



DEC 14 2010  
L-2010-293  
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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 Request for Additional Information (RAI) Regarding Alternative  
Source Term (AST) License Amendment Request (LAR) No. 196 and  
Meteorological Data Sensitivity (TAC NOS. ME1624 and ME1625)

References:

- (1) W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2009-133), "License Amendment Request 196: Alternative Source Term and Conforming Amendment," Accession No. ML092050277, June 25, 2009.
- (2) W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2009-163), "Transmittal of Meteorological Data CD Supporting Alternative Source Term and Conforming License Amendment Request 196 – Supplemental Information," Accession No. ML100680718, July 21, 2009.
- (3) J. Paige (NRC) to M. Nazar (FPL), "Turkey Point Units 3 and 4 – Request for Additional Information Regarding Request to Adopt the Alternate Source Term (TAC Nos. ME1624 and ME1625)," Accession No. ML100700446, March 24, 2010.
- (4) Email from J. Paige (NRC) to S. Franzone (FPL), Follow-up Requests for Additional Information RE Turkey Point, Unit 3 and 4 AST LAR, Accession No. ML101480750, May 28, 2010.
- (5) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-121), "Revised Meteorological Data for 2005-2009 Supporting Alternative Source Term and Conforming License Amendment Request 196," Accession No. ML101650648, June 11, 2010.
- (6) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-131), "Response to 5/28/2010 Request for Additional Information (RAI) Regarding Alternative Source Term (AST) License Amendment Request (LAR) 196 (TAC Nos. ME1624 and ME1625)," Accession No. ML101760019, June 23, 2010.
- (7) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-137), "Revised Radiological Dose Consequences for Alternative Source Term and Conforming License Amendment Request 196," Accession No. ML101800222, June 25, 2010.
- (8) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-136), "Revised Meteorological Data for 2005-2009 with  $\Delta T$  Bias Supporting Alternative Source Term and Conforming License Amendment Request 196," Accession No. ML102510127, September 2, 2010.

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- (9) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-226), "Summary of NRC Public Meeting Discussion on Meteorological Data for Alternative Source Term and Conforming License Amendment Request 196 (TAC Nos. ME1624 and ME1625)," Accession No. ML102880046, October 13, 2010.
- (10) Email from J. Paige (NRC) to S. Franzone (FPL), Request for Additional Information RE Met Data to Support AST LAR, December 8, 2010.

By letter L-2009-133 dated June 25, 2009 [Reference 1], Florida Power and Light (FPL) requested to amend Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 Technical Specifications (TS). The proposed amendments revise the TS to adopt the Alternative Source Term (AST) as allowed in 10 CFR 50.67.

The meteorological data for 2003-2007 originally used to support the AST License Amendment Request (LAR) was transmitted to the NRC staff by letter dated July 21, 2009 [Reference 2]. Subsequent NRC review of this meteorological data resulted in questions regarding the quality of the data as submitted for this period [References 3, 4]. Based on further evaluation of this data, FPL decided to revise the meteorological data set to include more recent meteorological data from years 2008-2009 that was not previously available. On June 11, 2010, FPL submitted revised meteorological data for years 2005-2009 [Reference 5]. Resolution of the quality issues that were raised regarding the calibration of the meteorological tower temperature sensors resulted in a conservative decision to bias vertical temperature differentials ( $\Delta T$ ) with the average (mean) calculated value for each channel over each calibration interval for the hourly meteorological data. On June 23, 2010, FPL provided its RAI response by letter L-2010-131 in which the basis for using the temperature biased meteorological data was discussed in detail [Reference 6]. On June 25, 2010, FPL provided the revised AST radiological dose consequences by letter L-2010-137 [Reference 7]. On September 2, 2010, FPL submitted the revised meteorological data for years 2005-2009 with the  $\Delta T$  bias corrections by letter L-2010-136 [Reference 8] to facilitate the NRC review. On October 1, 2010, a public meeting was held on AST meteorological data issues between the NRC and FPL representatives. On October 13, 2010, a summary of the technical issues discussed in the meeting was provided by letter L-2010-226 [Reference 9].

