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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT (CPNPP)
DOCKET NO. 50-446
RELIEF REQUEST NO. B-5 FOR THE UNIT 2 SECOND 10 YEAR ISI INTERVAL FROM 10 CFR 50.55a REQUIREMENTS FOR CLASS 1 REPAIR/REPLACEMENT OF CRDM CANOPY SEAL WELD (SECOND INTERVAL START DATE: AUGUST 3, 2004)

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(a)(3)(ii), Luminant Generation Company LLC (Luminant Power) hereby requests NRC approval of the attached relief request (B-5) for the second ten-year inservice inspection interval for Unit 2. A Proposed Alternative approval is requested from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI 1998 Edition through the 2000 Addenda, for an alternative method for a weld metal overlay of a CRDM canopy seal weld leak that may or may not exist during the second ISI interval.

This is essentially a request for re-approval for a new 10 year interval of an earlier relief request B-10 (TAC MB7742) for Unit 2. The code edition for ASME XI at CPNPP has been updated from the 1986 Edition, no Addenda to the 1998 Edition, 2000 Addenda. The code revisions have not negated the need for an alternative. There are no aging factors to consider on the CRDM as they are visually inspected each outage and there has been no change in inspection technology applicable to the overlay process since the request for the last interval.

The basis and justification for the relief request are attached. Luminant Power requests approval of this alternative for use during repair/replacement and examinations to be performed during the upcoming Unit 2 outage if required, and any future replacements or repairs to CRDM canopy seal welds should they become necessary during the second ten-year inservice inspection interval. Approval of this alternative is requested by March 15, 2008 for possible implementation during the refueling outage 2RF10, currently scheduled for the end of March 2008.

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NRR

This communication contains no new licensing basis commitments regarding CPNPP.

If you have any questions regarding this request, please contact Jack Hicks at (254) 897-6725.

Sincerely,

Luminant Generation Company LLC

Mike Blevins

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

Attachment

JCH/jrh

c - E. E. Collins, Region IV
B. K. Singal, NRR
Resident Inspectors, Comanche Peak
A. Jones, TDLR
Brian Welch ANII, Comanche Peak

Luminant Power
Comanche Peak Nuclear Power Plant
Relief Request B-5 for Unit 2
Proposed Alternative In Accordance With 10 CFR 50.55a(a)(3)(ii)
Hardship or Unusual Difficulty without Compensating Increase in Level of Quality or Safety

1. ASME Code Component(s) Affected

Reactor control rod drive mechanism canopy seal welds - Class 1 Appurtenance to the Reactor vessel.

2. Applicable Code Edition and Addenda

ASME Code, Section XI, 1998 Edition with the 2000 Addenda. Designed and fabricated to the ASME Code, Section III, 1974 Edition, Summer 1974 Addenda.

3. Applicable Code Requirements

Article IWA-4340 'Mitigation of Defects by Modification' of the ASME Code, Section XI requires that the modification shall meet the original Construction Code and Owner's requirements for the item. The canopy seal weld is a Code seal weld as described in NB-3227 of Section III and requires a liquid PT examination of the final weld in accordance with NB-5271. As an alternative to the PT examination, this request will require an 8X visual examination of the repair. Additionally, this request includes use of ASME Code Case N-504-2 for guidance to establish the acceptability of a repair by increasing the weld thickness by weld overlay as an alternative to IWA-4300. Furthermore, Luminant Power is requesting the use of Alloy 52 nickel-based weld repair material rather than austenitic stainless steel as required by Code Case N-504-2. Consequently, the ferrite requirements of Code Case N-504-2, Paragraph (e) do not apply.

4. Reason for Request

During an inspection of a CRDM in Unit 1 in 2002, Luminant Power identified boric acid crystal buildup on the CRDM housing. Further investigation revealed evidence of minor leakage at the intermediate CRDM canopy seal weld. The CRDM canopy seal welds are located above the Reactor Vessel Closure Head, which is highly congested and subject to high radiation levels. In the event that Unit 2 develops a similar damaged mechanism, the Code-required repair method would involve excavation of the defects and restoration to the original configuration. The Code repair method requires manual excavation of the defects and manual repair welding, and has a higher risk of failure due to the difficulty of making a quality weld on the canopy seal accompanied by the required back-purging and cleaning. In addition to the difficulty and time required to remove the defect and re-weld the canopy, a similar level of difficulty and resultant time is required for a PT examination of the weld repair. The high radiological dose associated with strict compliance with these requirements would be contrary to the intent of the ALARA (as low as reasonably achievable) radiological controls program. The PT examination would result in an estimated total dose of approximately 0.6 person-Rem per CRDM canopy seal weld.

