NRR-PMDAPEm Resource

From: Lyon, Fred
Sent: Monday, May 11, 2015 1:49 PM
To: bhansher@oppd.com; medwards@oppd.com
Subject: FW: FT Calhoun--relief Request 14 reactor vessel head inspections (MF6206)
Attachments: RAI for Fort Calhoun RR-14 Rev 1.docx

Importance: High

I haven't even read them yet.

From: Tsao, John
Sent: Monday, May 11, 2015 1:46 PM
To: Lyon, Fred
Cc: Collins, Jay; Cumblidge, Stephen; Alley, David
Subject: FT Calhoun--relief Request 14 reactor vessel head inspections

Fred,

Attached are our RAI questions regarding the subject relief request. These questions includes input from Jay, Stephen and David.

John

Hearing Identifier: NRR_PMDA
Email Number: 2055

Mail Envelope Properties (Fred.Lyon@nrc.gov20150511134800)

Subject: FW: FT Calhoun--relief Request 14 reactor vessel head inspections (MF6206)
Sent Date: 5/11/2015 1:48:54 PM
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From: Lyon, Fred

Created By: Fred.Lyon@nrc.gov

Recipients:
"bhansher@oppd.com" <bhansher@oppd.com>
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Tracking Status: None

Post Office:

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MESSAGE	413	5/11/2015 1:48:00 PM
RAI for Fort Calhoun RR-14 Rev 1.docx	34443	

Options
Priority: High
Return Notification: No
Reply Requested: No
Sensitivity: Normal
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REQUEST FOR ADDITIONAL INFORMATION
RELIEF REQUEST NUMBER RR-14
ALTERNATIVE INSPECTION OF REACTOR VESSEL
CLOSURE HEAD WITHRESPECT TO ASME
CODE CASE N-729-1 AS CONDITIONED BY 10CFR50.55A
OMAHA PUBLIC POWER DISTRICT
DOCKET NUMBER 50-285

By letter dated May 9, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number MLXXXXXXXX), Omaha Public Power District (the licensee) requested authorization of a proposed alternative from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, associated with the examination requirements of Code Case N-729-1 at Fort Calhoun Station (FCS). The licensee proposed an alternative examination requirement for the reactor vessel headnozzles as documented in Relief Request Number RR-14. To complete its review, the Nuclear Regulatory Commission (NRC) staff requests the following additional information.

QUESTIONS

1. (a) Identify all reactor vessel head penetration nozzles (with designated nozzle numbers) where corrosion, boric acid deposits, discoloration and other evidence of nozzle leakage (as defined in 3141(c) of Code Case N-729-1) were present at the nozzle annulus region. (b) Of all the nozzles, identify the nozzles that havebeen considered with a relevant condition.

2. If a relevant condition is considered at a nozzle, describe the evaluation and the basis for determination that the corrosion, boric acid deposits, or discolorationpresent was not indicative of nozzle leakage. In your discussion provide the following:

(a) Provide photographic evidence of these relevant conditions.

(b) Discuss the visual evidence obtained that showed the relevant conditions in each nozzle annulus that came from above of the reactor vessel closure head.

(c) Discuss the chemical analysis performed on each relevant condition.Including in the discussion, describe (a) where each chemical swipe was taken in relation to each reactor vessel head nozzle annulus,(b) the evidence showing conclusively that no boric acid was contained in the chemical swipe, and(c) the testing performed to show that the chemical swipe could not have come from nozzle leakage.

3. If the corrosion, boric acid deposits, or discolorationidentified was not considered a relevant condition, (a)describe the basis for that determination, including whether the material present was removed by vacuuming and the results of chemical analysis of such debris.(b) If observations and chemical test data are not available for the nozzle under consideration, describe the basis by which it was determined that the material present in the annulus could not have come from nozzle leakage.

4. Discuss any nozzles that had relevant conditions indicative of possible nozzle leakage but were not evaluated per the requirements of paragraph -3142.1(b)(1) of ASME Code Case N-729-1. If yes, provide justification the nozzle was not evaluated.As part of response to

Questions 1 through 4, provide a table that contains the information of the relevant conditions and dispositions of each nozzle to clarify the status of the nozzle conditions.

5. Discuss previous inservice inspections performed. (a) Discuss whether previous inspections (including boric acid control walkdowns, previous visual examination (VE) inspection, etc.) found boric acid on the reactor vessel head or found reactor vessel head nozzles with masked indications. If so, which nozzles identified as having relevant indications in the current VE inspection have had previous boric acid indications at the nozzle annulus region? (b) Provide the month and year of the inspections.

