



DEC 19 2003
L-2003-307
10 CFR 50.4

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington DC 20555

RE: Turkey Point Unit 4
Docket No. 50-251
NRC Bulletin 2003-02
Leakage from Reactor Pressure Vessel Lower Head Penetrations
and Reactor Coolant Pressure Boundary Integrity Inspection Results

On August 21, 2003, the NRC issued Bulletin (NRCB) 2003-02, "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity." By letter L-2003-234, dated September 19, 2003, Florida Power & Light Company (FPL) committed to perform a visual examination of all 50 reactor pressure vessel (RPV) lower head penetrations for Turkey Point Unit 4 during the October 2003 refueling outage. NRCB 2003-02 requested licensees to provide the results of the RPV lower head penetration inspection within 60 days of the plant restart. In accordance with NRCB 2003-02 Requested Information, Item 2, the attachment to this letter submits the FPL inspection results for Turkey Point Unit 4 for the October 2003 refueling outage.

Based on the results of the visual examinations performed, there is no evidence of leakage from the 50 RPV lower head penetrations or wastage of the RPV lower head at Turkey Point Unit 4.

Should there be any questions regarding this report, please contact Walter Parker at (305) 246-6632.

Very truly yours,


Terry O. Jones
Vice President
Turkey Point Nuclear Plant

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Attachment

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point

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**NRC BULLETIN 2003-02: REACTOR PRESSURE VESSEL LOWER
HEAD PENETRATIONS POST OUTAGE INSPECTION RESULTS
FOR TURKEY POINT UNIT 4**

On August 21, 2003, the NRC issued Bulletin 2003-02¹ requesting information on the reactor pressure vessel (RPV) lower head penetration inspection program, including plans for future inspections. NRC Bulletin 2003-02 also requested that within 60 days of plant restart following the next inspection of RPV lower head penetrations, the licensee submit a summary of the inspection performed. Florida Power and Light Company (FPL) hereby submits the RPV lower head penetration inspection results for Turkey Point Unit 4 (PTN-4) for the October 2003 refueling outage (PTN-4-CYC21).

Turkey Point Unit 4 October 2003 (PTN-4-CYC21) Post Outage Reactor Vessel Lower Head Inspection Results:

***NRC Bulletin 2003-02 Request 2:** Within 60 days of plant restart following the next inspection of the RPV lower head penetrations, the subject PWR addressees should submit to the NRC a summary of the inspections performed, the extent of the inspections, the methods used, a description of the as-found condition of the lower head, any findings of relevant indications of throughwall leakage, and a summary of the disposition of any findings of boric acid deposits and any corrective actions taken as a result of indications found.*

FPL Response to NRC Request 2: The following provides a summary and the details of the Turkey Point Unit 4 RPV lower head penetration inspection performed during the PTN-4-CYC21 refueling outage (RFO).

1. Examination Scope and Extent: A bare metal visual examination (VT-2) was performed of 100% of the circumference of each of the 50 RPV lower head (referred to as bottom mounted instrument (BMI)) penetrations where they enter the RPV lower head. The Turkey Point configuration at these penetrations includes an Alloy 600 weld pad around, but not connected to, each penetration. The area of interest for the inspection is the intersection between each penetration and its corresponding weld pad. In addition, an overall visual examination of the lower head bare metal surface was performed for evidence of wastage.

2. Methods Used: A remote visual examination was performed by a vendor Level II Visual Inspector. Continuous oversight was provided by FPL personnel during the entire evolution, to ensure location verification and observe the overall condition.

Access for the bare metal examination was accomplished by lowering the 12 foot diameter metal insulation dome assembly from the bottom RPV lower head. The lowered insulation provided access for a remote camera mounted on a magnetic crawler or long pole to view the 50 BMI penetrations as they penetrated the RPV lower head. The crawler mounted remote camera provided a 360° view of the intersection of nearly all of the instrument tubes and the alloy 600 weld pad. Additionally, a long handle pole mounted camera was used to perform inspections of the few remaining penetrations that the crawler mounted remote camera could not reach.

The criteria used to determine the adequacy of the inspection coverage was the ability to identify evidence of leakage similar to that found at the South Texas BMI penetrations and RPV upper head penetration leaks identified in the industry. Relevant penetration leakage is described as accumulation of boric acid resembling popcorn in EPRI Visual Inspection Guidelines Report 1007842.²

During the process of maneuvering the crawler mounted and pole mounted cameras to examine the 50 BMI penetrations, a large portion of the lower head bare metal surface was viewed. The lowered insulation also allowed for observation of a large portion of the lower head bare metal surface from perimeter mounted cameras. These observations allowed for an assessment of the condition of the RPV lower head surface.

