Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37384-2000

March 23, 2001

10 CFR 50.55a

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

Gentleman:

In the Matter of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

SEQUOYAH NUCLEAR PLANT - REQUEST FOR APPROVAL OF THE SQN AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI ALTERNATE INSERVICE INSPECTION PROGRAM - RISK INFORMED INSERVICE INSPECTION (RI-ISI)

Pursuant to 10 CFR 50.55a(a)(3)(i) TVA requests NRC review and approval of the enclosed (Enclosure 1) RI-ISI Program for Sequoyah Units 1 and 2. The RI-ISI Program is provided as an alternative to current ASME Section XI, 1989 Edition ISI requirements for Code Class 1 and Class 2 piping. The RI-ISI Program has been developed in accordance with the Westinghouse Owners Group (WOG) Topical Report, WCAP-14572, Revision 1-NP-A, entitled "Westinghouse Owners Group Application Of Risk-Informed Methods to Piping Inservice Inspection Topical Report," and WCAP-14572, Revision 1-NP-A Supplement 1, entitled "Westinghouse Structural Reliability and Risk Assessment (SRRA) Model For Piping Risk-Informed Inservice Inspection."

The enclosed RI-ISI Program supports the conclusion that the program alternatives provide an acceptable level of quality and safety as required by 10 CFR 50.55a(a)(3)(i). This program submittal has been reviewed by Sequoyah's Plant Operations and Review Committee (Meeting #5997).

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It should be noted that TVA considers implementation of the RI-ISI Program to be a Cost Beneficial Licensing Action. Quality of the plant is enhanced because the code required inservice inspections are specifically tailored to an identified failure mechanism. In addition, the safety of the plant is slightly improved. Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) for both units will be slightly reduced as the result of implementing the RI-ISI Program.

Sequoyah Units 1 and 2 are in the second period of their second ten-year ISI interval. The status of ASME code inspections performed to date for the second period are two category B-J welds examined on Unit 1 and no category B-J welds examined on Unit 2. To date there have been no category B-F/C-F-1/C-F-2 welds examined during the second period for either unit.

The code of record for Sequoyah's ISI Program is the 1989 Edition (no addenda) of the ASME Boiler and Pressure Vessel Code, Section XI. Additionally, in accordance with 10 CFR 50.55a(b)(2)(ii), the extent of examination for Examination Category B-J welds is in accordance with the 1974 Edition, Summer 1975 Addenda of ASME Section XI.

TVA requests NRC approval of the enclosed RI-ISI Program by July 1, 2001 to support implementation of the RI-ISI Program during the Unit 1 Cycle 11 (U1C11)refueling outage. The U1C11 refueling outage is currently planned to start in October 2001. NRC approval by July 1, 2001 will allow TVA to finalize resource planning associated with this outage. TVA intends to apply the RI-ISI Program for the remainder of the second inspection interval which ends in December 2005. TVA plans to continue application of the RI-ISI Program for Sequoyah's third and fourth ISI intervals.

TVA's RI-ISI Program for Sequoyah is similar to requests previously submitted for Surry and Turkey Point Nuclear Power Stations which were approved by NRC letters dated January 26, 2001 and November 30, 2000, respectively.

Enclosure 2 contains a related request for relief associated with the RI-ISI Program. The relief request proposes to

utilize a VT-2 visual examination in lieu of the RI-ISI Program requirement (i.e., WCAP-14572) for performing a volumetric examination of branch connection welds $\leq$ 2" nominal pipe size (NPS) and socket welds that are subject to thermal fatigue. TVA's request for Sequoyah is similar to a request previously approved for Surry Nuclear Power Station by NRC letter dated January 26, 2001. Pursuant to 10 CFR 50.55a(a)(3)(ii), TVA is requesting relief on the basis that compliance with the requirements would result in an undue hardship to TVA without a compensating increase in the level of quality and safety.

Enclosure 3 contains a request for relief that would become effective in the event NRC approval of the proposed RI-ISI Program cannot be provided in time to support Sequoyah's U1C11 refueling outage. The proposed request for relief would provide an alternative examination schedule in the interim until NRC review and approval of TVA's proposed RI-ISI Program is complete. TVA's request identifies a percentage of examinations that Sequoyah would perform on ASME Class 1 and 2 piping to complete the second period of the second 10-year interval. This request would become effective only if TVA's request for relief in Enclosures 1 and 2 cannot be approved by July 1, 2001. TVA's request for relief is similar to requests previously approved for Surry and Millstone Nuclear Power Stations by NRC letters dated April 19, 2000 and February 2, 2001, respectively. Pursuant to 10 CFR 50.55a(a)(3)(i), TVA is submitting the Enclosure 3 request for relief on the basis that the proposed alternative provides an acceptable level of quality and safety.

If you have any questions regarding this response, please contact me at extension (423) 843-7071 or J. D. Smith at extension (423) 843-6672.

Sincerely,

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ENCLOSURE 1

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2
REQUESTS FOR RELIEF 1-RI-ISI-1 AND 2-RI-ISI-1
RISK-INFORMED INSERVICE INSPECTION (RI-ISI)
PROGRAM SUBMITTAL

RISK-INFORMED INSERVICE INSPECTION (RI-ISI) PROGRAM PLAN

Table of Contents

1.0 INTRODUCTION/RELATION TO NRC REGULATORY GUIDE RG-1.174

Introduction

This submittal covers SQN Units 1 and 2.

