

August 15, 2005

Mr. J. A. Stall
Senior Vice President, Nuclear and
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Florida Power and Light Company
P.O. Box 14000
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SUBJECT: TURKEY POINT NUCLEAR PLANT, UNITS 3 AND 4 - RESPONSE TO
NRC BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE
ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED-WATER
REACTORS" (TAC NOS. MB9623 AND MB9624)

Dear Mr. Stall:

By letter dated August 8, 2003, the Florida Power and Light Company (FPL) responded to the U.S. Nuclear Regulatory Commission (NRC) Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003. In a November 9, 2004, letter, FPL responded to a September 17, 2004, NRC request for additional information (RAI).

In Bulletin 2003-01, the NRC requested all pressurized-water reactor (PWR) licensees to provide a response, within 60 days of the date of the Bulletin, that contained the information requested in either of the following options:

- Option 1: State that the emergency core cooling system (ECCS) and containment spray system (CSS) recirculation functions have been analyzed with respect to the potentially adverse post-accident debris blockage effects identified in the Discussion section, and are in compliance with all existing applicable regulatory requirements.
- Option 2: Describe any interim compensatory measures that have been implemented or that will be implemented to reduce the risk which may be associated with potentially degraded or nonconforming ECCS and CSS recirculation functions until an evaluation to determine compliance is complete. If any of the interim compensatory measures listed in the Discussion section will not be implemented, provide a justification. Additionally, for any planned interim measures that will not be in place prior to your response to this bulletin, submit an implementation schedule and provide the basis for concluding that their implementation is not practical until a later date.

FPL provided an Option 2 response for Turkey Point Units 3 and 4.

Bulletin 2003-01 discussed six categories of interim compensatory measures (ICMs): (1) operator training on indications of and responses to sump clogging; (2) procedural modifications, if appropriate, that would delay the switchover to containment sump recirculation (e.g., shutting down redundant pumps that are not necessary to provide required flows to cool

the containment and reactor core, and operating the CSS intermittently); (3) ensuring that alternative water sources are available to refill the Refueling Water Storage Tank (RWST) or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere; (4) more aggressive containment cleaning and increased foreign material controls; (5) ensuring containment drainage paths are unblocked; and (6) ensuring sump screens are free of adverse gaps and breaches.

In its bulletin response of August 8, 2003, FPL stated that it had implemented the following interim compensatory measures for Turkey Point Units 3 and 4:

- (1) operator guidance and training for continuously monitoring ECCS and containment building spray (CBS) pump parameters, including loss of net-positive suction head (NPSH) as indicated by erratic pump current or discharge flow - ICM category #1;
- (2) for small loss of coolant accidents (LOCAs), where reactor coolant system (RCS) pressure remains above the residual heat removal (RHR) pump shutoff pressure, cool down and depressurize the RCS to cold shutdown conditions without draining the RWST to the switchover level - ICM category #2;
- (3) an aggressive containment cleanliness program that ensures the containment buildings are free of foreign material and debris prior to entry into Mode 4 following shutdown, during power operation, and for containment entries at power - ICM category #4;
- (4) foreign material exclusion (FME) control around the recirculation sumps (including sump screen covers) as the unit transitions from hot standby to cold shutdown, and FME controls for maintenance activities inside containment (including walkdowns by senior plant personnel) - ICM category #4;
- (5) procedures for surface preparation, coating procurement, coating application, post-application surveillance, and coating maintenance inside containment - ICM category #4;
- (6) numerous openings in the biological shield wall separating the RCS piping from the outer containment annulus, which maintain adequate drainage flowpaths while screening some debris from being transported to the sump screens - ICM category #5;
- (7) multiple inspection times during outages during which the refueling cavity drain valves are verified locked open to avoid diversion of water from the containment sumps - ICM category #5;
- (8) design controls, evaluations and proceduralized stowing of equipment to be left in containment following an outage - ICM category #5; and
- (9) visual inspection of the containment sumps every 18 months, inspection of sump screens at the end of each refueling outage, and immediate repair of portions of sump screens found to be out of design physical tolerances - ICM category #6.

The FPL response also stated that the following interim compensatory measures would be implemented at Turkey Point Units 3 and 4:

- (1) operator guidance and training for continuously monitoring ECCS and CBS pump parameters to procedures for transferring to cold leg recirculation (by October 2003) - ICM category #1;
- (2) alignment, with appropriate throttling, of the opposite unit's RWST and High Head Safety Injection (HHSI) pumps to the RCS in event of sump blockage (by October 2003) - ICM category #1;
- (3) alignment of the accident unit's RWST to receive inventory from the normal boric acid makeup system (by October 2003) - ICM Category #3;
- (4) use of additional accident unit RWST inventory through alignment of charging pumps, which draw upon the RWST at a low level, thereby providing an additional 40,000 gallons (by October 2003) - ICM Category #3;
- (5) operation of two of the three installed emergency containment coolers in lieu of the CSS if containment pressure is between 55 psig and 14 psig - ICM category #3;
- (6) revision of containment cleanliness procedures in accordance with Nuclear Energy Institute guideline NEI 02-01, Revision 1, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments" (by October 2003) - ICM category #4;
- (7) additional detail in the sump inspection procedure requirements, such as direction to inspect the sump screen bolting and the condition of any existing sump screen patchwork (by October 2003) - ICM category #6; and
- (8) validation by plant engineering that the sump inspection procedure is being implemented properly in the field, during outages in fall 2003 and fall 2004 - ICM category #6.

