September 28, 2001

Mr. C. Lance Terry
Senior Vice President
& Principal Nuclear Officer
TXU Electric
Attn: Regulatory Affairs Department
P. O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES), UNITS 1 AND 2 - APPROVAL OF RELIEF REQUEST FOR APPLICATION OF RISK-INFORMED INSERVICE INSPECTION PROGRAM FOR AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE CLASS 1 AND 2 PIPING (TAC NOS. MB1201 and MB1202)

Dear Mr. Terry:

By letter dated February 15, 2001, you requested approval of an alternative risk-informed inservice inspection (RI-ISI) program for American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1 and 2 piping welds for CPSES, Units 1 and 2. The letter included an enclosure describing the proposed program. Additional information was provided in your letter dated July 20, 2001, and an email dated August 22, 2001 (available to the public via the Agencywide Documents Access and Management System under accession number ML012360194). Your letter dated July 20, 2001, was in response to our request for additional information dated July 9, 2001.

The RI-ISI program for CPSES was developed in accordance with Electric Power Research Institute Topical Report TR-112657, Revision B-A, using the Nuclear Energy Institute template methodology. Based on the enclosed safety evaluation, we conclude that the proposed RI-ISI program is an acceptable alternative to the requirements of Section XI of the ASME Code for inservice inspection. Therefore, your request for relief is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety. The relief is authorized for the second 10-year ISI interval for CPSES Unit 1 and the first 10-year ISI interval for CPSES Unit 2.

Sincerely,

/RA/

Robert A. Gramm, Chief, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure: Safety Evaluation

cc w/encl: See next page

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Docket Nos. 50-445 and 50-446

Enclosure: Safety Evaluation

cc w/encl: See next page

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* See previous concurrence # Comments by OGC were incorporated

ADAMS Accession No.: ML012710112 EMCB/SPSB SE Memo dated 08/28/01

OFFICE	PDIV-2/PM	PDIV-1/LA	PDIV-1/PM	OGC	PDIV-1/SC
NAME	JDonohew:lf	DJohnson*	DJaffe	RHoefling*#	RGramm
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Comanche Peak Steam Electric Station

cc:

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RISK-INFORMED INSERVICE INSPECTION PROGRAM

TXU ELECTRIC

COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-445 AND 50-446

1.0 INTRODUCTION

By application dated February 15, 2001 (Reference 1), TXU Electric (the licensee) proposed a risk-informed inservice inspection (RI-ISI) program as an alternative to a portion of their current inservice inspection (ISI) program for Comanche Peak Steam Electric Station, Unit 1 and 2 (CPSES). The scope of the RI-ISI program is limited to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (the ASME Code) Class 1 and 2 piping (Categories B-F, B-J, C-F-1, and C-F-2 welds) only. Additional information was provided in a letter from the licensee dated July 20, 2001 (Reference 2) and in an email dated August 22, 2001 (available to the public via the Agencywide Documents Access and Management System (ADAMS) under accession number ML012360194). The licensee's letter dated July 20, 2001, was in response to the staff's request for additional information (RAI) dated July 9, 2001 (see also ADAMS accession numbers ML011780473 and ML011580354).

The licensee's RI-ISI program was developed in accordance with the methodology contained in the Electric Power Research Institute (EPRI) Topical Report (TR) EPRI TR-112657, Revision B-A (Reference 3), which was previously reviewed and approved by the staff. Reference 3 contains the letter issued by the staff on October 28, 1999, that approved the topical report. CPSES, Unit 1, is currently in its second 10-year ISI interval, and CPSES, Unit 2, is currently in its first 10-year ISI interval. The RI-ISI program proposed by the licensee is an alternative pursuant to 10 CFR 50.55a(a)(3)(i).

2.0 BACKGROUND

2.1 Applicable Requirements

Pursuant to 10 CFR 50.55a(g), the ISI of the ASME Code Class 1, 2, and 3 components must be performed in accordance with Section XI of the ASME Code, "Rules for Inservice Inspection of Nuclear Power Plant Components," and applicable addenda, except where specific written relief has been granted by the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). The regulation 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements set forth in the ASME Code, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that ISI of components conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

CPSES, Unit 1, began its second 10-year interval on August 14, 2000, and CPSES, Unit 2, began its first 10-year interval on August 3, 1993. The applicable edition of the ASME Code for both units is the 1986 edition.