3. Description of the As-Found Condition of the Lower Head: There was no evidence of accumulated boric acid (popcorn, as defined in EPRI Visual Inspection Guidelines Report²) on any of the 50 BMI penetrations that would indicate operational reactor coolant system (RCS) leakage.

The lower head surface had a thin dry translucent film, or stain-like residue, around most of the BMIs, and on much of the RPV lower head surface. No evidence of wastage of the RPV lower head surface was observed. The film varied in color from mostly white on the alloy 600 BMI penetrations to very light orange (rust) on patches of the RPV head surface. The film had no volume. There was evidence of localized areas of small flaking paint on the vessel surface and on the surfaces of some of the alloy 600 weld pads around each nozzle. The film and flaking paint did not obstruct any of the examinations of the BMI nozzle to vessel interface.

The film on the BMIs and on the vessel surface appeared to have flow like characteristics, possibly from prior cavity seal ring leakage or wash down events. The most significant wash down of the reactor vessel head occurred after a conoseal leak in 1987.³ The flow characteristics of the film are indicative of a fluid traveling on the surface at low temperatures (cold shut down, refueling, etc) since the stains run for long distances. There were no deposits with accumulated thickness, which would occur from high temperature leakage, at any location on the RPV lower head. The inside surface on the original metal insulation dome adjacent to the RPV head surface was relatively clean and free of accumulation of corrosion product or debris. Based on the lack of debris in the insulation dome and the visual observations described above, it is concluded that there is no wastage of the RPV lower head surface.

4. Relevant indications of through wall leakage: There were no relevant indications of through wall leakage for any of the 50 BMI nozzle penetrations.

5. Summary of the disposition of any findings of boric acid deposits: Two representative BMI penetrations were selected for sampling of the white residue described above. The sampling plan was to swipe the locations with clean wet gauze pads, and scrape off any tightly adhering material. The swipes cleaned off the residue with light hand pressure and left nothing to scrape.

The swipe samples were analyzed first for fission and activation products that would indicate operational RCS leakage. The analysis did not detect the presence of short lived isotopes of Cs 134 (2.06 years half life) or Co 57 (272 days half life), but did detect the long lived isotopes of Cs 137 (30 years half life) or Co 60 (5.3 years half life). The analysis count time was increased and the same results were obtained. The swipe samples (residue) were then heated in water and the solution was tested for the presence of lithium. The solution was also analyzed for

boron by titration and pH testing. Neither lithium nor boron was detected in the solution. Additional tests identified large amounts of calcium in the solution.

Based on the representative samples collected, and the isotopic and chemical analysis results, it is concluded that the residue on the BMI penetrations and bottom head is not the result of operational RCS leakage.

6. Corrective Actions: No corrective actions were required.

7. Conclusion and Summary: Based on the results of the visual examinations, there is no evidence of leakage from the 50 RPV lower head penetrations or wastage of the RPV lower head at Turkey Point Unit 4. Implementation of this inspection meets the commitment to perform a 100% visual inspection of the RPV lower head nozzles, as documented in the FPL response to NRC Bulletin 2003-02 ⁴ for the Turkey Point Unit 4 October 2003 RFO (PTN-4-CYC21).

¹ US NRC Bulletin 2003-02 (ADAMS Accession No. ML032320153), "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity Reactors," from Bruce A. Boger (NRC) to all Pressurized Water Reactor Licensees, August 21, 2003.

² "Visual Examination for Leakage of PWR Reactor Head Penetrations: Revision 2 of 1006296, Includes 2002 Inspection Results and MRP Inspection Guidance" Electric Power Research Institute (EPRI), Palo Alto, CA: 2003. 1007842, March 2003.

³ FPL letter L-87-186, "Turkey point Unit 4 Docket No. 50-251, report on Instrument Port column Assembly Leakage", C.O. Woody to NRC, April 27, 1987.

⁴ FPL letter L-2003-234, "Florida Power and Light Company, St. Lucie Units 1 and 2, Docket Nos. 50-335 and 50-389, Turkey Point Units 3 and 4, Docket Nos. 50-250 and 50-251, FPL Energy Seabrook, LLC, Seabrook Station Docket No. 50-443, NRC Bulletin 2003-02, Leakage From Reactor Pressure Vessel Lower Head Penetrations And Reactor Coolant Pressure Boundary Integrity," J.A. Stall to NRC, September 21, 2003.