L-2015-178
10 CFR 52.3

June 23, 2015

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

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to NRC Request for Additional Information Letter No. 084
(eRAI 7908) Related to SRP Section 11.02.03 Liquid Waste Management Systems

Reference:

NRC letter dated June 4, 2015, Request for Additional Information Letter No. 084 Related to SRP Section 11.02.03 Liquid Waste Management Systems for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application

Florida Power & Light Company (FPL) provides, as an attachment to this letter, its response to NRC RAI No. 11.02-8 (eRAI 7908) provided in the referenced letter. The attachment identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License Application (if applicable). If you have any questions, or need additional information, please contact me at 561-691-7490.

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

Executed on June 23, 2015.

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFO

Attachment: FPL Response to NRC RAI No. 11.02-8 (eRAI 7908)

D097
NRO

cc:
PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

NRC RAI Letter No. PTN-RAI-LTR-084 Dated June 4, 2015

SRP Section: 11.02 – Liquid Waste Management System

NRC RAI Number: 11.02-8 (eRAI 7908)

NRC staff has reviewed the information presented in FSAR section 11.2 Rev. 6 and cannot determine the basis of the source term used in the analysis to calculate dose for 10 CFR 50 Appendix I Dose Objectives. At present the applicant states a one unit source term in FSAR Table 11.2-201 and describes a maximum source term that is identified through the use of the hydrology models as found in Table 11.2-203. Staff is unable to determine in the discussions provided in section 11.2 if the maximum radionuclide concentrations provided in Table 11.2-203 and in section 11.2.3.5.2.5.1 are also for one unit.

FSAR section 11.2 Rev. 6 includes a dose assessment for the DWI that uses the dose design objectives of 10 CFR 50, Appendix I as the basis for showing potential doses are "as low as reasonably achievable" (ALARA) for compliance with 10 CFR 20.2002(d). NRC staff finds this approach acceptable for 10 CFR 20.2002 disposals of a few millirem per year potential dose to members of the public. However, the analyses performed for the inadvertent intrusion scenario, as described in Table 11.2-209, appear to represent doses for a single unit, since the radionuclide concentrations are also representative of a single unit input, even though the transport times appear to have been calculated for a two unit input flows. Therefore, the analysis do not appear to be consistent with a single unit dose assessment for use of the Appendix I design objectives, which are also specified on a per unit basis, as a means for demonstrating ALARA. NRC staff finds that dose is a function of concentration; and the concentration for the DWI is the same whether it is one or two units since the source term divided by dilution flow stays the same. For one unit, the concentration is determined by dividing the single unit source term by the single unit dilution flow. The same holds for two units, where a two unit source term would be divided by the two unit dilution flow. Both source term and dilution flow double, making the concentration stay the same as for a single unit. The maximum individual dose for the intruder as presented in Table 11.2-210 is 5.6 mrem/year, which is above the Appendix I design objective of 3 mrem/y for liquid pathways. And, as discussed above, doubling the Appendix I design objective doses, since the analyses performed appear to represent two unit input flows, does not show adequate compliance on a per unit basis.

NRC staff requests clarification on the dose assessment included in FSAR section 11.2 Rev 6 for the intruder scenario to show how doses, when calculated on a per unit basis, remain in compliance with the design objective of 10 CFR 50, Appendix I. NRC staff also request that clarifying text be added to section 11.2 to support the description of compliance on a per unit basis.

The NRC staff request that any revisions to the FSAR be provided as a markup to the response to this RAI.

FPL RESPONSE:

Processed liquid radioactive waste from Turkey Point Units 6 & 7 operation is discharged to the plant blowdown sump pump discharge line before release to the Lower Floridan aquifer (Boulder Zone) by the deep well injection system (DIS). As described in FSAR Subsection 11.2.3.5, a performance assessment (PA) was performed to assess the environmental fate and transport of Turkey Point Units 6 & 7 liquid effluent releases by deep well injection. The PA coupled numerical groundwater modeling techniques with a liquid pathway analysis to identify the maximum exposed members of the public (maximally exposed individual – MEI) in unrestricted areas as a result of the Turkey Point Units 6 & 7 liquid effluent releases. For the dose assessment, including the analyses performed for the inadvertent intrusion scenario described in FSAR Section 11.2, a single unit source term based on information from the AP1000 DCD is divided by dilution flow from a single unit to yield the concentration. This concentration remains unchanged when the source term and dilution flow are both doubled for two units. Hence, the injectate concentrations in FSAR Table 11.2-201 are independent of the number of units operating. The concentrations at offsite receptors, however, are sensitive to the number of units operating. Assuming the concurrent release of effluents from both units is not only a realistic depiction of the way the plant will operate, but also yields the highest concentrations and doses at offsite receptors. As indicated in FSAR Subsection 11.2.3.5.2.2, "the two-unit case is more limiting as it results in a greater extent of plume expansion at any given point in time as well as a higher cumulative radionuclide inventory."

The concentrations in FSAR Subsection 11.2.3.5.2.5.1 and FSAR Table 11.2-203 are based on two units. The doses in FSAR Table 11.2-209 were calculated using LADTAP II based on source terms from two units and then divided by two to yield the doses per unit to facilitate comparisons with the per-unit limits in 10 CFR 50, Appendix I. The doses in Tables 11.2-208 and 11.2-210 are both for two units.

FSAR Subsection 11.2.3.5.2.5.1 and FSAR Tables 11.2-203 and 11.2-209 will be revised as described below.

This response is PLANT SPECIFIC.