Additional information regarding the meteorological data was requested by the NRC staff via email dated December 8, 2010 [Reference 10]. The attachment to this letter provides the FPL response to these questions from the NRC staff.

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-2009-133 [Reference 1].

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

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

Executed on December 14, 2010.

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

Attachment

Response to 12/8/2010 RAI Regarding AST LAR No. 196  
and  
Meteorological Data Sensitivity

### Response to Request for Additional Information

The following information is provided by Florida Power & Light (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) 196, Alternative Source Term (AST) and Conforming Amendment, for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL via letter (L-2009-133) dated June 25, 2009 [Reference 1].

The meteorological data for 2003-2007 originally used to support the AST License Amendment Request (LAR) was transmitted to the NRC staff by letter dated July 21, 2009 [Reference 2]. Subsequent NRC review of this meteorological data resulted in questions regarding the quality of the data as submitted for this period [References 3, 4]. Based on further evaluation of this data, FPL decided to revise the meteorological data set to include more recent meteorological data from years 2008-2009 that was not previously available. On June 11, 2010, FPL submitted revised meteorological data for years 2005-2009 [Reference 5]. Resolution of the quality issues that were raised regarding the calibration of the meteorological tower temperature sensors resulted in a conservative decision to bias vertical temperature differentials ( $\Delta T$ ) with the average (mean) calculated value for each channel over each calibration interval for the hourly meteorological data. On June 23, 2010, FPL provided its RAI response by letter L-2010-131 in which the basis for using the temperature biased meteorological data was discussed in detail [Reference 6]. On June 25, 2010, FPL provided the revised AST radiological dose consequences by letter L-2010-137 [Reference 7]. On September 2, 2010, FPL submitted the revised meteorological data for years 2005-2009 with the  $\Delta T$  bias corrections [Reference 8] to facilitate the NRC review. On October 1, 2010, a public meeting was held on AST meteorological data issues between the NRC and FPL representatives. On October 13, 2010, a summary of the technical issues discussed in the meeting was provided by letter L-2010-226 [Reference 9].

On December 7, 2010, a telephone conference between the NRC PM, Accident Dose Branch staff, and FPL EPU representatives was held in which a proposed RAI concerning the meteorological data was discussed. In an email dated December 8, 2010 [Reference 10], NRC staff documented its request for additional information regarding FPL's request to adopt the Alternate Source Term. Specifically, the question involved one RAI with two parts on AST LAR No. 196 regarding the sensitivity of the meteorological data to vertical temperature difference biasing methodologies. The question is documented below with the applicable FPL response.

- 1. The following summarizes several points of information provided by Florida Power & Light (FPL) in Attachment 1, item 4, of a June 23, 2010 letter response (ADAMS Accession No. ML101760019) to a Nuclear Regulatory Commission e-mail request for additional information dated May 28, 2010 (ADAMS Accession No. ML101480750).**
  - a) Approximately 50% of the as-found and as-left data fell within the  $\pm 0.18^\circ$  F criteria specified in Regulatory Guide (RG) 1.23, Rev. 1, "Meteorological Monitoring Programs for Nuclear Power Plants," while approximately 90% of the data fell within  $\pm 0.54^\circ$  F.**
  - b) The instruments used to measure temperature difference as a function of height ( $\Delta T$ ) experienced some drift between 2005 and 2009 which, for purposes of the discussion provided in Attachment 1, was assumed to be linear in behavior.**

- c) **A six month representative  $\Delta T$  value can be derived by taking the average of the beginning and end  $\Delta T$  values for each temperature channel.**
- d) **Since a number of the  $\Delta T$  values have been observed to be outside of the accepted range, the averaged  $\Delta T$  value for each channel was applied as a bias or correction factor to the hourly meteorological data. The effects of this correction were small shifts in the calculated stability classes for the hourly meteorological data and resulted in small changes to the calculated atmospheric dispersion factors ( $X/Q$  values).**
- e) **When the resultant biased  $X/Q$  values exceed the unbiased  $X/Q$ s, the more conservative value will be used. This technical approach will assure conservative radiological dose consequences for the analyzed design basis accidents.**

