December 13, 2001

Mr. Otto L. Maynard
President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KS 66839

SUBJECT: 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 FOR WOLF CREEK GENERATING STATION (WCGS) (TAC NO. MB1206)

Dear Mr. Maynard:

By letter dated February 15, 2001 (ET 01-0009), 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 WCGS. The letter included an enclosure describing the proposed program. Additional information was provided in your letter dated September 27, 2001 (ET 01-0028), which was in response to our request for additional information dated September 5, 2001.

The RI-ISI program for WCGS 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 WCGS.

Sincerely,

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosure: Safety Evaluation

cc w/encl: See next page

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President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
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EMCB and PSAB Memo dated November 20, 2001

ADAMS Accession No.: ML013200130

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<u>SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION</u>

<u>RELATED TO RISK-INFORMED INSERVICE INSPECTION PROGRAM</u>

<u>WOLF CREEK NUCLEAR OPERATING CORPORATION</u>

<u>WOLF CREEK GENERATING STATION, UNIT 1</u>

<u>DOCKET NO. 50-482</u>

1.0 INTRODUCTION

By application dated February 15, 2001 (Reference 1), Wolf Creek Nuclear Operating Corporation (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 Wolf Creek Generating Station, Unit 1 (WCGS). 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 September 27, 2001 (Reference 2). The licensee's letter dated September 27, 2001, was in response to the staff's request for additional information dated September 5, 2001. There was also a conference call on October 30, 2001, with the licensee to clarify one of the licensee's responses in its letter of September 27, 2001 (ADAMS Accession No. ML013060256).

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 TR. WCGS is currently in its second 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 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.

WCGS began its second 10-year interval in September 1995. The applicable edition of the ASME Code, Section XI for the unit is the 1989 Edition, no addenda.

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 percent of Category B-F welds and 25 percent 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 percent 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.

The number of inspection locations is significantly reduced by assessing piping failure potential and piping failure consequences, and performing probabilistic risk assessment (PRA) and safety significance ranking of piping segments. 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 the augmented inspection program for high energy "No Break Zone" piping is not affected by this RI-ISI program. Other remaining augmented ISI programs are either unaffected or modified in accordance with the guidance of Reference 3.

According to the information provided in Reference 1, WCGS is currently in the middle of the second period of its second 10-year interval that started in September 1995. The licensee stated that 33 percent of the examinations required by ASME Section XI have been completed. The licensee further stated that 67 percent of the RI-ISI examinations will be performed during the remaining second and third periods so that 100 percent of the selected examinations are performed during the interval. In response to a staff question (Reference 2), the licensee stated that the remaining 67 percent 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 percent, 50 percent, and 100 percent, respectively, and the maximum examinations credited at the end of the respective periods should be 34 percent, 67 percent, and 100 percent, respectively).

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 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, 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 Sections 3 and 5 of Attachment 1 to 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 WCGS piping ISI requirements with regards 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 WCGS RI-ISI program ensure that the proposed changes are consistent with the principles of defense-in-depth. 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. No changes to the evaluation of design basis accidents in the Updated Safety Analysis Report are being made in the RI-ISI process. Therefore, sufficient safety margins will be maintained.

The licensee's RI-ISI program at WCGS is limited to ASME Code Class 1 and 2 piping welds. The licensee stated in Reference 1 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; 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.

In Section 3 of Attachment 1 to Reference 1, the licensee described a deviation to the EPRI RI-ISI methodology for assessing the potential for TASCS that was implemented by the licensee. In Reference 2, the licensee stated that the methodology for assessing TASCS in the WCGS 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. 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.

Additionally, the licensee stated that the consequences of pressure boundary failure were evaluated and ranked based on their impact on core damage and containment performance (isolation, bypass and large early release), and that the impact due to both direct and indirect effects was considered using guidance provided in EPRI TR-112657. The licensee reported no deviations from the consequence evaluation methodology in EPRI TR-112657. The licensee further stated that shutdown operation and external events are included in the analysis. Based on above discussion, the staff finds the consequence evaluation performed for this application to be acceptable.

