | Raw Water Supply Well Locations |
| 005_Attachment 5.2.2-3C.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 3 |
| 006_Attachment 5.2.2-3D.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 4 |
| 007_Attachment 5.2.2-3E.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 5 |
| 008_Attachment 5.2.2-3F.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 6 |
| 009_Attachment 5.2.2-3G.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 7 |
| 010_Attachment 5.2.2-3H.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 8 |
| 011_Attachment 5.2.2-3I.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 9 |
| 012_Attachment 5.2.2-3J.pdf | SWFWMD DWRM2 TMR Groundwater Model - Figure 10 |
| 013_Attachment 5.2.2-3K.pdf | TMR Model Grid, Adjacent users, and 10-Mile Buffer - Figure 11 |
| 014_Attachment 5.2.2-3L.pdf | Simulated SAS and UFA 2078 Water Levels – Figure 12 |
| 015_Attachment 2.3.1-1A.pdf | Existing 100 Year Flood Zone at LNP Site |
| 016_Attachment 2.3.1-1B.pdf | Existing 100 Year Flood Zone Potentially Disturbed by the LNP Site |
| 017_Attachment 2.3.1-1C.pdf | Q3 Flood Data Users Guide, Draft, March 1996 |
| 018_Attachment 2.3.1-1D.pdf | FEMA Flood Insurance Rate Maps 1996 |

| Filename | Description |
|---|---|
| 019_Attachment 9.4.2-1A.pdf | LNP Report: Evaluation of Oxygen Scavenger, pH Control Agent, Potable Water Biocide, and Cooling Water Chemicals |
| 020_Attachment 7.1-1A.pdf | Response to Supplemental RAI Issues |
| 021_Attachment 2.4.1-1A.pdf | Listed Species Map |
| 022_Attachment 2.4.1-2A.pdf | Florida Waterfowl Focus Areas |
| 023_Attachment 2.4.1-3A.pdf | Wetlands & Potential Areas of Disturbance on the LNP Site |
| 024_Attachment 2.4.1-3B.pdf | Uniform Mitigation Assessment Method |
| 025_Attachment 2.4.1-3C_Part1_of_2.pdf | Wetland Mitigation Plan, Part 1 |
| 026_Attachment 2.4.1-3C_Part2_of_2.pdf | Wetland Mitigation Plan, Part 2 |
| 027_Attachment 2.4.1-3D.pdf | Wetland Map with Simulated Incremental Drawdown Contours |
| 028_Attachment 2.4.1-3E.pdf | LNP Transmission Line Segments |
| 029_Attachment 2.4.1-4A.pdf | Management Plan for Timber |
| 030_Attachment 4.3.1-1A.pdf | Limits of Construction and Potential Habitat Impacts on LNP Site |
| 031_Attachment 4.3.1-1B.pdf | FLUCCS Habitat Types in Vicinity of LNP Site |
| 032_Attachment 4.3.1-2A_Part1_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 1 of 8 |
| 033_Attachment 4.3.1-2A_Part2_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 2 of 8 |
| 034_Attachment 4.3.1-2A_Part3_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 3 of 8 |
| 035_Attachment 4.3.1-2A_Part4_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 4 of 8 |
| 036_Attachment 4.3.1-2A_Part5_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 5 of 8 |
| 037_Attachment 4.3.1-2A_Part6_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 6 of 8 |
| 038_Attachment 4.3.1-2A_Part7_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 7 of 8 |
| 039_Attachment 4.3.1-2A_Part8_of_8.pdf | FDEP Staff Analysis Report - LNP - Transmission Line Portion, Part 8 of 8 |

| **Filename** | **Description** |
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| 040_Attachment 5.3.3.2-1A.pdf | Maximum Predicted Monthly Average Deposition Rates - LNP Cooling Tower Operation - Figures 1 - 5 |
| 041_Attachment 5.3.3.2-1B_Part1_of_2.pdf | CREC Salt Deposition Study and Related Correspondence, Part 1 of 2 |
| 042_Attachment 5.3.3.2-1B_Part2_of_2.pdf | CREC Salt Deposition Study and Related Correspondence, Part 1 of 2 |
| 043_Attachment 4.4.2-1A.pdf | Representative Employment by Major Trade Groups Within NAICS 23700, Heavy and Civil Engineering Construction |
| 044_Attachment 4.4.2-1B.pdf | County Business Patterns |
| 045_Attachment 2.5.4-1A.pdf | Regional Minority Population Exceedance - African-American Population |
| 046_Attachment 2.5.4-1B.pdf | Regional Minority Population Exceedance - Hispanic Population |
| 047_Attachment 2.5.4-1C.pdf | Regional African-American Populations |