PMTurkeyCOLPEm Resource

From: Madden, George [George.Madden@nexteraenergy.com]
Sent: Tuesday, April 23, 2013 2:11 PM
To: Williamson, Alicia; Matthews, David; Nguyen, John-Chau; Maher, William; Comar, Manny; Hoeg, Tim; McCree, Victor
Subject: FPL Letter L-2013-142 Dated 04-23-2013 - Wet Bulb Temperature Departure Update
Attachments: L-2013-142 Dated 04-23-2013 - Wet Bulb Temperature Departure Update.pdf

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Submittal of Proposed Final Safety Analysis Report Changes
in Support of Wet Bulb Temperature Related Departures 2.0-2 and 2.0-3

References: (See Attachment 1)

Florida Power & Light Company (FPL) is providing the additional Final Safety Analysis Report (FSAR) changes described below to provide a similar level of detail as other AP1000 Combined License (COL) Applications with the wet bulb temperature departures. The FPL response letters (Attachment 1: References 2, 4, 6, 7, and 9) to NRC requests for additional information letters (Attachment 1: References 1, 3, 5, and 8) did not identify all of the supporting changes to the COL Application Part 2 subsections for the systems evaluated in the COL Application Part 7 wet bulb related departures (PTN DEP 2.0-2, Maximum normal wet bulb (noncoincident) air temperature or PTN DEP 2.0-3, Maximum safety wet bulb (noncoincident) air temperature).

FPL provides, as Attachment 2 to this letter, its proposed additional FSAR changes in support of PTN DEP 2.0-2, Maximum normal wet bulb (noncoincident) air temperature and PTN DEP 2.0-3, Maximum safety wet bulb (noncoincident) air temperature. The proposed FSAR changes are consistent with previous SCOLA FSAR descriptions supporting similar maximum normal and maximum safety wet bulb (noncoincident) air temperature departures. In addition, Attachment 2 also provides several administrative changes to the COL Application Part 7 for consistency with the system terminology used in the DCD and FSAR. Attachment 2 identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 COL Application.

Attachments:

1. List of NRC and FPL Correspondence Referenced in this Letter
2. COL Application Revisions Associated with this Supplement

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April 23, 2013

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

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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 April 23, 2013.

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/GRM

Attachments:

1. List of NRC and FPL Correspondence Referenced in this Letter
2. COL Application Revisions Associated with this Supplement

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

References:

1. NRC Letter to FPL dated May 18, 2011, Request for Additional Information Letter No.022 Related to SRP Section 09.02.02 - Reactor Auxiliary Cooling Water System for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application
2. FPL Letter L-2011-245 to NRC dated June 24, 2011, Response to NRC Request for Additional Information Letter No. 022 (eRAI 5403) - Standard Review Plan Section 09.02.02 Reactor Auxiliary Cooling Water System
3. NRC Letter to FPL dated May 19, 2011, Request for Additional Information Letter No. 023 Related to SRP Section 09.02.02 - Reactor Auxiliary Cooling Water System for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application
4. FPL Letter L-2011-246 to NRC dated June 24, 2011, Response to NRC Request for Additional Information Letter No. 023 (eRAI 5492) - Standard Review Plan Section 09.02.02 Reactor Auxiliary Cooling Water System
5. NRC Letter to FPL dated July 6, 2011, Request for Additional Information Letter No. 028 Related to SRP Section 09.02.01 - Station Service Water System for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application
6. FPL Letter L-2011-318 to NRC dated August 17, 2011, Response to NRC Request for Additional Information Letter No. 028 (eRAI 5399) - Standard Review Plan Section 09.02.01 Station Service Water System
7. FPL Letter L-2011-340 to NRC dated August 29, 2011, Revision to the Response to NRC Request for Additional Information Letter No. 022 (eRAI 5403) - Standard Review Plan Section 09.02.02 Reactor Auxiliary Cooling Water System
8. NRC Letter to FPL dated January 27, 2012, Request for Additional Information Letter No. 048 Related to SRP Section 6.2.2 - Containment Heat Removal Systems for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application
9. FPL Letter L-2012-076 to NRC dated February 27, 2012, Response to NRC Request for Additional Information Letter No. 048 (eRAI 6258) - Standard Review Plan Section 6.2.2 - Containment Heat Removal Systems

ASSOCIATED COL Application REVISIONS:

The following changes will be made in a future COL Application revision:

1. Add the following **RED BOLD** information to FSAR Table 1.8-201(Sheet 1 of 2), Summary of FSAR Departures from the DCD, for Departure Number PTN DEP 2.0-3.

