



MAY 09 2013

L-2013-163  
10 CFR 50.54(f)

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  
Path Forward for Resolution of GSI-191

References:

- (1) Generic Letter (GL) 2004-02: Potential Impact of Debris Blockage on Emergency recirculation During Design Basis Accidents at Pressurized-Water Reactors.
- (2) Staff Requirements Memorandum – SECY-10-0113 – Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance, dated December 23, 2010.
- (3) Pressurized Water Reactor Owners Group (PWROG), Topical Report (TR) WCAP-16793-NP, Revision 2, "Evaluation of Long-Term Core Cooling Considering Particulate Fibrous and Chemical Debris in the Recirculating Fluid", dated October 12, 2011.
- (4) Nuclear Energy Institute (NEI) to the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Reactor Regulation, Director, Division of Safety Systems – Subject: GSI-191 - Current Status and Recommended Actions for Closure, dated May 4, 2012.
- (5) SECY-12-0093 – Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance, dated July 9, 2012.
- (6) Nuclear Energy Institute (NEI) to the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Reactor Regulation, Director, Division of Safety Systems – Subject: GAI-191 – Revised Schedule for Licensee Submittal of Resolution Path, dated November 15, 2012.
- (7) Nuclear Regulatory Commission Review of Generic Safety Issue-191 Nuclear Energy Institute revised Schedule for Licensee Submittal of Resolution Path, dated November 21, 2012.
- (8) Staff Requirements Memorandum – SECY-12-0093 – Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance, dated December 14, 2012.
- (9) Final Safety Evaluation for Pressurized Water Reactor Owners Group Topical Report WCAP-16793-NP, Revision 2, "Evaluation of Long-Term Cooling Considering Particulate Fibrous and Chemical Debris in the Recirculating Fluid", dated April 8, 2013.

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Florida Power & Light Company  
9760 S.W. 344<sup>th</sup> Street Homestead, FL 33035

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NRR

In Reference (4) NEI highlighted the current industry status and recommended actions for closure of Generic Safety Issue (GSI)-191 which were based on licensees providing a docketed submittal to NRC by December 31, 2012 that would outline a GSI-191 resolution path and schedule pursuant to the Commission direction Reference (2). By Reference (6) NEI recommended to NRC that licensees delay submittal of GSI-191 resolution path and schedule until January 31, 2013, or 30 days following placement of both the Commission response to Reference (5) and the NRC staff safety evaluation (SE) on Reference (3). In Reference (8) the Commission approved the staff's recommendation in Reference (5) to allow licensees the flexibility to choose any of the three options discussed in the paper to resolve GSI-191. Further the Commission encouraged the staff to remain open to staggering licensee submittals and the associated NRC reviews to accommodate the availability of staff and licensee resources. The SE Reference (9) for Reference (3) was made publicly available by NRC on April 16, 2013.

An industry template was developed by NEI for the identification of a resolution path and schedule, and to describe defense-in-depth and mitigation measures to support the proposed resolution schedule.

The NEI template was used for the development of the Attachment to this letter and provides a resolution path forward and schedule for resolution, summary of actions completed for GL 2004-02, and defense-in-depth and mitigation measures which will be established and maintained throughout the resolution period.

Regulatory Commitments are addressed Tables 1 and 2 of the Attachment.

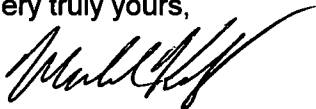
In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

If you have any questions or require additional information, please contact Robert Tomonto at 305-246-7327.

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

Executed on May 9, 2013

Very truly yours,



Michael Kiley  
Vice President  
Turkey Point Nuclear Plant

Attachment

cc: USNRC Regional Administrator, Region II  
USNRC Project Manager, Turkey Point Nuclear Plant  
USNRC Senior Resident Inspector, Turkey Point Nuclear Plant  
Ms. Cindy Becker, Florida Department of Health

**Attachment**

**Florida Power and Light Company  
Turkey Point Nuclear Plant  
Closure Option for Generic Safety Issue 191  
Assessment of Debris Accumulation on  
Pressurized Water Reactor Sump Performance**

**Florida Power and Light Turkey Point  
Closure Option for Generic Safety Issue 191,  
Assessment of Debris Accumulation on  
Pressurized Water Reactor Sump Performance**

Generic Safety Issue - 191 "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" (GSI-191) remains a long-standing open issue. GSI-191 concluded that debris could clog the containment sump strainers in pressurized water reactors (PWRs), leading to the loss of net positive suction head for the emergency core cooling system (ECCS) and containment spray system (CSS) pumps. The Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors" (ML042360586), dated September 13, 2004, requesting that licensees address the issues raised by GSI-191. GL 2004-02 was focused on demonstrating compliance with 10 CFR 50.46.

