Florida Power & Light, 9760 S.W. 344 ST. Florida City, FL 33034

APR 29 2011
L-2011-142
10 CFR 50.90

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Response to NRC Request for Additional Information Regarding
Extended Power Uprate License Amendment Request No. 205 and
Health Physics and Human Performance Issues

References:

(1) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.

(2) Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Health Physics and Human Performance (IHPB) Request for Additional Information - Round 1," Accession No. ML111050213, April 15, 2011.

By letter L-2010-113 dated October 21, 2010 [Reference 1], Florida Power and Light Company (FPL) requested to amend Renewed Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 Technical Specifications (TS). The proposed amendment will increase each unit's licensed core power level from 2300 megawatts thermal (MWt) to 2644 MWt and revise the Renewed Facility Operating Licenses and TS to support operation at this increased core thermal power level. This represents an approximate increase of 15% and is therefore considered an extended power uprate (EPU).

On March 31, 2011, a public meeting was held with the U.S. Nuclear Regulatory Commission (NRC) Project Manager (PM), applicable NRC technical reviewers, and FPL representatives to discuss proposed NRC requests for information (RAI) related to the EPU License Amendment Request (LAR). During the meeting, three (3) RAI questions from the Health Physics and Human Performance Branch (IHPB) were presented. On April 15, 2011, FPL received an email from the NRC PM containing the final RAI [Reference 2]. The RAI consisted of the three questions previously discussed in the above public meeting. The RAI questions and applicable FPL responses are documented in the Attachment to this letter.

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2010-113 [Reference 1].

This submittal contains no new commitments and no revisions to existing commitments.

Should you have any questions regarding this submittal, please contact Mr. Robert J. Tomonto, Licensing Manager, at (305) 246-7327.

A001
NRR

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

Executed on April 29, 2011.

Very truly yours,

Michael Kiley
Site Vice President
Turkey Point Nuclear Plant

Attachment

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Resident Inspector, Turkey Point Nuclear Plant
Mr. W. A. Passetti, Florida Department of Health

Turkey Point Units 3 and 4

RESPONSE TO NRC RAI REGARDING EPU LAR NO. 205
AND IHPB HEALTH PHYSICS AND HUMAN PERFORMANCE ISSUES

ATTACHMENT

Response to Request for Additional Information

The following information is provided by Florida Power and Light Company (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support License Amendment Request (LAR) 205, Extended Power Uprate (EPU), for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL via letter (L-2010-113) dated October 21, 2010 [Reference 1].

On March 31, 2011, a public meeting was held with the U.S. Nuclear Regulatory Commission (NRC) Project Manager (PM), applicable NRC technical reviewers, and FPL representatives to discuss proposed NRC requests for information (RAI) related to the EPU License Amendment Request (LAR). During the meeting, three (3) RAI questions from the Health Physics and Human Performance Branch (IHPB) were presented. It was concluded that question 2IHPB-1.2 needed revising by the NRC staff, and once revised, all three questions could be formally issued. On April 15, 2011, FPL received an email from the NRC PM containing the RAI [Reference 2]. The RAI consisted of the three questions previously discussed in the above public meeting. The RAI questions and applicable FPL responses are documented below.

2IHPB-2.1 Provide an estimate of the current shine dose that is referenced in Section 8.2.2 of Attachment 7 titled, "Offsite Doses at Power Uprate Conditions."

The current shine dose referenced in Section 8.2.2 as "negligible" is based on TLD survey data normally monitored locations at the Protected Area (PA) boundary. Review of the TLD data for the 2003 to 2007 period (i.e., the 5 year period used in the EPU evaluation as the basis of the pre-EPU estimates) indicates that the total pre-EPU annual dose due to shine at the PA fence is < 0.01 mrem.

As indicated in Section 8.8.2, for the EPU, the direct shine dose rate due to plant operation would increase by the increase percentage of the power level, i.e., 15.3%, however, the direct shine contribution due to accumulation of stored solid radwaste, could increase by approximately 17.7% when consideration is given to the average plant capacity factor during the 2003 to 2007 period. Thus, if the pre-EPU annual dose is <0.01 mrem, then the annual EPU dose would be <0.012 mrem, which is deemed negligible.