2.2 Summary of Proposed Approach

The licensee has proposed to use a RI-ISI program for ASME Code Class 1 and 2 piping (Examination Categories B-F, B-J, C-F-1, and C-F-2 welds), as an alternative to the ASME Code, Section XI requirements. The ASME Code requires in part that for each successive 10-year ISI interval, 100% of Category B-F welds and 25% of Category B-J welds for the ASME Code Class 1 non-exempt piping be selected for volumetric and/or surface examination, based on existing stress analyses and cumulative usage factors. For Category C-F welds, 7.5% of non-exempt welds are selected for volumetric and/or surface examination. The application follows the staff-approved RI-ISI process and methodology delineated in Reference 3.

By assessing piping failure potential and piping failure consequences, and performing probabilistic risk assessment (PRA) and safety significance ranking of piping segments, the number of inspection locations is significantly reduced. However, the RI-ISI program retains the fundamental requirements of the ASME Code, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements and quality control requirements. Thus ISI program requirements of other non-related portions of the ASME Code, Section XI are unaffected.

The licensee stated that the augmented ISI program for flow accelerated corrosion (FAC) implemented in response to NRC Bulletin 89-08, “Erosion/Corrosion - Induced Pipe Wall Thinning,” is not changed by the RI-ISI program. The licensee also indicated that, in response to the staff’s statement that the licensee should reconsider redistributing the 7.5% sample to include volumetric examination of welds on the discharge side of the containment spray pumps in item (2) on page 6-4 of Supplement 26 to NUREG-0797 (Reference 8), it committed to performing volumetric examinations on 7.5% of the exempt welds in portions of the CPSES, Unit 1, containment spray and residual heat removal systems piping that is less than 0.375 inches thick during each 10-year interval. This piping is included in the scope of the RI-ISI application and is thus subsumed by the program. Other remaining augmented ISI programs are either unaffected or modified in accordance with the guidance of Reference 3.

According to the licensee’s application, CPSES, Unit 1, is currently in the second 10-year interval that started on August 14, 2000, while CPSES, Unit 2, is currently in the first 10-year interval that started on August 3, 1993. Unit 1 is currently at the start of the first period of its second inspection interval. The licensee stated that 100% of the required RI-ISI program inspections will be completed in the second interval. Unit 2 is currently at the start of the third period of its first inspection interval. The licensee stated that 53% of the examinations required by ASME Code, Section XI have been completed. The licensee further stated that 47% of the RI-ISI examinations will be performed during the third period, so that 100% of the selected examinations are performed during the interval. In response to a staff question, the licensee stated in Reference 2 that the remaining 47% RI-ISI examinations will be based on risk categorization and that the more risk significant welds will be inspected first.

The implementation of an RI-ISI program for piping should be initiated at the start of a plant's 10-year ISI interval consistent with the requirements of the ASME Code and Addenda committed to by the licensee in accordance with 10 CFR 50.55a. However, the implementation may begin at any point in an existing interval, as long as the examinations are scheduled and distributed consistent with the ASME Code requirements (e.g., the minimum examinations completed at the end of the three inspection periods under ASME Code Program B should be 16%, 50%, and 100%, respectively, and the maximum examinations credited at the end of the respective periods should be 34%, 67%, and 100%, respectively). In Reference 1, the licensee stated that the ASME Code minimum and maximum inspection requirements will be met.