Piping inservice inspections (ISI) are currently performed to the requirements of the ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition as required by 10 CFR50.55a. As permitted by 10 CFR 50.55a (b)(2)(ii), Class 1, Examination Category B-J weld selections for examination are in accordance with the 1974 Edition, Summer 1975 Addenda of ASME Section XI. In accordance with code requirements, a different sample percentage of the total number of Class 1 welds are selected each 10-year inspection interval. Class 2 welds are scheduled per the 1989 Edition of ASME Section XI. Both units are currently in the second inspection interval as defined by the Code for Program B.

The objective of this submittal is to request a change to the ISI program plan for piping through the use of a risk-informed ISI program. The risk-informed process used in this submittal is described in Westinghouse Owners Group WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report," and WCAP-14572, Revision 1-NP-A, Supplement 1, "Westinghouse Structural Reliability and Risk Assessment (SRRA) Model for Piping Risk-Informed Inservice Inspection," (referred to as "WCAP-14572, A-version" for the remainder of this document). "

As a risk-informed application, this submittal meets the intent and principles of Regulatory Guide 1.174. Further information is provided in Section 3.10 relative to defense-in-depth.

PRA Quality

The plant-specific SQN Revision 1, probabilistic risk assessment (PRA) model, was used to evaluate the consequences of pipe ruptures for the purposes of the RI-ISI program. The Revision 1 PRA model and supporting documentation adequately reflects the configuration of the plant design. The Revision 1 model was enhanced in order to enable the direct computation of large early release frequency (LERF) for each set of sequences quantified. A series of sensitivity cases were run comparing the change in core damage frequency (CDF) and LERF as cut-off frequency was decreased over a range of 4 orders of magnitude. The purpose of these sensitivity studies was to establish a cut-off frequency which optimizes the PRA model's sequence representation and run time. Based on the results of the sensitivity studies, all initiators were quantified with cut-offs set equal to 1E-12. This cut-off frequency criterion

resulted in a base CDF of 4.0E-5/reactor year and base LERF of 8.6E-7/reactor year.

The PRA model is evaluated periodically for update. The guidance for this activity is contained in administrative procedures. Revision 1 of the PRA has been reviewed by the NRC staff as part of their review of the implementation of the requirements of the Maintenance Rule and as part of the evaluation of the technical specification change for SQN's seven day emergency diesel generator allowed outage time. In addition to these NRC reviewed applications, Revision 1 has been used for Phase 3 evaluations in the Significance Determination Process (SDP) and for risk ranking of MOVs under NRC Generic Letter 96-05.

In addition, the RI-ISI program included an evaluation and determination that Revision 1 of the SQN PRA and supporting documentation adequately reflects the current plant configuration and operational practices consistent with its intended application. This evaluation was based on the Appendix B of the EPRI PSA Applications Guide and was performed to confirm that the PRA conforms to the industry state-of-the-art with respect to completeness of coverage of potential scenarios.

Draft-Revision 2 of the PSA has been developed and reviewed under the Westinghouse Owner's Group (WOG) PSA Peer Review Certification Process. A qualitative assessment of the effects of the Findings and Observations of this Peer Review on the results of Revision 1 of the PSA was performed. This assessment concluded that Revision 1 of the PSA is fully adequate for use in the RI-ISI program.

2.0 PROPOSED ALTERNATIVE TO ISI PROGRAM

2.1 ASME Section XI

ASME Section XI Categories B-F, B-J, C-F-1 and C-F-2 contain the requirements for examining piping components via nondestructive examination (NDE). This portion of the program is limited to ASME Class 1 and Class 2 piping. The alternative risk-informed inservice inspection (RI-ISI) program for piping is described in WCAP-14572, A-version. The RI-ISI program will be substituted for the current examination program on ASME Class 1 and 2 piping in accordance with 10 CFR 50.55a(a)(3)(i) by alternatively providing an acceptable level of quality and safety. Other non-related portions of the ASME Section XI Code will be unaffected. WCAP-14572, A-version, provides the requirements defining the relationship between the risk-informed examination program and the remaining unaffected portions of ASME Section XI.

2.2 Augmented Programs

The augmented inspection programs remain unchanged.

3.0 RISK-INFORMED ISI PROCESSES

The processes used to develop the RI-ISI program are consistent with the methodology described in WCAP-14572, A-version.

The process that is being applied, involves the following steps:

- Scope Definition
- Segment Definition
- Consequence Evaluation
- Failure Assessment
- Risk Evaluation
- Expert Panel Categorization
- Element/NDE Selection
- Implement Program
- Feedback Loop

There are no deviations to the process described in WCAP-14572, A-version.

3.1 Scope of Program

The ASME Class 1 and 2 systems included in the risk-informed ISI program are provided in Table 3.1-1 for SQN Unit 1 and Table 3.1-2 for SQN Unit 2.

3.2 Segment Definitions

The piping for all Class 1 and 2 systems were divided into segments.

The number of pipe segments defined for the 11 systems are summarized in Tables 3.1-1 and 3.1-2. The as-operated piping and instrumentation diagrams were used to define the segments.

3.3 Consequence Evaluation

The consequences of pressure boundary failures are measured in terms of CDF and LERF. The impact on these measures due to both direct and indirect effects was considered.

3.4 Failure Assessment

Failure estimates were generated utilizing industry failure history, plant specific failure history and other relevant information.

The engineering team that performed this evaluation used the Westinghouse structural reliability and risk assessment (SRRA) software program (described in WCAP-14572, A-version) to aid in the process.

Table 3.4-1 summarizes the failure probability estimates by failure mechanism and also identifies the systems susceptible to these mechanisms.

