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Ref. # 10CFR50.55a

June 13, 2012

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NO. 50-446
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR
RELIEF REQUEST NO. A-2 (TAC NO. ME7789)

REFERENCES: 1. Letter logged TXX-12002 dated January 5, 2012 from Rafael Flores to the NRC submitting Relief Request No. A-2 for the Unit 2 Second 10 Year ISI Interval from 10CFR50.55a Inspection Requirements due to Geometric Limitations (Second Interval Start Date: August 3, 2004).

2. Email dated May 3, 2012 from Balwant Singal of the NRC to Timothy Hope of Luminant Power requesting additional information regarding Relief Request No. A-2 – TAC ME7789.

Dear Sir or Madam:

Per reference 1, Luminant Generation Company, LLC (Luminant Power) submitted Relief Request A-2 for Comanche Peak Unit 2 for the second ten year inservice inspection interval. Luminant Power had determined that certain inspection requirements of ASME Code Case N-729-1, "Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds, Section XI, Division 1," were impractical due to geometric limitations. Per reference 2, the NRC provided a request for additional information regarding the subject relief request.

Luminant Power has provided the information requested per reference 2 in the attachment to this letter. The due date was extended to June 14, 2012 based on a phone call with the NRC on June 4, 2012.

This communication contains no new commitments regarding Comanche Peak Unit 2.

Should you have any questions, please contact Mr. Jack Hicks at (254) 897-6725.

A047
NRR

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: Fred W. Madden
Fred W. Madden
Director, Oversight & Regulatory Affairs

Attachment Response to Request for Additional Information for Relief Request A-2

c - E. E. Collins, Region IV
B. K. Singal, NRR
Resident Inspectors, Comanche Peak
Jack Ballard, ANII, Comanche Peak

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR RELIEF REQUEST NUMBER A-2 FOR THE UNIT 2 SECOND 10 YEAR ISI INTERVAL FROM 10 CFR 50.55a INSPECTION REQUIREMENTS DUE TO GEOMETRIC LIMITATIONS

The following questions were provided to Luminant Power in the email dated May 3, 2012, from Balwant Singal of the NRC to Timothy Hope of Luminant Power (reference 2) requesting additional information regarding Relief Request Nos. A-2:

"By letter dated January 5, 2012, (Reference 1), supplementing letter dated December 18, 2006, (Reference 2), Luminant Generation Company, LLC, (the licensee) submitted "Relief Request A-2 for the Unit 2 Second 10 Year inservice inspection (ISI) Interval from Title 10 of the *Code of federal Regulations* (10 CFR) 50.55a Inspection Requirements Due to Geometric Limitations" for Comanche Peak Nuclear Power Station, Unit 2. In the relief requests the licensee proposes a shorter examination distance below the toe of the J-groove weld than that required by the First Revised Order EA-03-009 (Order, Reference 3) or that of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Case N-729-1, as required and conditioned by 10 CFR Part 50, paragraph (g)(6)(ii)(D). The licensee states that the control rod drive mechanism (CRDM) penetration nozzle numbers 74 through 78 cannot be volumetrically examined to the extent required due to the threaded region on the outside diameter and the chamfer on the inside diameter of the penetration nozzles. The licensee also states that the sleeve design of CRDM penetration nozzles 63 and 65 does not permit inspection with currently available equipment. In order to complete our review, the staff requests further information."

NRC Question 1:

Please provide the start date and expected end date of the second inservice inspection (ISI) interval.

Luminant Power's Response to Question 1:

Second ISI Interval start date: August 3, 2004
Second ISI Interval end date: August 2, 2014

NRC Question 2:

Describe any relevant indications from the CRDM ultrasonic examination (UT) performed in refueling outage 2RF12.

Luminant Power's Response to Question 2:

There were no relevant indications identified during the UT examinations of the CRDM nozzles during 2RF12.

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NRC Question 3:

ASME Code Case N-729-1 requires inspection of the penetration nozzle to a distance "a" below the lowest point of the J-groove weld. This exam coverage can be attained by UT, surface examination or a combination or the two. Please estimate the radiological dose associated with performing a surface examination to attain the required coverage for penetration nozzles 74 through 78.

Luminant Power's Response to Question 3:

Outside surface penetrant testing (PT) typically requires 500-700 mRem per penetration. This would equate to an estimated range of 2.5-3.5 Rem to inspect the five penetration OD surfaces. Additionally, the OD surface in the region of interest is threaded and the PT results would be of limited value and are likely to result in false positives due to the thread geometry. Resolution of geometric indications could easily cause a doubling of the personnel exposure.