It is also the staff's view that the inspections for the RI-ISI program and for the balance of the ISI program should be on the same interval start and end dates. This can be accomplished by either implementing the RI-ISI program at the beginning of the interval, or merging the RI-ISI program into the ISI program for the balance of the inspections if the RI-ISI program is to begin during an existing ISI interval. One reason for this view is that it eliminates the problem of having different ASME Codes of record for the RI-ISI program and for the balance of the ISI program. A potential problem with using two different interval start dates, and hence two different ASME Codes of record, would be having two sets of repair/replacement rules depending upon which program identified the need for repair (e.g., a weld inspection versus a pressure test). According to the information provided in Reference 1, the licensee will merge the RI-ISI program into the existing ISI program so that the 10-year interval start and end dates will not be impacted.

3.0 EVALUATION

Pursuant to 10 CFR 50.55a(a)(3)(i), the staff has reviewed and evaluated the licensee's proposed RI-ISI program, including those portions related to the applicable methodology and processes contained in Reference 3, based on guidance and acceptance criteria provided in Regulatory Guides (RGs) 1.174 (Reference 4) and 1.178 (Reference 5), and in Standard Review Plan (SRP) Chapter 3.9.8 (Reference 6).

3.1 Proposed Changes to the ISI Program

The scope of the licensee's proposed RI-ISI program is limited to ASME Code Class 1 and Class 2 piping welds for the following Examination Categories: B-F for pressure retaining dissimilar metal welds in vessel nozzles, B-J for pressure retaining welds in piping, C-F-1 for pressure retaining welds in austenitic stainless steel or high alloy piping, and C-F-2 for pressure retaining welds in carbon or low alloy steel piping. The RI-ISI program is proposed as an alternative to the existing ISI requirements of the ASME Code, Section XI. A general description of the proposed changes to the ISI program is provided in Attachment 1, Sections 3 and 5, of Reference 1.

During the course of its review, the staff verified that the proposed RI-ISI program is consistent with the guidelines contained in Reference 3, which states that industry and plant-specific piping failure information, if any, is to be utilized to identify piping degradation mechanisms and failure modes, and consequence evaluations are to be performed using PRAs to establish piping segment safety ranking for determining new inspection locations. Thus the staff concludes that the licensee's application of the Reference 3 approach is an acceptable alternative to the current CPSES, Unit 1 and Unit 2, piping ISI requirements with regard to the number, locations, and methods of inspections, and provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(i).

3.2 Engineering Analysis

In accordance with the guidance provided in References 4 and 5, an engineering analysis of the proposed changes is required using a combination of traditional engineering analyses and supporting insights from the PRA. The licensee elaborated as to how the engineering analyses conducted for the CPSES, Unit 1 and Unit 2, RI-ISI program ensure that the proposed changes are consistent with the principles of defense-in-depth and that adequate safety margins will be maintained. This is accomplished by evaluating a location's susceptibility to a particular degradation mechanism and then performing an independent assessment of the consequence of a failure at that location.

The licensee's RI-ISI program at CPSES, Unit 1 and Unit 2, is limited to ASME Code Class 1 and 2 piping welds. The licensee stated in its submittal that other non-related portions of the ASME Code will be unaffected by this program. Piping systems defined by the scope of the RI-ISI program were divided into piping segments. Pipe segments are defined as lengths of pipe whose failure leads to similar consequences and are exposed to the same degradation mechanisms. That is, some lengths of pipe whose failure would lead to the same consequences may be split into two or more segments when two or more regions are exposed to different degradation mechanisms.

In Reference 1, the licensee stated that failure potential categories were generated utilizing industry failure history, plant-specific failure history, and other relevant information using the guidance provided in Reference 3. The degradation mechanisms identified in the submittal include thermal fatigue, including thermal stratification, cycling and striping (TASCS), and thermal transients (TT); intergrannular stress corrosion cracking (IGSCC); and FAC. The licensee stated in Section 2.2, of Attachment 1 to Reference 1, that the augmented inspection program for FAC is relied upon to manage this mechanism, and is not changed by the RI-ISI program. The augmented inspection program for high energy break exclusion piping is also not affected by the RI-ISI program. In response to Reference 8, the licensee had committed to volumetric examinations of portions of Unit 1 containment spray and residual heat removal systems piping less than 0.375 inch-thick even though ASME Code, Section XI does not require surface or volumetric examinations on this piping. Section 2.2, of Attachment 1 to Reference 1, states that this piping was included in the scope of the RI-ISI application. In response to a staff question, the licensee stated in Reference 2 that this commitment was revised in accordance with Nuclear Energy Institute (NEI) 99-04, "Guidelines for Managing Commitment Changes," to state that, in lieu of selecting 7.5% of the thin wall (less than 0.375 inch) discharge piping welds for the containment spray and residual heat removal system pumps, the selection of welds will be based on the RI-ISI methodology. The staff finds that this selection of welds, based on the RI-ISI methodology, to be acceptable because the inspections are focused on locations with potential for flaws and with higher failure consequences under the RI-ISI program.