Another consideration was whether a segment is addressed by the plant augmented programs (such as flow accelerated corrosion and stress corrosion cracking). This information has been used to determine which failure probability is used in the risk-informed ISI process. The failure probabilities used in the risk-informed process are documented and maintained in the plant records.

3.5 Risk Evaluation

Each piping segment within the scope of the program was evaluated to determine its contribution to CDF and LERF due to the postulated piping failure. Calculations were performed with and without operator action.

Once this evaluation was completed, the total pressure boundary CDF and LERF were calculated by summing across the segments for each system. The results of these calculations are presented in Tables 3.5-1 and 3.5-2.

For SQN Unit 1, CDF due to piping failure without operator action (without ISI) is 9.97E-05/year, and with operator action (without ISI) is 9.30E-05/year. The LERF due to piping failure without operator action (without ISI) is 2.64E-06/year, and with operator action (without ISI) is 2.27E-06/year.

For SQN Unit 2, the CDF due to piping failure without operator action (without ISI) is 9.82E-05/year, and with operator action (without ISI) is 9.15E-05/year. The LERF due to piping failure without operator action (without ISI) is 2.59E-06/year, and with operator action (without ISI) is 2.22E-06/year.

To assess safety significance, the risk reduction worth (RRW) and risk achievement worth (RAW) were calculated for each piping segment with and without operator action.

3.6 Expert Panel Categorization

The final safety determination (i.e., high and low safety significance) of each piping segment was made by the expert panel using both probabilistic and deterministic insights. The expert panel was comprised of personnel who have expertise in the following fields; probabilistic risk assessment, inservice examination, stress and material considerations, plant operations, and system design and operation. Members associated with the Maintenance Rule were used to ensure consistency with the other PRA applications. Alternates were used if their expertise and training were sufficient.

The expert panel had the following positions represented by either the permanent or alternate member at all times during an expert panel meeting.

- Chairman
- Design Engineering - Probabilistic Risk Assessment
- Operations
- Inservice Inspection (ISI)
- System Engineering - Representative

A minimum of 5 members or alternates filling the above positions constituted a quorum. This core team of panel members was supplemented by other experts, including a materials and stress analysis engineer and safety analysis engineer.

The chairperson conducted and ruled on the proceedings of the meeting. The chairperson appointed an alternate chairperson from the panel if he was unable to attend a meeting.

Members and alternates received training and indoctrination in the risk-informed inservice inspection selection process. They were indoctrinated in the application of risk analysis techniques for ISI. These techniques included risk importance measures, threshold values, failure probability models, failure mode assessments, PRA modeling limitations and the use of expert judgment. Training documentation is maintained with the expert panel's records.

Worksheets were provided to the panel on each system for each piping segment, containing information pertinent to the panel's selection process. This information, in conjunction with each panel member's own expertise and other documents as appropriate, were used to determine the safety significance of each piping segment.

A consensus process was used by the expert panel. Consensus is defined as unanimous during first consideration and 2/3 of members or alternates present in the second or subsequent considerations. The chairperson allowed appropriate time duration between considerations for deliberation.

The chairperson appointed someone to record the minutes of each meeting. The minutes included the names of members and alternates in attendance and verified a quorum was present. The relevant discussion summaries and the results of the voting are included in the plant documents. These minutes are available as program records.

3.7 Identification of High Safety Significant Segments

The number of high safety significant segments for each system, as determined by the expert panel, is shown in Table 5-1 for SQN Unit 1 and Table 5-2 for SQN Unit 2.

3.8 Structural Element and NDE Selection

The appropriate structural elements in the high safety significant piping segments were selected for inspection and appropriate NDE methods were defined.

The initial program being submitted addresses the high safety significant (HSS) piping components placed in regions 1 and 2 of Figure 3.7-1 in WCAP-14572, A-version. Region 3 piping components, which are low safety significant, are to be considered in an Owner Defined Program and is not considered part of the program requiring approval. Region 1, 2, 3 and 4 piping components will continue to receive code required pressure testing, as part of the current ASME Section XI Program.

For the 576 piping segments that were evaluated in the SQN Unit 1 RI-ISI program, Region 1 contains 61 segments, Region 2 contains 28 segments, Region 3 contains 263 segments, and Region 4 contains 224 segments.

For the 584 piping segments that were evaluated in the SQN Unit 2 RI-ISI Program, Region 1 contains 54 segments, Region 2 contains 33 segments, Region 3 contains 269 segments, and Region 4 contains 228 segments.

The number of locations to be inspected in a HSS segment were determined using a Westinghouse statistical (Perdue) model as described in section 3.7 of WCAP-14572, A-version.

For SQN Unit 1, 15 of the HSS piping segments in Region 1 and 22 of the HSS piping segments in Region 2 were evaluated using the Perdue model. The 52 segments that were not evaluated using the Perdue model included 43 containing branch connection welds ≤ 2 inches nominal pipe size (NPS) and or socket welds, and 9 segments that are outside the applicability of the model or had only one weld in the segment. For these 52 segments, the guidance in Section 3.7.3 of WCAP-14572, A-version was followed.

For SQN Unit 2, 14 of the HSS piping segments in Region 1 and 23 of the HSS piping segments in Region 2 were evaluated using the Perdue model. The 50 segments that were not evaluated using the Perdue model included 43 segments containing branch connection welds ≤ 2 inches NPS and/or socket welds, and 7 segments that are outside the applicability of the model or had only one weld in the segment. For these 50 segments, the guidance in Section 3.7.3 of WCAP-14572, A-version was followed.