NRC Question 4:

Penetration nozzles 74 through 78 were examined in refueling outage 2RF12 in spring of 2011. For each of these nozzles:
a. Please provide the J-groove weld as-designed and as-built dimensions

b. Please provide the UT examination distance below lowest point of the as-built J-groove weld toe for both the axial and circumferential flaws

Luminant Power's Response to Question 4

a. The actual weld height was measured using the ultrasonic test data. The following table provides the dimensions for nozzles 74 through 78 for both the designed and as-built scenarios:

Nozzle Number	Weld As-Designed	Weld As-Built
74	1.46"	1.56"
75	1.46"	2.13"
76	1.46"	1.61"
77	1.46"	2.06"
78	1.46"	1.68"

b. The coverage reported in the previous relief request is based on the as–built dimensions as determined by ultrasonic measurements from the bottom (toe) of the weld to the lower extent of coverage using the circumferentially oriented tip diffraction (TOFD) probes for detecting axial flaws. The coverage with the axially oriented TOFD probes for detection of circumferential flaws is nominally 0.6" less. For flaw growth calculations below the weld, only axial flaws are of a concern, as documented in WCAP-16397. Eddy current test data was also acquired over this same region on the ID of the penetration. Also, the UT Leak Path (UTLP) was performed on all nozzles to address inspection of the J-weld. The following table lists the actual UT and ET coverage along with the calculated required coverage for the region with >20 ksi weld stress.

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The UT examination distance is described in the following table:

Penetration Nozzle Number	Weld Intersection Angle	Scan Coverage Below Weld for Axial Flaws	20 ksi Line below J-Groove Weld
74	48.7°	0.81″	0.29″
75	48.7°	0.30″	0.29″
76	48.7°	0.73″	0.29″
77	48.7°	0.33″	0.29″
78	48.7°	0.36″	0.29″

(Note: The previous flaw growth calculation was based on a flaw just below the credited inspection volume. With the required UT qualification results, the EPRI Performance Demonstration Qualification Sheet, PDQS-001, specifies a limitation that flaws <0.050″ deep were not detected in regions with OD threads, which is the case here. The earlier flaw analysis did not assume this flaw.)

NRC Question 5:

Was the analysis of Westinghouse Commercial Atomic Power report (WCAP)-16397-P (Reference 4) based on the as-designed or as-built J-groove weld dimensions? If the analysis was based on the as-designed dimensions, please demonstrate that it bounds the analysis of the as-built dimensions.

Luminant Power's Response to Question 5:

The flaw growth analysis in WCAP-16397-P is based on the as designed dimensions of the J groove weld, which assumed a smaller weld throat than the as-built condition. The size of the weld plays an important role in the welding residual stress analysis. Often, the fillet weld on the downhill side of the nozzle is larger than design because of access issues during fabrication. When a weld extends further below the head inside radius due to a larger than design fillet, it does not negatively affect the distance below the weld required for coverage.

Analysis results of larger as-built welds for CRDM nozzles have shown that lesser distance is required below the weld bottom for a transition to below 20 ksi. An assessment was performed on a plant with identical CRDM design and configuration to show that larger welds have a reduced stress profile relative to smaller welds. The cases of 1.46″, 2.35″, and 2.97″ were analyzed to determine their stress profiles. The 20 ksi criterion is reached in shorter distance for the larger length welds, therefore, the 1.46″ design value bounds the as-built dimensions of the CRDM nozzles for the current analysis.

(Note: The WCAP analysis assumed the nozzle was a right cylinder 0.625″ thick and did not consider the actual geometry with the relief, threaded section or chamfer. The threaded region has a wall thickness of 0.389″. The actual geometry will have a small change in the stress distribution. The real answer is OD flaws typically have started at the toe of the weld, where the stresses are 3.5-4x the value at the lower extent of the inspected region. So covering some distance below the toe of the weld is sufficient to preclude the existence of cracking. The exception to this only occurred with B&W tubular product material which had cold worked regions along the length of the nozzle, but cracks not connected to the weld toe have not been observed with the material used at Comanche Peak.)

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NRC Question 6:

The 2.25 RIY period for CRDM nozzles 63 and 65 includes 2RF13 in fall of 2013 when the inspection is expected to be successfully performed. Please explain why relief is being requested for inspection of these nozzles.

Luminant Power's Response to Question 6:

Nozzles #63 and #65 were only identified to bring this situation to your attention. Code Case N-729-1 implies the inspection interval applies to entire RPV head as a whole, rather than individual nozzles. In this unique case, two nozzles were inaccessible with the inspection tooling and will be inspected during a subsequent outage after modifications. All nozzles are being inspected within the 2.25 RIY time frame requirement.

References

1. Letter dated January 5, 2012, "Relief Request A-2 for the Unit 2 Second 10 Year ISI Interval from 10 CFR 50.55a Inspection Requirements Due to Geometric Limitations," Agencywide Documents Access and Management System (ADAMS) Accession Number ML12017A126

2. Letter dated December 18, 2006, "Update to 60-Day Response to Revision 1 of NRC Order EA-03-009, Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads At Pressurized Water Reactors," ADAMS Accession Number ML063630152

3. First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors, Issued February 20, 2004, ADAMS Accession Number ML040220181

4. Westinghouse Topical Report WCAP-16397-P, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetration to Support Continued Operations: Comanche Peak Units 1 and 2," ADAMS Accession Number ML063630186