2IHPB-2.2 In section 8.2.2, quantify the impact of the gas and liquid effluent levels. Also, provide the origin of the scaling factor and how this was applied to the impact projections.

The methodology used to develop the EPU scaling factors and associated annual dose projections from gaseous and liquid effluents is provided in Section 2.10.1.2.4 of Attachment 4, Reference 1, and is summarized below.

The EPU evaluation used scaling techniques to demonstrate compliance with regulatory guidelines relevant to dose to an individual in an unrestricted area due to gaseous and liquid effluents from PTN Units 3 & 4.

Consideration was given to the fact that the EPU does not change the existing radioactive waste systems (gaseous and liquid) design, plant operating procedures or waste inputs as defined by NUREG-0017, Revision 1. Therefore, a comparison of releases can be made based on current versus EPU inventories/radioactivity concentrations in the reactor coolant and secondary coolant and steam. As a

result, the impact of the EPU on radioactive gaseous and liquid releases and Appendix I doses can be estimated using scaling techniques.

Specifically, scaling techniques based on NUREG-0017, Revision 1 methodology were utilized to assess the impact of the EPU on radioactive gaseous and liquid effluents at PTN. Use of the adjustment factors presented in NUREG-0017, Revision 1 allowed development of coolant activity scaling factors to address the EPU.

The EPU analysis utilized the core power operating history during the years 2003 to 2007, the reported gaseous and liquid effluent and dose data during that period, NUREG-0017, Revision 1 equations and assumptions, and conservative methodology to estimate the impact of operation at the analyzed EPU core power level. The results were then compared to the comparable data from current operation on radioactive gaseous and liquid effluents and the consequent normal operation offsite doses.

For the current condition, the evaluation utilized offsite doses based on an average 5-year set of organ and whole body doses calculated from effluent reports for the years 2003 through 2007 extrapolated to a 100% capacity factor for both units.

For the EPU condition, the system parameters reflected the flow rates and coolant masses at an analyzed NSSS power level of 2652 MWt (2652 MWt is the sum of an EPU core power level of 2644 MWt and 8 MWt for thermal power from the reactor coolant pumps), and a conservative core power level of 2652 MWt (i.e., the EPU core power level of 2644 MWt with a 0.3% margin for power uncertainty). This is consistent with the guidance provided in NUREG-0017 which requires that the core power level utilized in the analysis reflect a margin for power uncertainty.

The maximum potential percentage increase in coolant activity levels due to the EPU, for each chemical group identified in NUREG-0017, was estimated using the methodology and equations found in NUREG-0017, Revision 1, and a comparison of the change in power level and in plant coolant system parameters (such as reactor coolant mass, steam generator liquid mass, steam flow rate, reactor coolant letdown flow rate, flow rate to the cation demineralizer, letdown flow rate for boron control, steam generator blowdown flow rate, or steam generator moisture carryover) for both current and EPU conditions. To estimate an upper bound impact on offsite doses, the highest factor found for representative isotopes in any chemical group (including corrosion products) in either unit, pertinent to the release pathway was applied to the average doses previously determined as representative of operation at current conditions. This approach was utilized to estimate the maximum potential increase in effluent doses due to the EPU and to demonstrate that the estimated offsite doses following the EPU, although increased, will remain below the regulatory limits.

Provided below is a summary of the basis of the scaling factors utilized to estimate the impact of the EPU.

1. Expected Reactor Coolant Source Terms

   Based on a comparison of current versus EPU input parameters, and the methodology outlined in NUREG-0017, Revision 1, the maximum expected increase in the reactor coolant source is approximately 17.1% for noble gases, 15.4% for I-131, and 15.3% for other long half-life activity. The above changes are primarily due to the increase in effective core power level (~15.3 percent, i.e., 2652 MWt [power level conservatively analyzed for the uprate] / 2300 MWt [pre-uprate licensed power level]) and a minor reduction in reactor coolant mass (<2%) between current and EPU conditions.