References:

None

ASSOCIATED COLA REVISIONS:

The third and fourth paragraphs of FSAR Subsection 11.2.3.5.2.5.1 will be revised in a future COLA revision as follows:

The expected radionuclide concentrations are evaluated at this location. Figure 11.2-209 presents the tritium, cesium-134, cesium-137, and strontium-90 relative concentration profiles at this location over the 100-year simulation duration, as calculated by the radial transport model. As discussed under *Radioactive Source Term Selection* in Subsection 11.2.3.5.1.1.1, these are the radionuclides that have been retained for fate and transport modeling and subsequent dose analysis. The maximum radionuclide concentrations and corresponding times of occurrence following start of plant operation are as follows**, based on two units**:

tritium:	3.1E04 pCi/L (25 years)
cesium-134:	7.7E-03 pCi/L (15 years)
cesium-137:	7.6E-01 pCi/L (42 years)
strontium-90:	5.6E-04 pCi/L (41 years)

The above concentrations are based on a 1-year interval between the startup of Units 6 and 7 and a projected 60 years of continuous operation per unit.

These maximum concentrations are conservatively assumed to occur concurrently and, therefore, are used collectively as the source term for the dose analyses conducted for this location. For these further analyses, a separate LADTAP II run is made for each radionuclide (tritium, strontium-90, cesium-134, and cesium-137) to calculate the dose to an offsite receptor 2.2 miles from the modeled effluent injection point. **In LADTAP II, doses are calculated based on the above concentrations for two units. Doses per unit are obtained by dividing the doses calculated by LADTAP II by two.**

The merged heading for the last four columns of Table 11.2-203 will be revised in a future COLA revision as follows:

Table 11.2-203
Peak Activity Concentrations at the 2.2-Mile Location

Case	Peak Activity Concentrations from 2 Units at 2.2 mi from Injection Point (pCi/L)[a]			
	H-3[b]	Cs-134	Cs-137	Sr-90
Base case	3.1E04	7.7E-03	7.6E-01	5.6E-04
Sensitivity Cases				
Φe = 15% (decreased Φe)	4.0E04 (+29%)	2.1E-02 (+173%)	8.6E-01 (+13%)	6.4E-04 (+14%)
α_V =0.1 m (decreased α_V)	3.9E04 (+26%)	1.2E-02 (+56%)	8.6E-01 (+13%)	6.3E-04 (+13%)
T = 55,736 m^2/day (increased T)	3.7E04 (+19%)	2.2E-02 (+186%)	8.1E-01 (+7%)	6.0E-04 (+7%)
b = 92 m (decreased b)	3.6E04 (+16%)	1.5E-02 (+95%)	8.2E-01 (+8%)	6.0E-04 (+7%)
K_z=0.1K_x (decreased K_z/K_x)	3.1E04 (0%)	7.8E-03 (+1%)	7.6E-01 (0%)	5.6E-04 (0%)
α_L= 5 m (decreased α_L)	3.1E04 (0%)	7.5E-03 (–3%)	7.6E-01 (0%)	5.6E-04 (0%)
α_L= 30 m (increased α_L)	3.1E04 (0%)	8.1E-03 (+5%)	7.6E-01 (0%)	5.6E-04 (0%)
S = 1E-3 (increased S)	3.1E04 (0%)	7.7E-03 (0%)	7.6E-01 (0%)	5.6E-04 (0%)
S = 1E-4 (decreased S)	3.1E04 (0%)	7.7E-03 (0%)	7.6E-01 (0%)	5.6E-04 (0%)
Saltwater injection 60 days per year	2.4E04 (–23%)	3.5E-03 (–55%)	6.5E-01 (–14%)	4.8E-04 (–14%)
α_V= 1.0 m (increased α_V)	2.3E04 (–26%)	4.0E-03 (–48%)	6.3E-01 (–17%)	4.6E-04 (–18%)
T = 5573 m^2/day (decreased T)	2.0E04 (–35%)	5.6E-04 (–93%)	6.4E-01 (–16%)	4.7E-04 (–16%)

(a) Values in parentheses represent changes in peak concentration relative to the base case on a percentage basis.
(b) Tritium contributes more than 90 percent of the member-of-the-public dose over the period in which these peak concentrations are seen.

Notes:
T = transmissivity
b = aquifer thickness (note that in this simulation the transmissivity value is the same as that of the base case and therefore hydraulic conductivity increases)
Φ_e = effective porosity
α_V = vertical dispersivity

α_L = longitudinal dispersivity
K_z = vertical hydraulic conductivity
K_x =horizontal hydraulic conductivity
S = storativity

Concentrations are from a simulated observation well in model layer 1.

Footnote (b) will be added to Table 11.2-209 in a future COLA revision as follows:

Table 11.2-209
Inadvertent Intrusion Subsistence Driller Dose Summary

Pathway	Dose (mrem) per Unit[(b)]	
	Total Body	Liver[(a)]
Annual Ingestion of Water and Irrigated Foods	2.7	3.8
Inhalation During Drilling	8.2E-02	8.3E-02
Air Immersion During Drilling	2.6E-06	2.6E-06
Deposition During Drilling	1.8E-05	0
Total	2.8	3.9
10 CFR Part 50, Appendix I Design Objectives	3	10

(a) Liver is the organ receiving the maximum dose.
(b) Doses are calculated based on the operation of two units, as this maximizes the doses at offsite receptors. The calculated two-unit dose is then divided by two to obtain the dose per unit.

ASSOCIATED ENCLOSURES:

None