



Serial: NPD-NRC-2009-095  
May 28, 2009

10CFR52.79

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

**LEVY NUCLEAR POWER PLANT, UNITS 1 AND 2  
DOCKETS NOS. 52-029 AND 52-030  
SUPPLEMENT 1 TO RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER  
NO. 014 RELATED TO POTENTIAL RECIRCULATION PATHWAY**

- References:
1. Letter from Brian C. Anderson (NRC) to Garry Miller (PEF), dated March 3, 2009, "Request for Additional Information Letter No. 014 Related to SRP Section 11.2 the Levy County Nuclear Plant, Units 1 and 2 Combined License Application"
  2. Letter from Garry D. Miller (PEF) to U.S. Nuclear Regulatory Commission, dated April 1, 2009, "Response to Request for Additional Information Letter No. 014 Related to Potential Recirculation Pathway," Serial NPD-NRC-2009-054

Ladies and Gentlemen:

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

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 May 28, 2009.

Sincerely,

Garry D. Miller  
General Manager  
Nuclear Plant Development

Enclosure

cc : 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 NRC Request for Additional Information Letter No. 014  
Related to SRP Section 11.2 for the Levy Nuclear Power Plant, Units 1 and 2 Combined  
License Application, Dated March 3, 2009**

<u>NRC RAI #</u>	<u>Progress Energy RAI #</u>	<u>Progress Energy Response</u>
11.02-3	L-0341	Revised response enclosed – see following pages

**NRC Letter No.:** LNP-RAI-LTR-014

**NRC Letter Date:** March 3, 2009

**NRC Review of Final Safety Analysis Report**

**NRC RAI NUMBER:** 11.02-3

**Text of NRC RAI:**

In the course of an Environmental Audit site visit, it was identified that periodically elevated levels of tritium from the Crystal River 3 (CR-3) discharge have been detected in the CR-3 intake canal water for samples collected as part of the routine radiological environmental monitoring program at CR-3. This situation indicates a potential recirculation pathway that needs to be considered (10CFR50 Appendix I compliance) for the discharge of Levy County liquid releases, since Levy County discharge is via the CR-3 discharge structure/canal. Please provide an evaluation of this potential recirculation pathway and provide additional information, as applicable, for the impact this recirculation path could have on potential doses from liquid effluents.

**PGN RAI ID #:** L-0341

**PGN Response to NRC RAI**

The existence of a recirculation path would not have an effect on the calculated doses from LNP liquid effluents or compliance with 10CFR50, Appendix I. The calculated doses from LNP liquid effluents are provided in LNP FSAR section 11.2 and are less than 1% of the Appendix I dose objective of 3 mrem/year/unit (total body from all pathways) and 10 mrem/year/unit (any organ from all pathways). The calculated doses are annual doses (mrem/yr) based on the total estimated annual LNP liquid curie discharge.

As noted in the RAI, there have been periodic instances where tritium has been detected in the CR3 intake water. Recent examples of this are documented in the Crystal River Unit 3 Annual Radiological Environmental Operating Reports (AREOR) as follows:

Per the 2006 Crystal River Unit 3 AREOR, monthly seawater grab samples were taken in the discharge canal (sample location C14G) and near the mouth of the intake canal (sample location C13). Of twelve samples in the discharge canal, one had measurable tritium (December) with a reported concentration of 689 pCi/L. Of the twelve monthly samples taken in the intake canal, the December sample had a reported concentration of 439 pCi/L. No other measurable tritium concentrations were recorded in 2006.

Per the 2007 Crystal River Unit 3 AREOR, monthly seawater grab samples were taken in the discharge canal (C14G) and near the mouth of the intake canal (C13). Of twelve samples in the discharge canal, eight had measurable levels of tritium (in the months of January, April, May, July, August, September, October and November) ranging from 84 pCi/L to 914 pCi/L. Of the twelve monthly samples taken in the intake canal four had measurable tritium levels (in the months of January, March, August and October) ranging from 89 pCi/L to 310 pCi/L.

For 2008 the only statistically positive samples identified to date were at seawater location C-13 (intake canal) in January at 99 pCi/l and in May at 83 pCi/l.

This data shows that recirculation from the discharge canal to the CR intake canal is a non-uniform phenomenon with respect to time.

As stated above, the existence of a recirculation path would not have an effect on the calculated doses from LNP liquid effluents or compliance with 10CFR50, Appendix I. Any of the LNP activity released via the Crystal River discharge canal which may be recirculated to the Crystal River intake canal will not concentrate in the Crystal River intake/discharge system since this is a full flow once through system. This is not physically similar to the impoundment systems described in USNRC Regulatory Guide 1.113. For example, per CR3 FSAR section 11.2, the CR3 circulating water flow rate is 680,000 gpm or 976 million gallons per day (MGD). CR3 FSAR Figure 9-18 shows that this flow is taken from the intake canal, passed through the CR3 condenser tubes and released to the discharge canal. The travel time from the intake canal to discharge canal through CR3 is on the order of minutes.