Table 4.1-1 in WCAP-14752, A-version, was used as guidance in determining the examination requirements for the HSS piping segments. VT-2 visual examinations will be scheduled in accordance with the station's pressure test program.

<u>Additional Examinations</u>

Since the risk-informed inspection program will require examinations on a large number of elements constructed to lesser pre-service inspection requirements, the program in all cases will determine, through an engineering evaluation, the root cause of any unacceptable flaw or relevant condition found during examination as described in WCAP-14572, A-version. The evaluation will include the applicable service conditions and degradation mechanisms to establish that the element(s) will still perform their intended safety function during subsequent operation. Elements not meeting this requirement will be repaired or replaced.

The evaluation will include whether other elements on the segment or segments are subject to the same root cause and degradation mechanism. 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 initially. If unacceptable flaws or relevant conditions are again found similar to the initial problem, the remaining elements identified as susceptible will be examined. No additional examinations will be performed if there are no additional elements identified as being susceptible to the same service related root cause conditions or degradation mechanism.

3.9 Program Relief Requests

Alternative examination methods are specified to ensure structural integrity in cases where examination methods cannot be applied due to limitations such as inaccessibility or radiation exposure hazard.

An attempt has been made to provide a minimum of >90 percent coverage (per Code Case N-460 and NRC Information Notice 98-42) when performing the risk-informed examinations. However, some limitations will not be known until the examinations are performed, since some locations will be examined for the first time due the RI-ISI selection process.

In instances where a location may be identified at the time of the examination that the examination does not achieve >90 percent coverage, the process outlined in Section 4.0 of WCAP-14572, A-version will be followed.

Currently there is no program available for qualifying single-sided Appendix VIII examinations of austenitic piping welds. Therefore, volumetric (ultrasonic) examinations of austenitic piping welds must be examined from two sides to meet the requirements of the Rule (10CFR50.55a). Consequently, austenitic welds selected by the RI-ISI process that are not accessible from both sides will require a request for relief because the coverage will be ≤ 90 percent (e.g., pipe-to-valve). The volumetric examination of ferritic piping welds may be performed from one side to obtain >90 percent coverage per the Rule.

The current SQN Unit 1 and 2 ASME Section XI ISI program requests for relief remain in place.

3.10 Change in Risk

The risk-informed ISI program has been prepared in accordance with Regulatory Guide 1.174, and the risk from implementation of this program is expected to slightly decrease when compared to that estimated from current requirements.

A comparison between the proposed RI-ISI program and the current ASME Section XI ISI program was made to evaluate the change in risk. The approach evaluated the change in risk with the inclusion of the probability of detection as determined by the SRRA model. This evaluation resulted in the identification of 4 additional piping segments for SQN Unit 1 and 5 additional piping segments for SQN Unit 2 for which examinations are now required.

The results from the risk comparison are shown in Table 3.10-1 for SQN Unit 1 and Table 3.10-2 for SQN Unit 2. As seen from the tables, the RI-ISI program reduces the risk associated

with piping CDF/LERF slightly more than the current Section XI program while reducing the number of examinations. Tables 3.10-1 and 3.10-2 also include the systems that are the main contributors to the risk reduction in moving from the current program to the RI-ISI program. The primary basis for this risk reduction is that examinations are now being performed on piping segments that are high safety significant and of which, some are not inspected by NDE in the current ASME Section XI ISI program.

Defense-In-Depth

As the reactor coolant piping serves as a fission product barrier, the reactor coolant piping will continue to receive a system pressure test and visual VT-2 examination as currently required by the Code. Volumetric examinations are proposed on the smaller reactor coolant piping as part of the RI-ISI program. The larger diameter reactor coolant loop piping was not selected in the RI-ISI process. However, the larger reactor coolant loop piping segments are retained in the program for "defense-in-depth" considerations. The locations selected were associated with the reactor vessel dissimilar metal welds on the hot and cold legs (a total of 8 welds are added). These locations were identified as being the area to inspect in the RI-ISI process.

4.0 IMPLEMENTATION AND MONITORING PROGRAM

Upon approval of the RI-ISI program, procedures that comply with the guidelines described in WCAP-14572, A-version, will be prepared to implement and monitor the program. The new program will be integrated into the existing ASME Section XI interval.

The final safety analysis report (FSAR) contains information on the current ASME Section XI ISI program. No changes to the FSAR are necessary for program implementation.

The applicable aspects of the Code not affected by this change would be retained, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements, and quality control requirements. Existing ASME Section XI program implementing procedures would be retained and would be modified to address the RI-ISI process, as appropriate.

The proposed monitoring and corrective action program will contain the following elements:

A. Identify
B. Characterize
C. (1) Evaluate, determine the cause and extent of the condition identified
   (2) Evaluate, develop a corrective action plan or plans
D. Decide
E. Implement
F. Monitor
G. Trend

The RI-ISI program is a living program requiring feedback of new relevant information to ensure the appropriate identification of high safety significant piping locations. As a minimum, risk ranking of piping segments will be reviewed and adjusted on an ASME period basis. Significant changes may require more frequent adjustment as directed by NRC bulletin or Generic Letter requirements, industry experience, or by plant specific feedback.

5.0 PROPOSED ISI PROGRAM PLAN CHANGE

A comparison between the RI-ISI program and the current ASME Section XI program requirements for piping is given in Table 5-1 for SQN Unit 1 and Table 5-2 for SQN Unit 2. An identification of piping segments that are part of plant augmented programs is also included in Tables 5-1 and 5-2.

The plant will be performing examinations on elements not currently required to be examined by ASME Section XI. An example of these additional examinations is provided below.