In accordance with the May 4, 2012 NEI letter to the NRC (ML12142A316), each licensee would submit a resolution option and associated implementation schedule to the NRC, by December 31, 2012. This was modified by the November 21, 2012 letter from the NRC to NEI (ML12326A497) that provided for submittal of the resolution option and associated implementation schedule by January 31, 2013, or 30 days following the NRC making the final safety evaluation (SE) associated with the review of WCAP-16793, Revision 2, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid," and the Staff Requirements Memorandum (SRM) associated with SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," publicly available. SRM-SECY-12-0093 became publicly available on December 17, 2012 (ML12349A378). The SE for WCAP-16793, Revision 2 became publicly available on April 16, 2012 (ML13084A152).

On July 9, 2012 the NRC staff issued SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance", presenting three options to the Commission all of which are considered to be viable paths for resolving GSI-191. These options are: Option 1- Deterministic, Option 2- (Deterministic or Risk-informed), and Option 3- Deterministic/Risk-informed. SECY-12-0093 considered and expanded upon the options provided in the May 4, 2012 NEI letter. The options identified in the SECY provide approaches that can be used to address plants with minimal fibrous insulation, low to medium fibrous insulation, and substantial amounts of fibrous insulation. On December 14, 2012, the NRC issued SRM-SECY-12-0093 which endorsed the proposed resolution options in SECY-12-0093 and also provided direction on the establishment of resolution option timelines.

Florida Power and Light (FPL) has selected Option 2 Risk Informed, because it has been determined that performing a risk-informed evaluation of the potential for recirculation sump(s) strainer blockage and in-vessel blockage (South Texas Project approach) will resolve GSI-191, as identified in SECY-12-0093, for Turkey Point Units 3 and 4.

To support use of this path, and justify continued operation for the period required to complete the necessary analysis and testing, FPL has evaluated the design and

procedural capabilities that exist to identify and mitigate sump strainer and in-vessel blockage. A description of these detection and mitigative measures are provided later in this document. Additionally, a summary of the existing margins and conservatisms that exist for Turkey Point Units 3 and 4 are included in this document. In the unlikely event that a risk-informed approach is determined not to be viable for Turkey Point Unit 3 or Unit 4, a resolution path utilizing a deterministic approach will be followed to resolve GL 2004-02.

The following provides the key components for the chosen resolution path option for Turkey Point Units 3 and 4.

#### Characterization of In-Vessel Effects

FPL intends to establish in-vessel debris limits for the type of plant design that exists at Turkey Point Units 3 and 4 through extensive modeling in a risk-informed framework or through the efforts currently being undertaken by the Pressurized Water Reactor Owners Group (PWROG), or through a combination of both paths.

#### Licensing Basis Commitments

FPL does not currently have open commitments within the Turkey Point Unit 3 and Unit 4 commitment management system to provide additional updates or information to the NRC regarding GL 2004-02. New commitments as a result of this document are listed in Table 1 for Turkey Point Unit 3 and Table 2 for Turkey Point Unit 4.

#### Resolution Schedule

FPL will achieve closure of GSI-191 and address GL 2004-02 per the following schedule:

- FPL will schedule a meeting with NRC, after June 1, 2013, to discuss this proposed resolution path.
- Measurements for insulation replacement for Turkey Point Unit 3 will be completed by end of the next Unit 3 refueling outage (approximately April, 2014). Measurements for insulation replacement for Turkey Point Unit 4 will be completed by the end of the next Unit 4 refueling outage (approximately December, 2014).
- FPL will provide a preliminary schedule for completion of the risk-informed resolution path activities by September 30, 2013, that provides for submittal of a licensing action approximately 12 months following issuance of the safety evaluation (SE) for South Texas Project, as coordinated by the NRC. FPL has established an anticipated date for issuance of an SE for the STP approach as December, 2014.
- The key testing and analysis milestones, as currently expected, are provided below.