**Given the uncertainties in a number of the reported hourly measurements and that the data are being used to calculate 95 percentile rather than average  $X/Q$  values, what is the basis for concluding that use of the methodology described above, assuming that drift is linear and estimated averages are representative, will assure conservative radiological dose consequences for the analyzed design basis accidents?**

Assuming that drift is linear and estimated averages are representative, the application of an estimated average value for  $\Delta T$  bias for each calibration interval was appropriate to correct the  $\Delta T$  readings for instrument drift for each channel. These corrections were not made to just bring the readings back into compliance with the allowable RG 1.23 tolerances but to actually "zero out" any deviation from the reference Maintenance and Test Equipment (M&TE) value. These corrections are above what is specifically required by RG 1.23 and therefore provide added assurance that the resulting atmospheric dispersion factors ( $\chi/Q$ s) for the various design basis accidents (DBA) were both representative and indeed conservative. As stated in the summary discussion in FPL letter L-2010-226 dated October 13, 2010, "Whereas correction of the 2005-2009 meteorological data was intended to provide for a 'representative' data set, the use of that data set was intended to ensure a 'conservative' result for each of the radiological dose consequence analyses. This latter objective was achieved by conservatively choosing a composite of the 'worst case'  $\chi/Q$ s between the unbiased and biased  $\chi/Q$  results... The resulting [radiological] dose consequences are thus conservative relative to both the meteorological data used and margin to the regulatory acceptance limits."

**What is the sensitivity of the analysis to more limiting assumptions such as non-linearity and use of limiting drift values?**

Refer to Figures 4-3 and 4-4 in Item 4 of the Attachment to FPL letter L-2010-131 dated June 23, 2010 for the as-left and as-found calibration data for each instrument channel (A/B). Instrument drift, by its nature, is random in that it may be exhibited in either increasing or decreasing shifts away from the reference value (in this case, the M&TE temperature) over a given period of operation but those shifts, per the sensor (thermistor) manufacturer, are expected to be linear in their behavior over the expected range of ambient air temperatures except in instances of gross thermistor failure. In the case of gross failures, the error is self-evident when the indicated reading is compared with that of its redundant channel and the invalid data is rejected. Therefore, the assumption of a linear characteristic for the installed air temperature sensors between the six month calibration checks is considered justified.

As stated in the Detailed Discussion on pages 2 & 3 of Attachment to FPL letter L-2010-226 dated October 13, 2010 [Reference 9], several alternative means of applying the  $\Delta T$  bias were considered and sensitivity studies were run for some of these alternative applications including using a large constant offset for all five years of data in a positive  $\Delta T$  direction and separately, the same constant offset in a negative  $\Delta T$  direction. The result of this simple approach was that the  $\chi/Q$  results and consequently the radiological dose results were inappropriately skewed, i.e., overcorrected. The  $\chi/Q$ s resulting from the application of a  $\pm 0.54^\circ\text{F}$  constant offset are provided in the table below. The increase in radiological dose consequence for the limiting DBA case (LOCA) resulting from the positive bias case was determined to be well within the regulatory limits of 10 CFR 50.67 - increasing from 4.47 rem to 4.70 rem TEDE for the 30 day accumulated control room dose. Two other options were considered and discussed in Reference 9. One was application of the worst offset per interval model that would yield smaller  $\chi/Q$  changes and dose results than the large constant offset discussed above. The other was application of the linear interpolation bias model that was judged to yield results essentially the same as the averaged  $\Delta T$  bias model that was eventually selected as the most representative of the actual site meteorological conditions.