- The ASME Section XI Code does not require volumetric or surface examinations of piping less than 3/8 inch wall thickness on Class 2 piping greater than 4 inch NPS. The welds are counted for percentage requirements, but not examined by NDE. The RI-ISI program will require examination of some of these welds. Examples where the risk informed process required examination, and the Code did not, are the suction lines to the charging pumps (high head safety injection).

The initial program may be started in the inspection period current at the time of program approval. For example the second inspection period of the second inspection interval for Unit 1 ends on December 15, 2002. If the program is approved in sufficient time that a refueling outage remains in the second period, at least 66% of the inspection interval required examinations per the RI-ISI program will be performed by the end of the second inspection interval.

6.0 REFERENCES/DOCUMENTATION

WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report," February 1999

WCAP-14572, Revision 1-NP-A, Supplement 1, "Westinghouse Structural Reliability and Risk Assessment (SRRA) Model for Piping Risk-Informed Inservice inspection," February 1999

<u>Supporting Onsite Documentation</u>

SQN Nuclear Plant Units 1 & 2 Risk Informed Inservice Inspection (RI-ISI) Program Scope, Revision 1, April 19, 2000

SQN-MEB-MDN0999-000085, Revision 0, "RI-ISI Piping Segment/Direct Consequence Definition."

SQN-MEB-MDQ0999-990055, Revision 0, "TVA RI-ISI Piping Indirect Consequence Evaluation for Sequoyah Units 1 and 2."

SQN-MEB-MDN0999-990077, Revision 0, "RI-ISI PSA Consequence Evaluation."

SQN-CEB-CDN0003-000013, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Auxiliary Feedwater System."

SQN-CEB-CDN0015-000014, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Steam Generator Blowdown System."

SQN-CEB-CDN0062-000023, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Chemical and Volume Control System."

SQN-CEB-CDN0999-000016, Revision 0, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Containment Isolation System."

SQN-CEB-CDN0072-000028, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Containment Spray System."

SQN-CEB-CDN0003-000012, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Feedwater System."

SQN-CEB-CDN0001-000010, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Main Steam

System."

SQN-CEB-CDN0068-000026, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Reactor Coolant System."

SQN-CEB-CDN0074-000029, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Residual Heat Removal System."

SQN-CEB-CDN0063-000024, Revision 1, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Safety Injection System."

SQN-CEB-CDN0043-000019, Revision 0, "RI-ISI Structural Reliability and Risk Assessment (SRRA) of the Water Quality and Sampling System."

Westinghouse Calculation Note, CN-RRA-00-45, Revision 1, "TVA RI-ISI Risk Ranking Evaluation for Sequoyah Units 1 and 2."

Westinghouse Calculation Note, CN-RRA-00-56, Revision 0, "TVA RI-ISI Expert Panel and RI-ISI Database for SQN 1/2."

Westinghouse Calculation Note, CN-RRA-00-54, Revision 1, "TVA RI-ISI Perdue Model Calculation for Sequoyah Unit 1."

Westinghouse Calculation Note, CN-RRA-00-55, Revision 1, "TVA RI-ISI Perdue Model Calculation for Sequoyah Unit 2."

Westinghouse Calculation Note, CN-RRA-00-57, Revision 0, "TVA RI-ISI Delta Risk Evaluation for SQN 1/2."

Table 3.1-1
SQN Nuclear Plant Unit 1
System Selection and Segment Definition

System Description	PRA	Section XI	Number of Segments
AF - Auxiliary Feedwater	Yes	Yes[1]	13
BD - Steam Generator Blowdown	Yes	Yes[1]	17
CH - Chemical & Volume Control	Yes	Yes	88
CI - Containment Isolation[2]	Yes[3]	Yes[4]	106
CS - Containment Spray	Yes	Yes	26
FW - Main Feedwater	Yes	Yes	44
MS - Main Steam	Yes	Yes	17
RC - Reactor Coolant	Yes	Yes	122
RH - Residual Heat Removal	Yes	Yes	28
SI - Safety Injection	Yes	Yes	109
SQ - Sampling and Water Quality	No	Yes[1]	6
Total			576

Notes:
1. System is exempt from current ASME Section XI pipe weld examination requirements (volumetric, surface).
2. Includes containment isolation piping only. Other portions of these systems are not Class 1 or 2 and are not within the scope of this program. The systems included are: Air Conditioning, Component Cooling Water, Control Air/Auxiliary Control Air, Demineralized Water and Cask Decon, Essential Raw Cooling Water, High Pressure Fire Protection, Ice Condenser, Primary Makeup Water, Radiation Monitoring, Service Air, Spent Fuel Pit Cooling, Ventilation, & Waste Disposal. Containment isolation piping for the other systems within scope of this program are included with the system.
3. Portions of this system are not currently analyzed as part of the PRA.
4. System is exempt from current ASME Section XI pipe weld examination program requirements (volumetric, surface) or is not within the scope of the current ASME Section XI NDE program.