Turkey Point Unit 3

MILESTONE	EXPECTED COMPLETION DATE
Update Containment CAD models to include pipe welds	2 <sup>nd</sup> Quarter 2013
Conduct meeting with NRC	3 <sup>rd</sup> Quarter 2013
**Perform baseline strainer bypass testing	1 <sup>st</sup> Quarter 2014
Assemble base inputs for CASA Grande	2 <sup>nd</sup> Quarter 2014
Modify PRA to include Strainer and Core Blockage models	2 <sup>nd</sup> Quarter 2014
Establish break frequencies based on weld type failure probabilities	4 <sup>th</sup> Quarter 2014
**Perform modeling of RCS, Core, and Containment conditions	3 <sup>rd</sup> Quarter 2015
**Evaluate Boric Acid Precipitation impacts	3 <sup>rd</sup> Quarter 2015
**Perform Chemical Effects testing	4 <sup>th</sup> Quarter 2015
**Perform Strainer Head Loss testing to establish correlation for range of break sizes	4 <sup>th</sup> Quarter 2015
Finalize inputs to CASA Grande	1 <sup>st</sup> Quarter 2016
Complete Sensitivity Analyses in/for CASA Grande	2 <sup>nd</sup> Quarter 2016
Integrate CASA Grande results into PRA to determine $\Delta$ CDF and $\Delta$ LERF	3 <sup>rd</sup> Quarter 2016
Licensing Submittal for Turkey Point Unit 3	To be established through discussions with NRC – tentatively March 2017

\*\* Denotes those milestone activities that will determine the viability of this resolution strategy approach.

Turkey Point Unit 4

MILESTONE	EXPECTED COMPLETION DATE
Update Containment CAD models to include pipe welds	2 <sup>nd</sup> Quarter 2013
Conduct meeting with NRC	3 <sup>rd</sup> Quarter 2013
**Perform baseline strainer bypass testing	2 <sup>nd</sup> Quarter 2014
Assemble base inputs for CASA Grande	2 <sup>nd</sup> Quarter 2014
Modify PRA to include Strainer and Core Blockage models	2 <sup>nd</sup> Quarter 2014
Establish break frequencies based on weld type failure probabilities	4 <sup>th</sup> Quarter 2014
**Perform modeling of RCS, Core, and Containment conditions	2 <sup>nd</sup> Quarter 2015
**Perform Chemical Effects testing	3 <sup>rd</sup> Quarter 2015
**Perform Strainer Head Loss testing to establish correlation for range of break sizes	3 <sup>rd</sup> Quarter 2015
**Evaluate Boric Acid Precipitation impacts	3 <sup>rd</sup> Quarter 2015
Finalize inputs to CASA Grande	4 <sup>th</sup> Quarter 2015
Complete Sensitivity Analyses in/for CASA Grande	1 <sup>st</sup> Quarter 2016
Integrate CASA Grande results into PRA to determine $\Delta$ CDF and $\Delta$ LERF	2 <sup>nd</sup> Quarter 2016
Licensing Submittal for Turkey Point Unit 4	To be established through discussions with NRC – tentatively December 2016

\*\* Denotes those milestone activities that will determine the viability of this resolution strategy approach.

- FPL will complete any necessary insulation replacements or remediation, or other identified plant changes in two phases. The first phase are those plant changes determined to be required by the analyses supporting submittal of the licensing action for NRC review and approval for the risk-informed approach. These plant changes will be completed by the fourth quarter of 2018 for Turkey Point Unit 3 and the second quarter 2019 for Turkey Point Unit 4. The second phase are those plant changes determined to be necessary through any re-analysis associated with the NRC review of the licensing action leading up to issuance of a SE for Turkey Point Unit 3 and Unit 4. These plant changes will be completed by the fourth quarter of 2021 for Turkey Point Unit 3 and the fourth quarter of 2020 for Turkey Point Unit 4.



- Within six months of receipt of the SE for the risk-informed resolution licensing action, FPL will submit a final updated supplemental response to support closure of GL 2004-02 for Turkey Point Unit 3 and Unit 4.
- If it is determined during the risk-informed process that this option is not viable, FPL will complete a deterministic resolution path that will be acceptable to the NRC, by June 30, 2020.
- FPL will update the current licensing basis (UFSAR) following receipt of the NRC SE that approves the risk-informed resolution approach and completion of any identified removal or modification of insulation debris sources in containment per plant modification procedures and processes (10 CFR 50.71(e)).