The response further stated, including justifications, that Turkey Point would not be implementing the following interim compensatory measure: for larger LOCAs, procedural changes that would delay the switchover to containment sump recirculation.

In its November 9, 2004, response to the September 17, 2004, NRC RAI, FPL elaborated on the existing operator actions now included in the Turkey Point Emergency Operating Procedures (EOPs). The EOP steps address:

- (1) responses to large break LOCAs (including alignment of one HHSI pump to take suction on the RWST, thereby increasing the available RWST inventory due to the lower suction point of the HHSI pump) - ICM category #1 and ICM category #3;
- (2) transfer to containment sump recirculation with monitoring for RHR pump distress (a condition which would result in five actions to prolong the latter stages of RWST injection, including RWST refill and use of RWST inventory from the non-accident unit) - ICM category #2;

(3) to reduce CSS operation demand, taking credit for the redundant heat removal capability of the emergency containment coolers to provide the necessary containment pressure control function (operation of two of the three coolers is permitted in lieu of CSS if containment pressure is between 55 psig and 14 psig) - ICM category #3;

(4) for small break LOCAs (where RCS pressure remains above RHR pump shutoff pressure) cooldown and depressurization of the RCS to cold shutdown conditions without draining the RWST to containment sump recirculation switchover level - ICM category #2.

In its November 9, 2004, response, FPL also elaborated on its evaluation of the Westinghouse Owners Group (WOG) Candidate Operator Actions (COAs) of WCAP-16204, Revision 1, "Evaluation of Potential ERG [Emergency Response Guidelines] and EPG [Emergency Procedure Guidelines] Changes to Address NRC Bulletin 2003-01 Recommendations (PA-SEE-0085)" dated March 2004. The COA evaluation results were as follows:

(1) COA A1a-W, "Secure One Spray Pump": one containment spray pump is secured during RWST injection when RWST inventory decreases to 155,000 gallons at about 16 minutes after accident initiation - ICM category #2;

(2) COA A1b, "Operator Action to Secure Both Spray Pumps": this action is not analyzed in the Turkey Point containment response analysis for a large break LOCA (which assumes that at least one train of CSS operates in conjunction with two of the three emergency containment coolers), and therefore will not be implemented at Turkey Point;

(3) COA A2, "Manually Establish One Train of Containment Sump Recirculation Prior to Automatic Actuation": determined to not be advantageous for Turkey Point due to the arrangement of RHR suction piping and suction piping sectionalizing valves (which would increase sump approach velocity at the sole operating sump), and due to reduced NPSH margin for the RHR pump drawing on the containment sump;

(4) COA A3-W, "Terminate One Train of Safety Injection [SI] after Recirculation Alignment": as a Westinghouse plant with HHSI and RHR pump engineered safety features, only one train of SI is currently required to be aligned in the recirculation-cooling mode - ICM category #2;

(5) COA A4, "Early Termination of One LPSI [Low-Pressure Safety Injection]/RHR Pump Prior to Recirculation Alignment": applicable to Combustion Engineering (CE) plants only, unlike Turkey Point's Westinghouse design;

(6) COA A5, "Refill of Refueling Water Storage Tank": using the Turkey Point common SI system, injection from the opposite unit's RWST, as well as utilization of the accident unit's RWST unused volume by taking a (low level piping) suction with the charging pumps while simultaneously refilling that RWST - ICM category #3;

(7) COA A6, "Inject more than one RWST Volume from a Refilled RWST or by Bypassing the RWST": Turkey Point aligns to the opposite unit RWST should sump screen clogging prevent entering recirculation mode (allows injection only up to the containment flooding limit) - ICM category #3;

(8) COA A7, "Provide More Aggressive Cooldown and Depressurization Following a Small Break LOCA": Turkey Point procedures already address maximizing the cooldown rate up to the Technical Specification limit for small break LOCAs (see discussion above) - ICM category #2;

(9) COA A8-W, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage": considered and implemented in response to Bulletin 2003-01 (see discussion above) - ICM category #1;

(10) COA A9-W, "Develop Contingency Actions in Response to: Containment Sump Blockage, Loss of Suction, and Cavitation": six of eight applicable WOG recommended items implemented - ICM category #1;

(11) COA A10, "Early Termination of One Train of HPSI/High-Head Injection Prior to Recirculation Alignment (RAS)": applicable to CE plants only, unlike Turkey Point's Westinghouse design;

(12) COA A11, "Prevent or Delay Containment Spray for Small Break LOCAs (<1.0 Inch Diameter) in Ice Condenser Plants": Turkey Point is not equipped with an ice condenser.

The NRC staff has considered the Option 2 response for compensatory measures that were, or were to have been, implemented at Turkey Point Units 3 and 4 to reduce the interim risk associated with potentially degraded or nonconforming ECCS and CSS recirculation functions. Based on the response, the NRC staff considers the actions to be responsive to and meet the intent of Bulletin 2003-01 for Turkey Point Units 3 and 4.

Should you have any questions, please contact me at 301-415-3974 or the lead Project Manager for this issue, Alan Wang, at 301-415-1445.

Sincerely,

/RA/

Brendan T. Moroney, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

cc: See next page

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