In Section 3, of Attachment 1 to Reference 1, of the application, the licensee described a deviation to the EPRI RI-ISI methodology for assessing the potential for TASCS that was implemented by the licensee for CPSES. In Reference 2, the licensee stated that the methodology for assessing TASCS in the CPSES RI-ISI submittal is identical to the Materials Reliability Project (MRP) methodology in EPRI TR-1000701, “Interim Thermal Fatigue Management Guideline (MRP-24),” January 2001 (ADAMS Accession No. ML011070238). The staff has reviewed the guidance for evaluating TASCS in EPRI TR-1000701 and finds it to be acceptable. The licensee further stated that it will update the RI-ISI program based on the final EPRI MRP guidance if warranted.

3.3 Probabilistic Risk Assessment

In Reference 2, the licensee stated that in February 2000, it completed an extensive update of the CPSES Individual Plant Examination (IPE), which is now referred to as the CPSES PRA. The licensee further stated in Reference 2 that the PRA model was then incorporated into Revision 1 of the CPSES Safety Monitor. The licensee used its CPSES Safety Monitor, Revision 1, as a model to evaluate the consequences of pipe rupture for the RI-ISI assessment. In Reference 1, the licensee stated that the estimated base core damage frequency (CDF) is 1.83E-5/year, and the estimated base large early release frequency (LERF) is 1.97E-6/year from the CPSES Safety Monitor. In Reference 2, the licensee stated that the CPSES Safety Monitor is essentially the same as the CPSES PRA. Although the CPSES Safety Monitor has less detailed modeling to describe plant damage states for the Level 2 analysis, the licensee further stated that it conforms to the CPSES PRA. In Reference 1, the licensee states that 14.2% of Unit 1 and 13.9% of Unit 2 Class 1 non-socket welds will be inspected. Experience with previous RI-ISI submittals indicates that changes in risk associated with ISI programs that inspect about 10% of Class 1 non-socket welds are consistently within the EPRI and staff guidelines. Therefore, the staff finds the licensee’s use of a slightly simplified model of the PRA to support this submittal is adequate for use in their RI-ISI program.

The licensee stated in Reference 1 that the CPSES IPE was reviewed through an internal review by the licensee and external review by PRA experts. The CPSES IPE was submitted to the staff on August 28 and October 30, 1992, and supplemented by responses in letters dated June 14 and October 24, 1996, on the IPE. The IPE estimated a CDF of 5.7E-5/year. The staff evaluation report (SER) on the CPSES IPE, issued March 10, 1997, concluded that the IPE satisfied the intent of Generic Letter 88-20, “Individual Plant Examination for Severe Accident Vulnerabilities,” dated November 23, 1988, and its supplements. However, in its SER, the staff noted that the licensee, as part of the human reliability analysis (HRA), credited local repair of various equipment and systems but did not take into account certain plant-specific factors. In Reference 2, the licensee stated that plant-specific factors were taken into account and provided a description illustrating the factors considered when crediting recovery of failed equipment in their HRA analysis.

The staff did not review the IPE analysis to assess the accuracy of the quantitative estimates. The staff recognizes that the quantitative results of the IPE are used as order of magnitude estimates for several risk and reliability parameters used to support the assignment of segments into three broad consequence categories. Inaccuracies in the models or in assumptions large enough to invalidate the broad categorizations developed to support RI-ISI should have been identified during the staff’s review of the IPE and by the licensee’s model update control program. Minor errors or inappropriate assumptions will affect only the consequence categorization of a few segments and will not invalidate the general results or conclusions. The staff finds that the quality of the licensee's PRA sufficient to support the proposed RI-ISI program.