#### Summary of Actions Completed For GL 2004-02

In response to GL 2004-02, FPL has completed the following actions for Turkey Point Unit 3 and Unit 4:

- Replaced strainers in Unit 3 that had a simple geometry with a filtering surface area of ~63 ft<sup>2</sup>, with nominal 1/4" mesh openings with complex geometry strainers having a filtering surface area of ~5,500 ft<sup>2</sup>, with nominal 3/32" circular openings.
- Replaced strainers in Unit 4 that had a simple geometry with a filtering surface area of ~63 ft<sup>2</sup>, with nominal 1/4" mesh openings with complex geometry strainers having a filtering surface area over 3,600 ft<sup>2</sup>, with nominal 3/32" circular openings.
- Installed debris interceptors at the exit points of the bioshield wall for Unit 4.
- Removed all of the Cal-Sil insulation on the Pressurizer Relief Tank (PRT) for Units 3 and 4.
- Replaced the insulation on the Reactor Coolant Pumps (RCP) on Units 3 and 4, and Pressurizer Surge Line with reflective metal insulation (RMI) on Unit 3.
- Replaced the insulation on the Residual Heat Removal (RHR) return line and various valves with RMI in Unit 3.
- Removed a substantial quantity of aluminum from containment and over-jacketed a significant quantity of aluminum jacketed insulated piping with stainless steel jacketing for Units 3 and 4.
- Replaced the mechanical seals (removed cyclone separators) on the Unit 4 Containment Spray (CS) pumps.
- The latent debris quantity in Unit 4 (154.44lbs) was established at twice the measured value of latent debris determined from sampling in Unit 3. Miscellaneous debris sources (labels, etc.) were also evaluated and established at a value of 116.5 ft<sup>2</sup> for Unit 4, which is approximately 25% greater than that determined from walkdowns in Unit 3.
- Completed debris generation and debris transport analyses.
- Completed ex-vessel downstream effects analysis.
- Completed NPSH analysis.
- Established programmatic and procedural controls to maintain acceptable configuration and protect the containment recirculation function.

Summary of Margins and Conservatisms for Completed Actions Supporting Resolution of GL 2004-02

- Turkey Point Unit 3 and Unit 4 are re-performing deterministic analyses and testing to establish baseline conditions for the containment sump strainers to support resolution of GL 2004-02 using the risk-informed approach. Those inherent conservatisms that exist as a result of the use of deterministic methodologies can be applied to Turkey Point Unit 3 and Unit 4.
- For in-vessel, the injection flow rate (~24.5 gpm per fuel assembly) is significantly lower than the value used for fuel assembly blockage testing (~44.7 gpm per fuel assembly) as described in WCAP-16793-NP. This provides for a significant margin above the bounding 15g/FA established in the WCAP.
- Additionally, for in-vessel, there are additional conservatisms described in PWROG-OG-12-287 that can be applied to Turkey Point Unit 3 and Unit 4.

Summary of Defense-In-Depth (DID) Measures

The following describes the plant specific design features and procedural capabilities that exist for detecting and mitigating a strainer blockage or fuel blockage condition.

**Strainer Blockage**

- Turkey Point Unit 3 and Unit 4 have within their Emergency Operating Procedure (EOP) framework, specific steps for monitoring for indications of sump strainer blockage and actions to be taken if this condition occurs. These actions are described in the Turkey Point Unit 3 and Unit 4 response to NRC Bulletin 2003-01 dated August 8, 2003 (ML032240419). The actions taken in response to the Bulletin are still in effect at Turkey Point Unit 3 and Unit 4.

