UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 9, 2010

Mr. Barry S. Allen
Site Vice President
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
Mail Stop A-DB-3080
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE RELIEF REQUEST FOR 10 CFR 50.55A REQUEST FOR ALTERNATE REPAIR METHODS FOR REACTOR PRESSURE VESSEL HEAD PENTRATION NOZZLES (TAC NO. ME3703)

Dear Mr. Allen:

By letter to the Nuclear Regulatory Commission (NRC) dated April 1, 2010 (L-10-099), FirstEnergy Nuclear Operating Company submitted a request to update the leak-before-break evaluation for the reactor coolant pump suction and discharge nozzle dissimilar metal welds.

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. During a discussion with your staff on April 8, 2010, it was agreed that you would provide a response within 14 days from the date of this letter.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-3867.

Sincerely,

Michael Mahoney, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

DAVIS BESSE NUCLEAR POWER STATION

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NUMBER NO. 50-346

By letter dated April 1, 2010, FirstEnergy Nuclear Operating Company requested Nuclear Regulatory Commission (NRC) review and approval of relief request RR-A34 pertaining to an alternative to repair the reactor pressure vessel head penetration nozzles at Davis-Besse Nuclear Power Station. To complete its review, the staff requests the following additional information.

1. Pages 1 to 3.
Section 3.0 of Relief Request RR-A34 lists 14 applicable [ASME] code requirements. The licensee provided alternatives for some, but not all, of the applicable code requirements. For example, as discussed in Section 5 of RR-A34, the licensee provided alternatives to certain requirements in Code Case N-638-1 that it asks for relief. Identify which requirements relief is being requested and provide alternatives and reasons why the alternatives are acceptable.

2. Page 4.
The licensee states that the area above the repair in the nozzle will be roll expanded.

   (1) Discuss the distance of the roll expansion above the nozzle cut.

   (2) Discuss how the roll expansion is controlled and monitored so that the region of the nozzle immediately outside of the vessel head penetration (bore) will not be expanded unnecessarily.

   (3) Discuss the vertical distance of the nozzle that will be applied with the abrasive water jet.

   (4) Discuss why the PT and UT are performed before the abrasive water jet is applied to the remnant nozzle. It seems that PT and UT of the nozzle should be the last step to be performed (after the abrasive water jet is applied) in the repair process to ensure that the repaired nozzle is fit for service.

3. Page 6.
The licensee states that the UT is qualified to detect flaws in the new weld to the maximum practical extent. In the last paragraph on page 7, the licensee states that approximately 70 percent of the [new] weld surface will be scanned by UT examination.

   (1) Specify to which ASME Code section and subsection is the UT qualified.

(2) Justify why it is acceptable that the UT cannot achieve 100-percent examination coverage.

(3) Without achieving 100 percent coverage, justify how the new weld can be demonstrated to be free of fabrication defects.

4. Page 6, last paragraph.
The licensee states that the UT is capable of scanning from cylindrical surfaces with inside diameters near 2.75 inches. Confirm that 2.75 inches is the nominal inside diameter of the nozzle.

5. Page 8, third paragraph.
The licensee states that a weld anomaly of 0.1 inch deep and 360 degrees in circumferential extent is modeled at the triple point. Discuss the depth of a flaw at the triple point that the UT is qualified to detect and discuss how the UT is qualified.

6. Page 8, fourth paragraph.
The licensee discussed a fracture mechanics analysis for the weld anomaly at the triple point. Please submit the referenced fracture mechanics analysis.

7. Page 8, second to the last paragraph.
The licensee states that Alloy 600 nozzle material properties or equivalent are used to ensure that another potential path through the heat affected zone between the new repair weld and the Alloy 600 nozzle material is bounded. Clarify pictorially this other potential path.

8. Page 8, last two paragraphs.
For flaw path 1, discuss the length and depth of the axial flaw. Use a diagram similar to that in Figure 3 to show the exact location of the axial and circumferential weld anomalies.

9. Page 9, second paragraph.
The licensee states that the results of flaw evaluation at the triple point show that the 0.10 inch weld anomaly is acceptable for greater than a four-year design life for the new [nozzle] configuration. The four-year design life implies that after four years the repaired nozzles will no longer be acceptable for service. The staff understands that the licensee plans to replace the reactor vessel head in four years. However, the licensee may need to design the half nozzle repair longer than four years in case the new reactor vessel head cannot be delivered to and installed in the plant within four years. Confirm that the design life of the half-nozzle repair is four years from the date of the relief request implementation.

10. Page 9.
Lay out the flaw path 2 on a diagram similar to Figure 3 of the submittal. Discuss whether the flaw sizes (weld anomaly) in path 2 are the circumferential and axial flaws with the same depth and length as described in the last paragraph on page 8 for path 1.

11. Page 9, last two paragraphs.
The licensee discusses the preservice and inservice inspections for the repaired nozzles.

    (1) Confirm that Davis Besse will follow ASME Code Case N-729-1 with conditions in accordance with 10 CFR 50.55a(g)(6)(D) for the preservice and inservice inspection of the repaired nozzles.

    (2) Discuss the inservice inspection schedule for the repaired nozzles.

12. Figure 3.
Figure 3 provides a vertical distance of 1 and 1.5 inches of the remnant nozzle for the preservice (post-weld) surface and UT examinations.

    (1) Discuss whether the 1 to 1.5 inch distance covers the region of the nozzle that has been rolled. If the 1 or 1.5 inches do not cover the entire rolled region, the staff expects that the entire rolled region of the nozzle needs to be inspected to ensure that flaws do not occur in the rolled region of the remnant nozzle. Figure 9 also provides the same vertical distance of 1 inch and 1.5 inches of the remnant nozzle for the inservice surface examination. For inservice inspection, the staff expects that the entire rolled region of the nozzle be inspected to ensure that flaws do not occur in the rolled region of the remnant nozzle.

    (2) Discuss whether the entire rolled region of the remnant nozzle will be inspected.

13. Please submit a fracture mechanics analysis demonstrating that the acceptability of the structural integrity of the reactor vessel head assuming the flaw in the remnant J-groove weld has propagated into the vessel head.

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Sincerely,
/RA/
Michael Mahoney, Project Manager
Plant Licensing Branch III-2
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