**Table – Variable Bias  $\chi/Q$  Values Compared to Constant  $\pm 0.54^\circ\text{F}$  Biased Results**

Case ID	LTR Pair ID	Release Point	Receptor Point	$\chi/Q$ Values					
				% low	-0.54°F	Variable Bias	+0.54°F	% high	
tp10	A	Plant Stack	Normal Intake						
				0h to 2h	-4.84%	1.77E-03	1.86E-03	1.89E-03	1.61%
tp12	B	Plant Stack	SE Emergency						
				0h to 2h	-2.43%	8.83E-04	9.05E-04	1.00E-03	10.50%
				2h to 8h	-13.91%	6.56E-04	7.62E-04	8.24E-04	8.14%
				8h to 24h	-14.49%	2.42E-04	2.83E-04	3.42E-04	20.85%
				1d to 4d	-10.75%	1.91E-04	2.14E-04	2.42E-04	13.08%
				4d to 30d	-13.66%	1.39E-04	1.61E-04	1.72E-04	6.83%
tp16	C	Unit 4 RWST	Normal Intake						
				0h to 2h	-15.91%	8.30E-04	9.87E-04	1.04E-03	5.37%
tp18	D	Unit 4 RWST	SE Emergency						
				0h to 2h	-7.65%	1.81E-03	1.96E-03	2.09E-03	6.63%
				2h to 8h	-11.61%	1.37E-03	1.55E-03	1.75E-03	12.90%
				8h to 24h	-20.40%	5.19E-04	6.52E-04	7.77E-04	19.17%
				1d to 4d	-13.64%	4.18E-04	4.84E-04	5.50E-04	13.64%
				4d to 30d	-16.89%	3.15E-04	3.79E-04	4.19E-04	10.55%
tp22	E	Unit 4 MSSV	Normal Intake						
				0h to 2h	-14.60%	1.17E-02	1.37E-02	1.46E-02	6.57%

Case ID	LTR Pair ID	Release Point	Receptor Point	$\chi/Q$ Values				
				% low	-0.54°F	Variable Bias	+0.54°F	% high
<b>tp24</b>	<b>F</b>	Unit 4 MSSV	SE Emergency					
<i>0h to 2h</i>				-4.80%	6.55E-04	6.88E-04	7.36E-04	6.98%
<i>2h to 8h</i>				-14.12%	3.77E-04	4.39E-04	4.98E-04	13.44%
<i>8h to 24h</i>				-12.99%	1.54E-04	1.77E-04	1.98E-04	11.86%
<i>1d to 4d</i>				-9.38%	1.16E-04	1.28E-04	1.44E-04	12.50%
<i>4d to 30d</i>				-11.08%	7.14E-05	8.03E-05	8.91E-05	10.96%
<b>tp30</b>	<b>F</b>	Unit 4 Closest ADV	SE Emergency					
<i>4d to 30d</i>				-10.52%	7.23E-05	8.08E-05	9.07E-05	12.25%
<b>tp34</b>	<b>G</b>	Unit 4 MSL	Normal Intake					
<i>0h to 2h</i>				-11.95%	1.40E-02	1.59E-02	1.74E-02	9.43%
<b>tp36</b>	<b>H</b>	Unit 4 MSL	SE Emergency					
<i>0h to 2h</i>				-5.43%	6.97E-04	7.37E-04	7.75E-04	5.16%
<i>2h to 8h</i>				-12.91%	3.98E-04	4.57E-04	5.14E-04	12.47%
<i>8h to 24h</i>				-11.17%	1.67E-04	1.88E-04	2.16E-04	14.89%
<i>1d to 4d</i>				-9.77%	1.20E-04	1.33E-04	1.49E-04	12.03%
<i>4d to 30d</i>				-10.38%	7.77E-05	8.67E-05	9.53E-05	9.92%
<b>tp61</b>	<b>I</b>	Unit 4 Personnel Hatch	Normal Intake					
<i>0h to 2h</i>				-7.02%	9.67E-03	1.04E-02	1.09E-02	4.81%
<b>tp69</b>	<b>J</b>	Unit 4 Emergency Hatch	SE Emergency					
<i>0h to 2h</i>				-3.42%	1.41E-03	1.46E-03	1.50E-03	2.74%
<i>2h to 8h</i>				-9.34%	9.61E-04	1.06E-03	1.15E-03	8.49%
<i>8h to 24h</i>				-12.59%	3.47E-04	3.97E-04	4.56E-04	14.86%
<i>1d to 4d</i>				-8.92%	2.86E-04	3.14E-04	3.46E-04	10.19%
<i>4d to 30d</i>				-10.21%	2.11E-04	2.35E-04	2.50E-04	6.38%
<b>tp79</b>	<b>K</b>	Unit 4 SFP Bldg NW	Normal Intake					
<i>0h to 2h</i>				-13.14%	2.05E-03	2.36E-03	2.48E-03	5.08%