The degradation category and the consequence category were combined, according to the approved methodology described in Reference 3, to categorize the risk significance of each segment. The risk significance of each segment is used to determine the number of weld inspections required in each segment.

As required by Section 3.7 of Reference 3, the licensee evaluated the change in risk expected from replacing the current ISI program with the RI-ISI program. The calculations estimated the change in risk due to removing locations and adding locations to the inspection program. The expected change in risk was quantitatively evaluated using the "Simplified Risk Quantification Method" described in Section 3.7.2 of Reference 3. For high consequence category segments, the licensee used the conditional core damage probability (CCDP) and conditional large early release probability (CLERP) based on the highest estimated CCDP and CLERP. For medium consequence category segments, bounding estimates of CCDP and CLERP were used. The licensee estimated the change in risk using bounding pipe failure rates from the EPRI methodology.

The licensee performed their bounding analysis with and without taking credit for an increased probability of detection (POD). In Reference 1, for CPSES, Unit 1, the licensee estimated the aggregate change in CDF to be about 4.54E-9/year and aggregate change in LERF to be about 1.82E-9/year. These changes did not include credit for any increased POD due to the use of improved inspection techniques. Including the expected increased POD, the licensee estimated the aggregate change in CDF to be about -7.18E-9/year and aggregate change in LERF to be about -2.9E-9/year for Unit 1.

For CPSES, Unit 2, the licensee estimated the aggregate change in CDF to be about 4.76E-9/year and aggregate change in LERF to be about 1.93E-9/year, again excluding credit for any increased POD due to the use of improved inspection techniques. Including the expected increased POD, the licensee estimated an aggregate change in CDF of -9.73E-9/year and aggregate change in LERF of -3.91E-9/year for Unit 2.

The staff finds that the licensee's process to evaluate and bound the potential change in risk is reasonable because it accounts for the change in the number and location of elements inspected, recognizes the difference in degradation mechanism related to failure likelihood, and considers the effects of enhanced inspection. System level and aggregate estimates of the changes in CDF and LERF are less than the corresponding guideline values in Reference 3. The staff finds that re-distributing the welds to be inspected with consideration of the safety-significance of the segments, provides assurance that segments whose failures have a significant impact on plant risk receive an acceptable and often improved level of inspection. Therefore, the staff concludes that the implementation of the RI-ISI program as described in the licensee's application will have a small impact on risk consistent with the guidelines of Reference 4.

3.4 Integrated Decisionmaking

As described in Reference 1, an integrated approach is utilized in defining the proposed RI-ISI program by considering, in concert, the traditional engineering analysis, risk evaluation, and the implementation and performance monitoring of piping under the program. This is consistent with the guidelines of Reference 5.

The selection of pipe segments to be inspected using the results of the risk category rankings and other operational considerations is described in Section 3.5 of Attachment 1 of Reference 1. Tables 3.5-1 and 3.5-2 provide the number of locations and inspections by risk category for the various systems in CPSES, Unit 1 and Unit 2, respectively. Table 5-2-1 in Attachment 1 of Reference 1 compares the number of inspections required under the existing ASME Code, Section XI ISI program with the alternative RI-ISI program for Unit 1 and Table 5-2-2 provides the same information for Unit 2. The risk impact analysis results for each system for Unit 1 and Unit 2 are provided in Tables 3.6-1 and Table 3.6-2, respectively. The licensee used the methodology described in Reference 3 to guide the selection of examination elements within high and medium risk-ranked piping segments. The methodology described in Reference 3 requires that existing augmented programs, other than thermal fatigue and IGSCC Category A piping welds, which the RI-ISI program subsumes, be maintained. Reference 3 describes targeted examination volumes (typically associated with welds) and methods of examination based on the type(s) of degradation expected. The staff has reviewed these guidelines and has determined that, if implemented as described, the RI-ISI examinations should result in improved detection of service-related degradations over those currently required by ASME Code, Section XI.