3.3 Probabilistic Risk Assessment

The licensee used its August 1999, update of the Wolf Creek PRA model to evaluate the consequences of pipe rupture for the RI-ISI assessment. In August 2000, this version of the PRA was evaluated by the Westinghouse Owners Group Peer Review process. The licensee reported a core damage frequency (CDF) of 5.5E-5/year (excluding internal flooding) and a large early release frequency (LERF) of 8.3E-7/year.

The Individual Plant Examination (IPE) was originally submitted in September 1992 and a modified analysis which revised the human reliability analysis (HRA) and common cause failure analysis was submitted in May 1996. The staff evaluation report (SER), dated November 18, 1996, concluded that the WCGS IPE satisfied the intent of Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities." However, in its SER on the IPE, the staff noted that only a few miscalibration errors were modeled and that time critical human actions might not have been appropriately modeled. In Reference 2, the licensee stated that an evaluation to address this apparent weakness included a review of reported instrument failure events over a ten-year period, a review of events modeled in plants similar to WCGS, and a review of the impact of failures on operator actions dependent on these instruments. The licensee further described the current HRA that compares the time available to the time needed to diagnose and perform the required action.

The staff SER on the IPE also noted five enhancements identified by the licensee in their IPE that, if implemented, would decrease CDF. In Reference 2, the licensee described the current status of the enhancements. Three of these enhancements have been completed and are reflected in the current PRA. One enhancement, installation of high temperature qualified reactor coolant pump (RCP) seal O-rings, is not completed and not reflected in the PRA. The final enhancement, replacement of the positive displacement charging pump (PDP) with a third centrifugal charging pump (CCP), has been completed. In the conference call of October 30, 2001 (ADAMS Accession No. ML013060256), the licensee clarified that, when modeled in the PRA, the PDP's dependency on the component cooling water (CCW) was inadvertently left in the model of the CCP even though the CCP is not dependent on the CCW. The EPRI method categorizes each segment independently based on the magnitude of the conditional core damage probability (CCDP) and conditional large early release probability (CLERP). Correcting the model by removing the dependent failure would only reduce the CCDPs and CLERPs. Therefore the categorization in the RI-ISI submittal is, if affected at all, conservative, and the analysis is adequate to support the RI-ISI submittal.

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 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 CCDP and the CLERP based on the highest estimated CCDP and CLERP. For medium consequence category segments, bounding estimates of CCDP and CLERP were used.

The licensee performed their bounding analysis with and without taking credit for an increased probability of detection (POD). In Reference 1, the licensee estimated the aggregate change in CDF to be about -5.75E-9/year and estimated the aggregate change in LERF to be about -3.40E-10/year excluding credit for any increased POD due to the use of improved inspection techniques. Including the expected increased POD results in an aggregate estimated change in CDF of -3.05E-8/year and an aggregate estimated change in LERF of -1.8 E-9/year for WCGS.

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. Table 3.5-1 provides the number of locations and inspections by risk category for the various systems in WCGS. Tables 5-1 and 5-2 in Attachment 1 to Reference 1 compares the number of inspections required under the existing ASME Code, Section XI ISI program with the alternative RI-ISI program for WCGS. The risk impact analysis results for each system are provided in Table 3.6-1. 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, provides 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 to 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 2 that the ISI program will be updated and submitted to the NRC consistent with regulatory requirements in effect at the time such an 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 2 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 Reference 1, or if industry experience determines that there is a need for significant revision to the program as described in Reference 1.

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 2, 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 2 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 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 3.

The staff finds that the results of the different elements of the engineering analysis are considered in an integrated decision-making 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 WCGS 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 WCGS 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 WCGS.

5.0 REFERENCES

1. Letter (ET 01-0009), Richard A. Muench to U. S. Nuclear Regulatory Commission, "Relief Request for Application of an Alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI Examination Requirements for Class 1 and 2 Piping Welds, Wolf Creek Generating Station," February 15, 2001.

2. Letter (ET 01-0028), Richard A. Muench to U. S. Nuclear Regulatory Commission, "Response to NRC Request for Additional Information Regarding Relief Request for Application of an Alternative to the ASME Boiler and Pressure Vessel Code Section XI Examination Requirements for Class 1 and 2 Piping Welds, Wolf Creek Generating Station," September 27, 2001.

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.

Principal Contributors: Syed Ali
Stephen Dinsmore

Date: December 13, 2001