Table 3.1-2
SQN Unit 2
System Selection and Segment Definition

System Description	PRA	Section XI	Number of Segments
AF - Auxiliary Feedwater	Yes	Yes[1]	13
BD - Steam Generator Blowdown	Yes	Yes[1]	17
CH - Chemical & Volume Control	Yes	Yes	88
CI - Containment Isolation[2]	Yes[3]	Yes[4]	114
CS - Containment Spray	Yes	Yes	26
FW - Main Feedwater	Yes	Yes	44
MS - Main Steam	Yes	Yes	17
RC - Reactor Coolant	Yes	Yes	122
RH - Residual Heat Removal	Yes	Yes	28
SI - Safety Injection	Yes	Yes	109
SQ - Sampling and Water Quality	No	Yes[1]	6
Total			584

Notes:
1. System is exempt from current ASME Section XI pipe weld examination requirements (volumetric, surface).
2. Includes containment isolation piping only. Other portions of these systems are not Class 1 or 2 and are not within the scope of this program. The systems included are: Air Conditioning, Component Cooling Water, Control Air/Auxiliary Control Air, Demineralized Water and Cask Decon, Essential Raw Cooling Water, High Pressure Fire Protection, Ice Condenser, Primary Makeup Water, Radiation Monitoring, Service Air, Spent Fuel Pit Cooling, Ventilation, & Waste Disposal. Containment isolation piping for the other systems within scope of this program are included with the system.
3. Portions of this system are not currently analyzed as part of the PRA.
4. System is exempt from current ASME Section XI pipe weld examination program requirements (volumetric, surface) or is not within the scope of the current ASME Section XI NDE program.

Table 3.4-1 SQN Units 1 and 2 Failure Probability Estimates (without ISI)		
Failure Mechanism	Failure Probability Range (Small Leak Probability @ 40 years, no ISI)	Susceptible Systems
Thermal Fatigue	1.40E-09 - 8.39E-04	AF, CH, CI, CS, MS, RC, RH, SI, SQ
Thermal Fatigue, Striping/Stratification	1.77E-05 - 4.70E-02	AF, CH, FW, RC, RH, SI
Erosion/Corrosion/Wastage	8.75E-08 - 5.60E-01	BD, CI, FW
Thermal and Vibratory Fatigue	2.66E-07 - 1.19E-02	BD, CH, CS, FW, MS, RC, RH, SI
Stress Corrosion Cracking	1.50E-03 - 6.90E-03	SI

Table 3.5-1 SQN Unit 1 Number of Segments and Mean Piping Risk Contribution by System (without ISI)					
System	Number of Segments	Case			
		CDF Without Operator Action	CDF With Operator Action	LERF Without Operator Action	LERF With Operator Action
AF	13	1.08E-06	2.04E-08	3.62E-08	1.55E-09
BD	17	2.08E-06	2.07E-06	8.94E-08	8.88E-08
CH	88	4.16E-05	3.87E-05	9.54E-07	8.21E-07
CI	106	3.19E-08	3.16E-08	6.35E-10	6.29E-10
CS	26	6.42E-07	2.17E-07	4.30E-08	9.09E-09
FW	44	2.10E-07	2.07E-07	3.23E-08	3.23E-08
MS	17	5.52E-08	5.52E-08	5.49E-09	5.49E-09
RC	122	9.11E-06	8.78E-06	1.70E-07	1.64E-07
RH	28	1.12E-06	3.96E-07	7.60E-08	7.46E-09
SI	109	4.36E-05	4.23E-05	1.23E-06	1.14E-06
SQ	6	1.37E-07	1.37E-07	3.14E-09	3.14E-09
Total	576	9.97E-05	9.30E-05	2.64E-06	2.27E-06

Table 3.5-2 SQN Unit 2 Number of Segments and Mean Piping Risk Contribution by System (without ISI)					
System	Number of Segments	Case			
		CDF Without Operator Action	CDF With Operator Action	LERF Without Operator Action	LERF With Operator Action
AF	13	1.08E-06	2.04E-08	3.62E-08	1.55E-09
BD	17	1.08E-06	1.07E-06	4.62E-08	4.59E-08
CH	88	4.16E-05	3.87E-05	9.54E-07	8.21E-07
CI	114	3.19E-08	3.16E-08	6.35E-10	6.29E-10
CS	26	6.42E-07	2.17E-07	4.30E-08	9.09E-09
FW	44	2.10E-07	2.07E-07	3.23E-08	3.23E-08
MS	17	5.52E-08	5.52E-08	5.49E-09	5.49E-09
RC	122	9.11E-06	8.78E-06	1.70E-07	1.64E-07
RH	28	1.12E-06	3.96E-07	7.60E-08	7.46E-09
SI	109	4.31E-05	4.18E-05	1.22E-06	1.13E-06
SQ	6	1.37E-07	1.37E-07	3.14E-09	3.14E-09
Total	584	9.82E-05	9.15E-05	2.59E-06	2.22E-06

Table 3.10-1 SQN Unit 1 Comparison Of CDF/LERF For Current Section XI And Risk-Informed ISI Programs And The Systems Which Contributed Significantly To The Change		
Case (Systems Contributing to Change)	Piping CDF/LERF Current Section XI	Piping CDF/LERF Risk-Informed
CDF No Operator Action (BD, CH, RC, SI)	3.73E-05	3.44E-05
CDF with Operator Action (BD, CH, RC, SI)	3.10E-05	2.80E-05
LERF No Operator Action (BD, CH, CS, RC, SI)	1.13E-06	1.05E-06
LERF With Operator Action (BD, CH, RC, SI)	7.74E-07	6.94E-07

Table 3.10-2 SQN Unit 2 Comparison Of CDF/LERF For Current Section XI And Risk-Informed ISI Programs And The Systems Which Contributed Significantly To The Change		
Case (Systems Contributing to Change)	Piping CDF/LERF Current Section XI	Piping CDF/LERF Risk-Informed
CDF No Operator Action (BD, CH, CS, RC, SI)	3.51E-05	3.37E-06
CDF with Operator Action (BD, CH, RC)	2.88E-05	2.74E-05
LERF No Operator Action (BD, CH, CS, RC, SI)	1.06E-06	1.01E-06
LERF With Operator Action (BD, CH, RC, SI)	7.09E-07	6.65E-07