PTN DEP 2.0-3	The site parameter value provided in the DCD Tier 1, Table 5.0-1 for the air temperature maximum wet bulb (noncoincident) is 86.1°F. This site parameter value is listed as the maximum safety wet bulb (noncoincident) air temperature in DCD Tier 2, Table 2-1. The corresponding site characteristic value is 87.4°F as reported in FSAR Subsection 2.3.1.5. This site characteristic exceeds the DCD site parameter by 1.3°F.	2.0 2.3.1.5 5.4.7.1 6.2.1.1.3 6.2.2.3 **6.4** **6.4.1.1** **9.1.3.1.3.1** 9.2.2.1 **9.2.7.2.4**

2. Add the following **RED BOLD** paragraphs to the PTN DEP 2.0-3 existing bullet in FSAR Subsection 5.4.7.1.

   - The component cooling water system supply temperature to the normal residual heat removal system heat exchangers is based on an ambient design wet bulb temperature of no greater than 87.4°F (100 year return estimate of 2-hour duration). The 87.4°F value is assumed for normal conditions and transients that start at normal conditions.

     The steaming prevention function is evaluated assuming the ambient wet bulb temperature is at the maximum safety value for the site. During plant operation, maximum IRWST temperature is reduced below 120°F whenever necessary by circulating IRWST water through one of the RNS heat exchangers, and removing the heat through the CCS and SWS. Since the RNS heat exchangers are not being used to remove decay heat with the plant at power, at least one is available for IRWST heat removal. Only one train of CCS (pump and heat exchanger) and one train of SWS (pump, strainer, and cooling tower cell) are normally in operation with the plant at power. There is sufficient margin in CCS pump flow capacity and motor size, and in CCS heat exchanger UA, to valve in one of the RNS heat

exchangers and remove IRWST heat by directing CCS flow through the heat exchanger and transferring the excess heat to the SWS cooling tower. CCS temperature rises slightly above the normal full power CCS temperature during this evolution, but does not approach the maximum allowable value of 100°F.

Prevention of IRWST steaming following high pressure heat removal operations with the Passive Residual Heat Removal (PRHR) heat exchanger is accomplished in the same manner, by lining up both RNS heat exchangers to the CCS and the IRWST. CCS is delivered to the RNS heat exchangers at a temperature consistent with the maximum safety ambient wet bulb temperature and the CCS and SWS heat duty and flow rates. Cooling is assumed to begin two hours after reactor trip, with decay heat appropriate for that time after the event. Calculations performed to determine the maximum IRWST temperature achieved following a high pressure heat removal event using the PRHR heat exchanger assumed CCS temperature is determined by use of a maximum safety ambient wet bulb temperature value of 87.4°F. The maximum predicted IRWST liquid temperature is 201°F. Therefore, it can be concluded that IRWST cooling performance (prevention of steaming) is acceptable.

3. Add the following **RED BOLD** information after the first sentence of FSAR Section 6.4 with PTN DEP 2.0-3 LMA for each insert.

Add the following information after the second paragraph of DCD Subsection 6.4:

Based on system design margin of the VBS, the MCR temperature and humidity at the higher Turkey Point Units 6 & 7 maximum safety wet bulb temperature will remain at or below the desired design points during normal operation.

6.4.1.1 Main Control Room Design Basis

Add the following information after the last paragraph of DCD Subsection 6.4.1.1:

The VBS system maintains design conditions in the MCR during all normal and accident conditions when the VBS system is operational. The VWS low capacity subsystem also serves the RNS and CVS pump room coolers. The nominal refrigeration capacity of each of the air-cooled chillers used in the VWS low capacity subsystem is 300 tons at an ambient dry bulb temperature of 115°F.

4. Add the following **RED BOLD** information after the first sentence of FSAR Section 9.1 with PTN DEP 2.0-3 LMA for each insert.

9.1.3.1.3.1 Partial Core

Add the following information at the end of the third bullet in DCD Subsection 9.1.3.1.3.1:

SFS performance following restart after a normal refueling is affected by a change in maximum safety wet bulb temperature. Calculations confirm that spent fuel pool temperature remains below 115°F with a CCS supply temperature of 97°F at the specified spent fuel pool loading condition and decay time on the fuel fraction just replaced during the previous 17 day refueling outage.

While the maximum CCS temperature expected for Turkey Point Units 6 & 7 is 97.4ºF, an increase of 0.4ºF in CCS supply temperature will produce a similar increase in the spent fuel pool maximum temperature; therefore, the requirement to maintain spent fuel temperature below 120°F is met with margin.

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5. Add the following **RED BOLD** information after the bullet of the existing insert of FSAR Subsection 9.2.2.1.2.1.

- The component cooling water supply temperature to plant components is not more than 100°F assuming a 100-year return estimate of 2-hour duration wet bulb temperature of 87.4°F for service water cooling (per Table 2.0-201).

  The most limiting component cooled by the CCS, the RCP motor cooling system, has been designed to operate for at least 6 hours continually with cooling water supplied at temperatures up to 100°F.