Luminant Power
Comanche Peak Nuclear Power Plant
Relief Request B-5 for Unit 2
Proposed Alternative In Accordance With 10 CFR 50.55a(a)(3)(ii)
Hardship or Unusual Difficulty without Compensating Increase in Level of Quality or Safety

5. Proposed Alternative and Basis for Use

Luminant Power requests an alternate from the requirements of IWA-4000 in accordance with 10 CFR 50.55a (a)(3)(ii) by proposing an alternative method of repair and nondestructive examination due to hardship and unusual difficulty without a compensating increase in quality or safety.

ASME Code Case N-504-2, 'Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1,' (approved in RG 1.147 Rev. 14, with conditions) will be used as guidance for repair by weld overlay which increases the weld thickness to establish the acceptability of the defect in accordance with IWA-4340. In addition, alloy 52 nickel-based weld repair material will be used rather than austenitic stainless steel as required by Code Case N-504-2. In lieu of performance of PT examinations of CRDM seal weld repairs or replacement, an enhanced 8X visual (VT-l) examination will be performed after welding is completed.

The alternative method of repair and nondestructive examination is being requested to facilitate such a repair in Unit 2 should the need arise for the second interval of Unit 2 operation.

Industry experience with failure analyses performed on leaking canopy seal welds removed from service at other plants has attributed the majority of the cases to transgranular stress corrosion cracking (SCC). The size of the opening where leakage occurs has been extremely small, normally a few thousandths of an inch. The crack orientations vary, but often radiate outward such that a pinhole appears on the surface, as opposed to a long crack. The SCC results from exposure of a susceptible material to residual stress, which is often concentrated by weld discontinuities, and to a corrosive environment, such as water trapped in the cavity behind the seal weld that is mixed with the air initially in the cavity, resulting in higher oxygen content than is in the bulk primary coolant.

As allowed by the guidance of Code Case N-504-2, the CRDM canopy seal weld flaws will not be removed, but an analysis of the repaired weldment will be performed using Paragraph (g) of the Code case as guidance to assure that the remaining flaw will not propagate unacceptably. This analysis establishes the critical flaw size used to qualify the VT-l examination method to ensure capability of detecting a flaw sufficiently small to assure an adequate margin of safety is maintained. The canopy seal weld is not a structural weld, nor a pressure-retaining weld, but provides a seal to prevent reactor coolant leakage if the mechanical joint leaks.

The alternative CRDM canopy seal weld repair uses a Gas Tungsten Arc Welding (GTAW) process and VT-1 examination controlled remotely. The VT-1 examination will use a video camera with approximately 8X magnification within several inches of the weld, qualified to ensure identification of a flaw significantly smaller than the analyzed critical flaw size. The examination technique will be demonstrated to resolve a 0.001 inch thick wire against the surface of the weld. The proposed alternative is an enhanced visual examination technique with resolution and consistency much greater than that provided by the requirements of a Code

Luminant Power
Comanche Peak Nuclear Power Plant
Relief Request B-5 for Unit 2
Proposed Alternative In Accordance With 10 CFR 50.55a(a)(3)(ii)
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(visually unaided) VT-1 and comparable to flaw sizes detectable using PT. Reasonable assurance of the weld integrity is provided based on the capability of the remote visual examination system to resolve flaws of a size 0.001 inch in width. Additionally, alloy 52 nickel-based weld repair material will be used rather than austenitic stainless steel as required by Code Case N-504-2. Alloy 52 nickel-base weld repair material was selected rather than austenitic stainless steel as required by Code Case N-504-2, Paragraph (b), for the repair because of its resistance to stress corrosion cracking. Consequently, the ferrite requirements of Code Case N-504-2, Paragraph (e) do not apply. The repair will be documented on Form NIS-2A, reviewed by the Authorized Nuclear Inspector, and maintained in accordance with the requirements for archiving permanent plant records.

The GTAW weld repair and VT-l examination methods result in significantly lower radiation exposure because the equipment is remotely operated after setup.

The use of remote visual examination and pressure test provide weld integrity for the multiple layer seal weld repair or the seal weld replacement. The radiation exposure associated with performance of a Code-required repair or surface examination would not result in a compensating increase in the level of quality and safety.

6. **Duration of Proposed Alternative**

Luminant Power requests this alternative for the second 10 year interval of the plant. The use of this alternative is requested until the Code Case is revised and the NRC publishes the Code Case in a future revision of RG. 1.147. No undue risk to the public health and safety is presented by this request.

7. **Precedents:**

1. Letter from Robert A. Gramm (NRC) to William T. Cottle (STP NOC) dated November 5, 2002; Subject: Request for Relief (TAC No. MB6576 and MB6577)

2. Letter from Robert A. Gramm (NRC) to C. Lance Terry (TXU Energy) dated January 3, 2003; Subject Request for Relief (TAC No. MB6867)

3. Letter from Robert A. Gramm (NRC) to C. Lance Terry (TXU Energy) dated March 21, 2003; Subject Request for Relief (TAC No. MB7742)