Table 5-1
SQN UNIT 1
STRUCTURAL ELEMENT SELECTION
RESULTS AND COMPARISON TO ASME SECTION XI
1989 EDITION REQUIREMENTS

System	Number of High Safety-Significant Segments (No. in Augmented Program)	RI-ISI Program High Safety-Significant Structural Elements[1]		ASME Section XI ISI Program 1989 Edition Examination Category Weld Selections[12]				Total Number of Segments Credited in Augmented Programs
		CLASS 1	CLASS 2	B-F	B-J	C-F-1	C-F-2	
AF	0	-	-	-	-	-	-	2
BD[9]	12 (8[5])	-	12[3]	-	-	-	-	12[5]
CH[10]	13 (3)	10+9[3]	2[6]	-	71	44	-	3
CI[9]	0	-	-	-	-	-	-	1[5]
CS	1 (0)	-	3+1[4]	-	-	16	-	0
FW[9]	8 (8[5])	-	8+8[4]	-	-	-	11	14[5]+2
MS[9]	0	-	1[8]	-	-	-	18	14[5]
RC[11]	17 (2)	11+8[7]+9[3]	-	22	73	-	-	2
RH	5 (0)	2	4+1[4]+4[8]	-	5	23	-	0
SI[10]	33 (4)	12+11[3]+ 2[4]	12+7[3]+3[4]	-	110	60	-	4
SQ	0	-	-	-	-	-	-	0
Total	89	74	66	22	259	143	29	54

Summary: Current ASME Section XI selects a total of 453[12] weld locations for non-destructive examination while the proposed RI-ISI program selects a total of 75 exam locations (140-65 visual exam locations), which results in a 83% reduction.

Notes:

1. ASME Section XI system pressure tests and VT-2 visual examinations shall continue to be performed for all ASME Code Class 1 and 2 systems.
2. All augmented programs continue.
3. VT-2 examination for entire segment (see Request for Relief 1-RI-ISI-2).
4. VT-2 examination for a portion of the segment (see Request for Relief 1-RI-ISI-2).
5. UT thickness only.
6. VT-2 examination for entire segment.
7. Eight examination locations added for defense-in-depth at the reactor vessel nozzle to safe-end pipe welds.
8. Five examination locations added for change in risk considerations.
9. Augmented programs for erosion-corrosion (including MIC) continue.
10. Augmented program for thermal stratification of base metal at socket weld areas continues.
11. Augmented program for stress corrosion cracking of draw bead welds continues.

12. Weld selection numbers are based on plant procedure 0-SI-DXI-000-114.2 revision 10 "ASME Section XI ISI/NDE Program Unit 1 and Unit 2".

Table 5-2
SQN UNIT 2
STRUCTURAL ELEMENT SELECTION
RESULTS AND COMPARISON TO ASME SECTION XI
1989 EDITION REQUIREMENTS

System	Number of High Safety-Significant Segments (No. in Augmented Program)	RI-ISI Program High Safety-Significant Structural Elements[1]		ASME Section XI ISI Program 1989 Edition Examination Category Weld Selections[11]				Total Number of Segments Credited in Augmented Programs
		CLASS 1	CLASS 2	B-F	B-J	C-F-1	C-F-2	
AF	0	-	-	-	-	-	-	2
BD[9]	12 (8[5])	-	12[3]	-	-	-	-	12[5]
CH[10]	13 (3)	10+9[3]	2[6]	-	77	46	-	3
CI[9]	0	-	-	-	-	-	-	1[5]
CS	1 (0)	-	3+1[4]	-	-	17	-	0
FW[9]	8 (8[5])	-	8+8[4]	-	-	-	11	12[5]+4
MS[9]	0	-	-	-	-	-	18	14[5]
RC	17 (2)	11+8[7]+9[3]	-	22	65	-	-	2
RH	5 (0)	2	4+1[4]+4[6]	-	6	23	-	0
SI[10]	31 (4)	7+11[3]+2[4]	12+6[3]+3[4]+ 2[3,8]	-	90	61	-	4
SQ	0	-	-	-	-	-	-	0
Total	87	69	66	22	238	147	29	54

Summary: Current ASME Section XI selects a total of 436[11] weld locations for non-destructive examination while the proposed RI-ISI program selects a total of 69 exam locations (135-66 visual exam locations), which results in a 84% reduction.

Notes:

1. ASME Section XI system pressure tests and VT-2 visual examinations shall continue to be performed for all ASME Code Class 1 and 2 systems.
2. All augmented programs continue.
3. VT-2 examination for entire segment (see Request for Relief 2-RI-ISI-2).
4. VT-2 examination for a portion of the segment (see Request for Relief 2-RI-ISI-2).
5. UT thickness only.
6. VT-2 examination for entire segment.
7. Eight examination locations added for defense-in-depth at the reactor vessel nozzle to safe-end pipe welds.
8. Six examination locations added for change in risk considerations.
9. Augmented programs for erosion-corrosion (including MIC) continue.
10. Augmented program for thermal stratification of base metal at socket weld areas continues.
11. Weld selection numbers are based on plant procedure 0-SI-DXI-000-114.2 revision 10 "ASME Section XI ISI/NDE Program Unit 1 and Unit 2".