2. Liquid Effluents

   There is a maximum 15.3% increase in the radioactivity content of the liquid releases since input activities are based on long-term reactor coolant activity that is proportional to the core power uprate percentage increase, and on radwaste volumes that are essentially independent of power level within the applicability range of NUREG-0017. In the secondary coolant, halogens increased by a maximum of approximately 15.5%; thus, this value is used to represent the halogen chemical class in the liquid releases. It is noted, however, that halogens are a small contributor to liquid radwaste releases.

   Tritium releases in liquid effluents are assumed to increase approximately 15.3% (corresponding to the effective core power uprate percentage) since the analysis is based on changes in an existing facility's power rating without changing its mode of operation. Thus a 15.3% increase is applied to the whole body dose.

3. Gaseous Effluents

   For all noble gases, there will be a bounding maximum 17.1% increase of radioactivity content in effluent releases due to the effective core power uprate percentage increase and a very slight decrease in primary coolant mass. Gaseous releases of isotopes with long half-lives such as Kr-85 will increase by approximately the percentage of power increase (~15.3%). Gaseous isotopes with shorter half-lives will have increases slightly more than the effective percentage increase in power level up to a bounding value of 17.6%.

   The particulate and iodine category in gaseous effluents include Tritium, I-131 and airborne particulates with half-lives greater than 8 days. Consequently, the calculated EPU dose would reflect the blend of the pre-EPU particulate, iodine and tritium dose contributions, times the associated scaling factors. Note that the reported thyroid dose reflects the blend of pre-EPU iodine and tritium dose contributions, times the associated scaling factors.

   Tritium releases in the gaseous effluents increase in proportion to their increased production (15.3%), which is directly related to core power and is allocated in this analysis in the same ratio as current releases.

   The impact of the EPU on iodine releases is approximated by the effective core power level increase with the calculated increase in the I-131 concentration in the reactor coolant and secondary steam (includes the impact

of EPU increase in the moisture carryover fraction), of 15.4% and 25.3%, respectively. The 25.3% is used in determining the increase in thyroid doses due to iodine releases, but tritium is a major contributor in this category, especially for Unit 4.

For particulates, the methodology of NUREG-0017 specifies the release rate per year per unit per building ventilation system. This is not dependent on power level within the range of applicability. Particulates released via the Turbine Building due to leakage of main steam and air ejector exhaust are generally considered to be a small fraction of total particulate releases. Therefore, minimal change would be expected for the EPU operations. However, a conservative approach is dictated by the fact that the annual effluent release reports do not delineate the source of particulates or iodines released.

Particulates released from the turbine building due to main steam leaks and air ejector exhaust, have been very conservatively estimated using a bounding multiplier. This multiplier of ~2.88 is higher than the percentage of the EPU due to an estimated 2.5 fold increase in the steam generator design moisture carry over fraction coupled with a 15.3% increase in coolant concentration. While it is unlikely that the release from steam leakage is the controlling contributor for determining the impact in the particulate and iodine category, a bounding scaling factor approach is utilized to estimate the impact of the EPU.

4. Estimated Impact on Effluent Doses - Compliance with 10CFR50 Appendix I

   The Environmental Report Table 8-4, Average Off-Site Dose Commitments for Liquid Effluents (PTN 3 and 4), and Table 8-5, Average Off-Site Dose Commitments for Gaseous Effluents (PTN 3 and 4), included as Attachment 7 of the EPU LAR provide average effluent doses given in the annual effluent reports scaled to 100% availability for years 2003–2007 as well as estimated EPU doses using scaling factors developed using the above methodology.

2IHPB-2.3 In section 2.10.1, "Occupational and Public Radiation Doses," it states that the NRC's acceptance criteria for occupational and public radiation doses are based on 10 CFR 10 [Title 10 of the *Code of Federal Regulations* Part 10]. Provide additional information on the specific portions of 10 CFR 10 referenced in Section of the application.

10 CFR 10 was incorrectly referenced as a result of a typographical error. 10 CFR 20 is the correct reference.

References

1. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
2. Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Health Physics and Human Performance (IHPB) Request for Additional Information – Round 1," Accession No. ML111050213, April 15, 2011.