**Fuel (Core) Blockage**

- Detection

Multiple methods exist for detection of a core blockage condition as manifested by an inadequate reactor coolant system (RCS) inventory or RCS and core heat removal condition. The primary methods include core exit thermocouples (CET) and reactor vessel level monitoring system (RVLMS). This monitoring is initiated early in the event in the EOPs through the Critical Safety Function Status Trees which is performed continuously after completion of diagnosis of the event and when plant conditions are frequently changing, and every 10 to 20 minutes if plant conditions are not frequently changing and a Red or Orange path does not exist. Emergency Response Personnel in the Technical Support Center (TSC) or Emergency Operations Facility (EOF) will also maintain oversight of plant status through review of Emergency Response Data Acquisition Display System (ERDADS) which includes both CET and RVLMS data. An additional method for detection of a core blockage condition includes monitoring of containment radiation levels by the TSC or EOF staff and/or if an alarm setpoint is reached resulting in an alarm in the control room.

- Mitigation

Upon identification of an inadequate RCS inventory or core heat removal condition, the EOPs direct the operators to take actions to restore cooling flow to the RCS including:

- Reducing HPSI flow rate.
- Refill the Refueling Water Storage Tank (RWST).
- Attempt to provide core cooling by steaming through the steam generators.
- Fill the RCS from alternate paths including using injection from the opposite unit's RWST.

The operators will also inform the TSC of the condition. The TSC will evaluate the condition and recommend the following actions, as necessary, to the operators to restore core heat removal:

- Reduce RCS injection flow rate to meet minimal heat removal requirements.
- Use of hot leg injection flow path.
- Establish alternate injection paths to recover the core. These alternate paths include the following sources; Opposite Unit's RWST, Volume Control Tank (VCT), and Boric Acid Storage Tanks (BAST).
- Refill of the RWST from the Primary Water Storage Tank (PWST) or fire protection water.
- Restart Reactor Coolant Pumps (RCP).
- Flood containment using the Portable Diesel Fire Pump (PDFP)

The PWROG Procedures Subcommittee has developed guidance for updating the EOP framework for Westinghouse plants (DW-12-013). This guidance will provide additional information to the operators and technical staff for a symptom based condition of lower plenum blockage in the core. FPL will evaluate the recommended changes to the EOP framework and implement the necessary changes, along with the requisite operator training by March 15, 2014.

Although these measures are not expected to be required based on the very low probability of an event that would challenge either the capability of the strainer to provide the necessary flow to the ECCS and CS systems, or result in significant quantities of debris being transported to the reactor vessel that would inhibit the necessary cooling of the fuel, they do provide additional assurance that the health and safety of the public would be maintained. These measures provide support for the extension of time required to completely address GL 2004-02 for Turkey Point Unit 3 and Unit 4.

### Conclusion

FPL expects that the GSI-191 resolution path for Turkey Point Unit 3 and Unit 4 is acceptable, based on the information provided in this document. The execution of the actions identified in this document will result in successful resolution of GSI-191 and closure of GL 2004-02.

**Table 1: Turkey Point Unit 3**

The following table identifies those actions committed to by FPL in this letter for Turkey Point Unit 3. Any other actions discussed in this submittal represent intended or planned actions by FPL. They are described to the NRC for the NRC's information and are not regulatory commitments.

<b>Commitments</b>	<b>Date</b>
FPL will schedule a meeting with the NRC to discuss this proposed resolution path.	August 1, 2013
FPL will provide a preliminary schedule for completion of the risk-informed resolution path activities.	September 30, 2013
FPL will complete measurements for insulation replacement.	End of the next Unit 3 refueling outage (approx. April, 2014)
FPL will complete any necessary insulation replacements or remediation, or other identified plant changes.	December 31, 2021
FPL will submit a final updated supplemental response to support closure of GL 2004-02.	Within 6 months of receipt of the SE for the risk-informed resolution licensing action

**Table 2: Turkey Point Unit 4**

The following table identifies those actions committed to by FPL in this letter for Turkey Point Unit 4. Any other actions discussed in this submittal represent intended or planned actions by FPL. They are described to the NRC for the NRC's information and are not regulatory commitments.

<b>Commitments</b>	<b>Date</b>
FPL will schedule a meeting with NRC to discuss this proposed resolution path.	August 1, 2013
FPL will provide a preliminary schedule for completion of the risk-informed resolution path activities.	September 30, 2013
FPL will complete measurements for insulation replacement.	End of the next Unit 4 refueling outage (approx. December, 2014)
FPL will complete any necessary insulation replacements or remediation, or other identified plant changes.	December 31, 2020
FPL will submit a final updated supplemental response to support closure of GL 2004-02.	Within 6 months of receipt of the SE for the risk-informed resolution licensing action