  The performance of the standard AP1000 CCS and SWS for single cooling water train, full power operation at a maximum safety wet bulb temperature of 87.4°F has demonstrated the highest CCS temperature achieved at these conditions is 97.4°F, for a period of less than 2 hours. As ambient wet bulb temperature decreases, the CCS temperature follows and will return to below 95°F with ambient wet bulb temperature slightly lower than 84°F, assuming nominal performance of both the CCS and SWS. Since the definition of the maximum normal wet bulb temperature value is the seasonal 1 percent exceedance value observed at the site, the annual total operating time for which CCS temperature could exceed 95°F is less than 30 hours per year, for periods of a few hours at most. The maximum CCS temperature of 97.4ºF is bounded by the maximum allowable cooling water temperature for Reactor Coolant Pumps (the most limiting component) and

the increase in maximum safety wet bulb temperature is therefore acceptable on this basis.

6. Add the following **RED BOLD** information before the first sentence of the first insert of FSAR Subsection 9.2.7.2.4 with PTN DEP 2.0-3 LMA.

Add the following information at the end of the first paragraph under 'Normal Operation' in DCD Subsection 9.2.7.2.4:

The increased heat load produced by operation at the higher Turkey Point Units 6 & 7 maximum safety ambient wet bulb temperature of 87.4ºF can be accommodated within the available capacity margin of the chiller units, without impacting the VWS low capacity subsystem or supporting systems design or plant operation. Cooling coil design calculations indicate that during operation at the standard plant design temperatures (115ºF dry bulb, 86.1ºF wet bulb), the VBS air handling unit has cooling coil and system margin.

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7. The following **RED BOLD** insertions and strikeout deletions are administrative changes to COL Application Part 7 Departure PTN DEP 2.0-2 bullet for design basis heating ventilation air conditioning system operation for consistency of nomenclature.

   The increase in wet bulb temperature will impact the standard plant design of the **Chilled Water System (VWS) high capacity subsystem** ~~High Capacity Chilled Water System (HCVWS)~~. To accommodate the impact of the higher wet bulb temperature on HVAC margins, the size of the air-cooled chillers in the **VWS high capacity subsystem** ~~HCVWS~~ will be increased. The current **VWS high capacity subsystem** has two 1700-ton water cooled chillers coupled with two 300-ton air-cooled chillers. Replacing the two 300-ton air-cooled chillers with 400-ton air-cooled chillers will maintain adequate HVAC design margins and allow the **VWS high capacity subsystem** ~~HCVWS~~ to meet the increased load due to higher wet bulb design basis. There is no impact on the performance of SSCs important to safety or to analysis methods as a result of the increase in maximum normal wet bulb temperature.

8. The following **RED BOLD** insertions and strikeout deletions are administrative changes to COL Application Part 7 Departure PTN DEP 2.0-2 Departure Evaluation item 1 for consistency of nomenclature.

   1. Increase **VWS high capacity subsystem** ~~HCVWS~~ chiller refrigeration tonnage by 100 tons (total 2100 tons per train) by increasing the capacity of the air-cooled **VWS**

high capacity subsystem ~~HCVWS~~ chillers to 400 tons. No change to **VWS low capacity subsystem** ~~Low Capacity Chilled Water~~ chiller tonnage is required.

9. The following **RED BOLD** insertions are administrative changes to COL Application Part 7 Departure PTN DEP 2.0-3 Affected DCD/FSAR Sections for of nomenclature.

   2.0; 2.3.1.5; 5.4.7.1; 6.2.1.1.3; 6.2.2.3; **6.4; 6.4.1.1; 9.1.3.1.3.1;** 9.2.2.1**; 9.2.7.2.4**

10. The following **RED BOLD** insertions and strikeout deletions are administrative changes to COL Application Part 7 Departure PTN DEP 2.0-3 bullet for Nuclear Island Nonradioactive Ventilation System (VBS) Capability for consistency of nomenclature.

    The evaluation shows that the increase in the safety noncoincident wet bulb temperature will not impact the standard plant design of the **Chilled Water System (VWS) low capacity subsystem** ~~Low Capacity Chilled Water System (LCVWS)~~. With the increased heat loads resulting from the higher maximum safety wet bulb temperature, the **VWS low capacity subsystem** maintains the VBS's capability to maintain the main control room, and 1E electrical rooms below 75°F with a single train of VBS and the Chilled Water System in service. No change to **VWS low capacity subsystem** chiller capacity or the VBS capacity is required with the safety noncoincident wet bulb at or below 87.4°F.

11. The following **RED BOLD** insertions and strikeout deletions are administrative changes to COL Application Part 7 Departure PTN DEP 2.0-3 in the fourth bullet for the Departure Evaluation for consistency of nomenclature.

    - No change to **VWS low capacity subsystem** ~~LCVWS~~ chiller capacity required due to the increase in the maximum safety wet bulb temperature