The staff finds that the location selection process is acceptable since it is consistent with the process approved for Reference 3, takes into account defense-in-depth, and includes coverage of systems subjected to degradation mechanisms in addition to those covered by augmented inspection programs.

The objective of the ISI required by ASME Code, Section XI is to identify conditions (i.e., flaw indications) that are precursors to leaks and ruptures in the pressure boundary that may impact plant safety. Therefore, the RI-ISI program should meet this objective if found to be acceptable for use. Further, since the risk-informed program is based on inspection for cause, element selection should target specific degradation mechanisms. The inspection for cause approach involves identification of specific damage mechanisms that are likely to be operative, the location where they may be operative, and appropriate examination methods and volumes specific to address the damage mechanisms.

Chapter 4 of Reference 3 provides guidelines for the areas and/or volumes to be inspected, as well as the examination method, acceptance standard, and evaluation standard for each degradation mechanism. Based on review of the cited portion of Reference 3, the staff concludes that the examination methods for the proposed RI-ISI program are appropriate since they are selected based on specific degradation mechanisms, pipe sizes, and materials of concern.

3.5 Implementation and Monitoring

Implementation and performance monitoring strategies require careful consideration by the licensee and are addressed in Element 3 of References 5 and 6. The objective of Element 3 is to assess the performance of the affected piping systems under the proposed RI-ISI program by implementing monitoring strategies that confirm the assumptions and analyses used in the development of the RI-ISI program. To approve an alternative pursuant to 10 CFR 50.55a(a)(3)(i), the staff must conclude that implementation of the RI-ISI program, including inspection scope, examination methods, and methods of evaluation of examination results, must provide an adequate level of quality and safety.

The licensee stated that, upon approval of the RI-ISI program, procedures that comply with the guidelines in Reference 3 will be prepared to implement and monitor the RI-ISI program. The licensee confirmed that the applicable portions of the ASME Code, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements, and quality control requirements would be retained.

The licensee stated in Section 4, of Attachment 4 of Reference 1, that the RI-ISI program is a living program and its implementation will require feedback of new, relevant information to ensure the appropriate identification of safety significant piping locations. The submittal also states that, as a minimum, risk ranking of piping segments will be reviewed and adjusted on an ASME Code period basis, and that significant changes may require more frequent adjustment as directed by NRC bulletin or generic letter requirements, or by industry and plant-specific feedback.

In response to the staff’s request for further clarification, the licensee stated in Reference 7 that the ISI Program will be updated and submitted to the NRC consistent with regulatory requirements in effect at the time such update is required (currently every 10 years). The licensee stated that this may again take the form of a relief request to implement an updated RI-ISI program depending on future regulatory requirements. Reference 7 also stated that the RI-ISI program will be resubmitted to the NRC prior to the end of any 10-year ISI interval if there is some deviation from the RI-ISI methodology described in the initial 10-year interval ISI submittal to NRC for that interval, or if industry experience determines that there is a need for significant revision to the program as described in the initial 10-year interval ISI submittal to NRC for that interval.

The licensee presented the criteria, in Reference 1, for engineering evaluation and additional examinations if unacceptable flaws or relevant conditions are found during examinations. The licensee further stated in Reference 1 that the evaluation will include whether other elements in the segment or segments are subject to the same root cause conditions. In Reference 7, the licensee clarified that additional examinations will be performed on these elements up to a number equivalent to the number of elements required to be inspected on the segment or segments scheduled for the current outage. Reference 7 also stated that elements selected for additional examinations will be selected based on the root cause or damage mechanism and will include high risk-significant, as well as medium risk-significant elements (if needed), to reach the required number of additional elements. The licensee will revise its procedures for ISI data evaluation and expanded scope examinations to include these requirements.

The proposed periodic reporting requirements meet existing ASME Code requirements and applicable regulations and, therefore, are acceptable. The staff finds that the proposed process for RI-ISI program updates meets the guidelines of Reference 4 which provide that risk-informed applications should include performance monitoring and feedback provisions; therefore, the licensee's proposed process for program updates is acceptable.