Case ID	LTR Pair ID	Release Point	Receptor Point	$\chi/Q$ Values				
				% low	-0.54°F	Variable Bias	+0.54°F	% high
<b>tp81</b>	<b>L</b>	Unit 4 SFP Bldg SE	SE Emergency					
<i>0h to 2h</i>				-4.72%	3.23E-03	3.39E-03	3.64E-03	7.37%
<i>2h to 8h</i>				-11.19%	2.46E-03	2.77E-03	3.08E-03	11.19%
<i>8h to 24h</i>				-14.67%	9.13E-04	1.07E-03	1.25E-03	16.82%
<i>1d to 4d</i>				-11.19%	7.46E-04	8.40E-04	9.49E-04	12.98%
<i>4d to 30d</i>				-14.79%	5.53E-04	6.49E-04	6.92E-04	6.63%
<b>tp85</b>	<b>M</b>	Unit 4 SJAE	Normal Intake					
<i>0h to 2h</i>		ARCON96 Results		-6.71%	5.42E-02	5.81E-02	6.20E-02	6.71%
<i>0h to 2h</i>	<b>M</b>	Distance Penalized / Licensing Basis Result	Penalized manually by 1/r <sup>2</sup> to account for being closer than 10 meters	N/A	N/A	6.61E-02	N/A	N/A
<b>tp94</b>	<b>N</b>	Unit 4 Western Electrical Penetration	Normal Intake					
<i>0h to 2h</i>				-6.96%	1.07E-02	1.15E-02	1.17E-02	1.74%
<b>tp37</b>	<b>O</b>	Aux Bldg Vent V-10	Normal Intake					
<i>0h to 2h</i>				-19.37%	2.29E-03	2.84E-03	2.96E-03	4.23%
<i>2h to 8h</i>				-13.57%	2.23E-03	2.58E-03	2.81E-03	8.91%
<i>8h to 24h</i>				-36.33%	8.15E-04	1.28E-03	1.46E-03	14.06%
<i>1d to 4d</i>				-27.14%	8.67E-04	1.19E-03	1.38E-03	15.97%
<i>4d to 30d</i>				-25.44%	6.30E-04	8.45E-04	9.41E-04	11.36%

## References

- (1) W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2009-133), "License Amendment Request 196: Alternative Source Term and Conforming Amendment," Accession No. ML092050277, June 25, 2009.
- (2) W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2009-163), "Transmittal of Meteorological Data CD Supporting Alternative Source Term and Conforming License Amendment Request 196 – Supplemental Information," Accession No. ML100680718, July 21, 2009.
- (3) J. Paige (NRC) to M. Nazar (FPL), "Turkey Point Units 3 and 4 – Request for Additional Information Regarding Request to Adopt the Alternate Source Term (TAC Nos. ME1624 and ME1625)," Accession No. ML100700446, March 24, 2010.
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- (9) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-226), "Summary of NRC Public Meeting Discussion on Meteorological Data for Alternative Source Term and Conforming License Amendment Request 196 (TAC Nos. ME1624 and ME1625)," Accession No. ML102880046, October 13, 2010.
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