6. Page 3 of the relief request states, "…There is no evidence of a flaw in any of the RVH [reactor vessel head] nozzles or partial penetration welds; therefore, performing emergent supplemental examination and/or repair/replacement of the nozzles does not result in a compensating increase in the level of quality or safety..."The NRC staff questions that there is no evidence of relevant conditions indicative of possible nozzle leakage because the NRC questions the effectiveness of the licensee's disposition of the relevant conditions. As such, the NRC staff is concerned regardingthe potential for nozzle ejection or significant degradation of the low alloy steel reactor vessel head due to boric acid corrosion if the nozzles with relevant conditions are allowed to remain in service. Therefore, provide technical basis to demonstrate that nozzle ejection or a loss of upper head structural integrity will not occur during the duration of this proposed alternative. If the licensee has performed calculations to address the level of quality or safety for the proposed alternative, the NRC staff notes that the time to leakage, given the short operational lifetime of the current reactor vessel head would not provide a sufficient basis for crack growth rate improvement factors due to the use of alloy 690 or its weld materials.

7. Page 3 of the relief request identifies several nozzles associated with the FCS Control Element Assembly rack extensions. Are any of these nozzles the ones with relevant conditions indicative of possible nozzle leakage?

8. Page 3 of the relief request notes that there is no qualified ultrasonic examination technique for the FCS ICI nozzles because of its thickness. (a) Are any of these nozzles the ones with relevant conditions indicative of possible nozzle leakage? (b) Provide justificationwhyperforming an ultrasonic examination of the ICI nozzlesis a hardship, given that the licensee should have been aware, prior to this inspection, that an ultrasonic inspection of the FCS ICI nozzles may be required.

9. Page 3 of the relief request notes a hardship that performance of supplemental examinations would cause a radiological dose of two REM. (a) Is this dose for a supplemental examination of the entire head, including the necessary manual examinations due to the licensee not having a qualified ultrasonic inspection technique? (b) What is the actual radiological dose associated with performing the paragraph -3200(b) supplemental examinations of ASME Code Case N-729 on the penetration nozzles and associated welds with relevant conditions indicative of nozzle leakage?

10. Page 4 of the relief request identifies performance of an enhanced leakage monitoring and action plan to identify leakage promptly. (a) Address how the leakage limits will identify leakage from the penetration nozzle and/or associated J-groove welds given the low operational history of leakage rates from 0.001 to 0.1 gpm. (b) What actions will be taken at these leakage limits?(c)Are there airborne radiation monitoring equipment in the area of the upper reactor vessel head? (d) Due to the high corrosion rates associated with boric acid on low alloy steel,provide a unidentified leakage limit that is lower than the leakage limit in the current plant

Technical Specifications for the inspection of the reactor vessel head nozzles, or justify why a lower limit for unidentified leakage is not needed.

11. On page 4 and 5, the chemical analysis performed identified “minor concentrations of boron.” (a) How much boric acid residue is considered as a relevant condition? (b) How did the chemical analysis show conclusively that this boron was a result of “minor contamination from leakage from the RC-100 packing and ICI Port Number 44 mechanical connection”?

12. Page 5 of the relief request identifies the non-destructive examinations performed on the reactor vessel head penetration nozzles and associated welds prior to commercial service. (a) Was the surface examination of the J-groove welds performed prior to or after the hydrostatic test during the construction? (b) How many fabrication defects were found during the ultrasonic inspection of the reactor vessel head penetration nozzles andidentify whether any of those nozzles with relevant conditions indicative of possible nozzle leakagehave had fabrication defects?

13. Given the inspection results of Alloy 690 components identified by the licensee on page 5 of the relief request, (a) discuss the Ft Calhoun recommended change in bare metal visual inspection frequency for future reactor vessel head inspections.(b) Discuss procedures and process for the future bare metal visual inspections of the reactor vessel head nozzles. (c) Discuss evaluation methods of relevant conditions in the future bare metal visual inspection of reactor vessel head nozzles. (d) Discuss whether a volumetric examination or a bare metal visual examination of the reactor vessel head nozzles will be performed at the next refueling outage. If not, provide justification. (e) Discuss a plan regarding how to communicate to the NRC for the future inspections of the reactor vessel head nozzles to minimize the occurrence of emergent issues.

14. The operating experience has shown that corrosion rates associated with boric acid on low ally steel are aggressive. The NRC staff suggests that the licensee proposes an opportunistic inspection of the reactor vessel head nozzles under the insulation (as access permits) if the plant is required to shut down in mid-cycle. If not,justify why it is not necessary for an opportunistically inspection during the mid-cycle.