4.0 CONCLUSIONS

In accordance with 10 CFR 50.55a(a)(3)(i), proposed alternatives to regulatory requirements may be used when authorized by the NRC when the applicant demonstrates that the alternative provides an acceptable level of quality and safety. In this case, the licensee's proposed alternative is to use the risk-informed process described in the NRC-approved Reference 7.

The staff finds that the results of the different elements of the engineering analysis are considered in an integrated decisionmaking process. The impact of the proposed change in the ISI program is founded on the adequacy of the engineering analysis and acceptable change in plant risk in accordance with the guidelines in References 4 and 5.

The CPSES methodology also considers implementation and performance monitoring strategies. Inspection strategies ensure that failure mechanisms of concern have been addressed and there is adequate assurance of detecting damage before structural integrity is affected. The risk significance of piping segments is taken into account in defining the inspection scope for the RI-ISI program.

System pressure tests and visual examination of piping structural elements will continue to be performed on all Class 1, 2, and 3 systems in accordance with the ASME Code, Section XI program. The RI-ISI program applies the same performance measurement strategies as existing ASME Code requirements and, in addition, increases the inspection volumes at weld locations that are exposed to thermal fatigue.

The CPSES methodology provides for conducting an engineering analysis of the proposed changes using a combination of engineering analysis with supporting insights from a PRA. Defense-in-depth and quality are not degraded in that the methodology provides reasonable confidence that any reduction in existing inspections will not lead to degraded piping performance when compared to existing performance levels. Inspections are focused on locations with active degradation mechanisms, as well as selected locations that monitor the performance of system piping. As discussed in Section 3.2 above, the licensee will address any staff concern, if applicable, as a result of a separate, ongoing review on the generic report MRP-24 regarding alternative TASCS screening criteria.

The staff's review of the licensee's proposed RI-ISI program concludes that the program is an acceptable alternative to the current ISI program, which is based on ASME Code, Section XI, requirements for Class 1 and Class 2 welds. In Section 3.1 above, the staff concluded that the licensee's proposed RI-ISI program, as described in its application and supplemental responses to the staff, will provide an acceptable level of quality and safety pursuant to 10 CFR 50.55a(a)(3) with regard to the number of inspections, locations of inspections, and methods of inspections. Therefore, the licensee's request for relief is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the request provides an acceptable level of quality and safety. This safety evaluation authorizes application of the proposed RI-ISI program during the second 10-year ISI interval for CPSES, Unit 1, and the first 10-year ISI interval for CPSES, Unit 2.

5.0 REFERENCES

1. Letter, dated February 15, 2001, C. Lance Terry to U. S. Nuclear Regulatory Commission, containing *Risk-Informed Inservice Inspection Program Plan Comanche Peak Steam Electric Station Units 1 and 2*.

2. Letter, dated July 20, 2001, C. Lance Terry to U. S. Nuclear Regulatory Commission, containing *Additional Information related to Risk-Informed Inservice Inspection Program Plan Comanche Peak Steam Electric Station Units 1 and 2*.

3. EPRI TR-112657, Revision B-A, *Revised Risk-Informed Inservice Inspection Evaluation Procedure*, January 2000.

4. NRC Regulatory Guide 1.174, *An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis*, July 1998.

5. NRC Regulatory Guide 1.178, *An Approach for Plant-Specific Risk-Informed Decisionmaking Inservice Inspection of Piping*, September 1998.

6. NRC NUREG-0800, Chapter 3.9.8, *Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping*, September 1998.

7. ADAMS Accession No. ML012360194 (Email, dated August 22, 2001, Obaid Bhatty to Jack Donohew, Project Manager, U. S. Nuclear Regulatory Commission, on *Additional Questions on CPSES RI-ISI Application.)*

8. Supplement No. 26 to NUREG-0797, “Safety Evaluation Report Related to the Operation of Comanche Peak Steam Electric Station, Unit 2,” Docket No. 50-446, Texas Utilities Electric Company, et. al., Dated February 1993.

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