The total Crystal River site discharge/intake canal system includes Units 1, 2, 3, 4 and 5. The NPDES permitted flow rates are:

1898 MGD	Units 1, 2, 3 Combined Flow Limit
44 MGD	Unit 4 Flow Limit
44 MGD	Unit 5 Flow Limit

Crystal River Units 1, 2, and 3 circulating water systems are full flow once through systems. Crystal River Units 4 and 5 have cooling towers, however, their combined flows are a small fraction of the total flow.

Per the CR3 ODCM, Table 5.1-1, the location of sample point C14G (discharge) is approximately 2.5 mi W of the site. Similarly, the location of sample point C13 (intake) is approximately 4.6 mi WSW of the site. Using an assumed velocity of 5 fps for this entire distance yields a travel time of about 7500 sec (approximately 2 hours) for a complete flushing of the system. The sampling at the above locations indicates that the potential for recirculation occurs only periodically. The fact that there is no impoundment for buildup and that the residence time in the system is on the order of hours signifies that any recirculated activity is re-released to the Gulf and does not buildup in the system. The calculated doses provided in the LNP FSAR are annual doses (mrem/yr) based on the total estimated LNP annual curie discharge.

The U.S. Nuclear Regulatory Commission (NRC) issued NRC RIS 2008-03 to clarify its regulations related to controls over previously discharged radioactive materials in gaseous or liquid effluents that are returned from the environment to an operating nuclear power facility. The NRC has determined that radioactive material properly released in gaseous or liquid effluents to the environment is not considered licensed material when returned to the facility as long as the concentration of radioactive material does not exceed 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," exempt concentration limits. The water containing radioactive material returned from the environment can be used by the licensee and returned to the environment without being considered a new radioactive material effluent release. The basis for this determination is that the licensee has already accounted for this radioactive material when the effluent was originally released, provided that the subsequent

use, possession, or release does not introduce a new significant dose pathway to a member of the public.

Therefore, the LNP discharge discussed above is not subject to any additional disposal requirements since the concentration of recirculated radioactive material remains significantly less than the 10 CFR Part 30 exempt concentration listed in 10 CFR Part 70 for tritium ( $3 \times 10^{-2}$   $\mu\text{Ci/ml}$  or  $3 \times 10^7$   $\text{pCi/L}$ ). As reported in the CR3 Radioactive Effluent Release Reports (RERR) for 2006, 2007 and 2008, the annual tritium releases were 311 Ci, 713 Ci and 348 Ci, respectively. The average tritium discharge concentrations from the plant at the point of release for 2006, 2007 and 2008 were  $1.39 \times 10^2$   $\text{pCi/L}$ ,  $3.37 \times 10^2$   $\text{pCi/L}$  and  $1.60 \times 10^2$   $\text{pCi/L}$  determined by dividing the Ci releases by the volume of dilution water used as reported in the RERR. These values are well below 10 CFR Part 30 exempt concentration. It should be noted that the sampling program for stations C13 and C14G includes gamma spectrometry analysis for other isotopes including, Mn, Fe, Co, Zn, Zr, I, Cs and Ba. No measurable concentrations have been identified for these isotopes.

Even with the addition of LNP discharges in the future, any recirculated activity will be significantly less than the 10 CFR Part 30 exempt concentration. The total design basis release from LNP for both units is a total of 2020 Ci tritium. LNP FSAR Table 11.2-201 lists the CR discharge canal actual average flow rate as 1651.8 million gallons per day. This results in a calculated average discharge concentration for tritium of  $8.85 \times 10^2$   $\text{pCi/L}$ .

Since the calculated doses from LNP liquid effluents are less than 1% of the Appendix I dose objective of 3 mrem/year/unit (total body from all pathways) and 10 mrem/year/unit (any organ from all pathways) and the concentration of recirculated radioactive material remains significantly below the 10 CFR Part 30 exempt concentration listed in 10 CFR Part 70 for tritium ( $3 \times 10^{-2}$   $\mu\text{Ci/ml}$  or  $3 \times 10^7$   $\text{pCi/L}$ ), it can be concluded that recirculation of activity in the Crystal River site discharge/intake canal system will have a negligible effect on the LNP doses and does not introduce a new significant dose pathway to a member of the public.

**Associated LNP COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.