ENCLOSURE 2

SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2
REQUESTS FOR RELIEF 1-RI-ISI-2 AND 2-RI-ISI-2

EXECUTIVE SUMMARY:

The SQN Risk-Informed Inservice Inspection (RI-ISI) Program was developed in accordance with the provisions of WCAP-14572, Revision 1-NP-A. Table 4.1-1 of the WCAP requires that high safety significant (HSS) piping segments which are subject to thermal fatigue and that have been selected for examination be volumetrically examined. The requirements contained in Table 4.1-1 have been taken directly from Code Case N-577, Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method A.

Certain HSS segments, or portions of HSS segments, at SQN have been identified as subject to thermal fatigue. These segments have been identified with a potential thermal fatigue damage mechanism either caused by a postulated temperature stratification or as a default mechanism for segments selected for their consequence of failure with no active or postulated mechanism occurring. Some of these segments, which are subject to thermal fatigue, contain branch connection welds ≤ 2 inches nominal pipe size and/or socket welds. Performance of a volumetric examination of branch connection welds ≤ 2 inches nominal pipe size (NPS) and/or socket welds will not result in an examination which achieves meaningful results due to the size and geometric configuration of the weld joint. Performance of surface examinations from the OD would not provide additional information for ID initiated flaws.

TVA has taken protective measures to mitigate OD initiated or OD postulated failures. These measures include programmatic control of procurement of piping and components, control of welding processes, surface cleanness specifications, and utilizing insulation to reduce temperature differentials.

Code Case N-577 has been revised to allow a VT-2 examination of socket welds for all failure mechanisms. Performance of a VT-2 examination of branch connection welds ≤ 2 inches NPS and/or socket welds is the most reasonable alternative to the required volumetric examination. The required volumetric examination would result in a hardship without a compensating increase in the level of quality and safety.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), it is requested that relief be granted.

UNITS: SQN Units 1 and 2

SYSTEM: Various

ASME CODE CLASS: 1 and 2

ASME SECTION XI CODE EDITION/ADDENDA: 1989 Edition of ASME Section XI and WCAP-14572, Revision 1-NP-A

CODE TABLE: Table 4.1-1 of WCAP-14572, Revision 1-NP-A

EXAMINATION CATEGORY: R-A, RISK-INFORMED PIPING EXAMINATIONS

EXAMINATION ITEM NUMBER: R1.11, High Safety Significant Piping Structural Elements Subject to Thermal Fatigue

REQUIREMENTS:

Table 4.1-1, Examination Category R-A, Item Number R1.11, requires elements in high safety significant (HSS) segments which are subject to thermal fatigue and that have been selected for examination be volumetrically examined.

REQUIREMENT FROM WHICH RELIEF IS REQUESTED:

Relief is requested from performing a volumetric examination of branch connection welds ≤ 2 inches NPS and socket welds that are subject to thermal fatigue.

BASIS FOR RELIEF:

The design joint configuration and size of branch connection welds that are ≤ 2 inches NPS and socket welds prohibits the performance of a volumetric examination which achieves meaningful results. The performance of a VT-2 examination during a system pressure test provides reasonable assurance of continued structural integrity.

ALTERNATIVE EXAMINATIONS:

Branch connection welds ≤ 2 inches NPS and socket welds in HSS segments subject to thermal fatigue will be VT-2 examined each refueling outage during a system pressure test or a pressure test specific to a component/element. Butt welds selected for examination will be volumetrically examined.

JUSTIFICATION FOR THE GRANTING OF RELIEF:

Table 4.1-1, Examination Category R-A, of WCAP-14572, Rev. 1-NP-A provides information for the examination of structural elements (welds or base material for failure mechanisms such as FAC) in piping segments which have been identified as HSS. The requirements contained in Table 4.1-1 have been taken directly from

Code Case N-577, Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method A. Piping welds within a HSS segment are selected for examination, and examination methods are determined based on active or postulated failure mechanisms as identified in Table 4.1-1. Piping welds subject to thermal fatigue that are selected for examination, are required to be volumetrically examined in accordance with Item Number R1.11 of Examination Category R-A.

Certain HSS piping segments at SQN have been identified as being subject to thermal fatigue, and therefore, require volumetric examination. Some of these segments include branch connection welds which are ≤ 2 inches NPS and/or socket welds. These segments have been identified with a potential thermal fatigue damage mechanism either caused by a postulated temperature stratification or as a default mechanism for segments selected for their consequence of failure with no active or postulated mechanism occurring. The requirement to perform a volumetric examination on branch connection weld ≤ 2 inches NPS or socket weld does not consider the size and geometric limitations imposed by these types of welds. Performance of a volumetric examination on branch connection welds ≤ 2 inches NPS or socket welds will not result in an examination which achieves meaningful results. Performance of surface examinations from the OD would not provide additional information for ID initiated flaws such as thermal stratification.

TVA has taken protective measures to mitigate OD initiated or OD postulated failures. These failures include but are not limited to transgranular stress corrosion cracking, halogen-induced stress corrosion cracking, OD initiated fatigue mechanisms, and intergranular stress corrosion cracking. Austenitic stainless steel and nickel based alloys piping and components are purchased to ASTM/ASME requirements which ensures that no sensitized/improperly heat treated parts are bought or issued for installation. These are covered by TVA's General Engineering Specifications G-29 Part B sections 1 and 2 (process and purchase specifications) for these materials. In addition, TVA's welding program (G-29, Part A) requirements ensure that proper measures are taken prior to welding. The purchase of filler metals and related materials (e.g., insulation, temperature indicating materials, etc.) are controlled such that limited amounts of detrimental halides are introduced to the weldments. The welding procedures utilized by TVA are controlled to prevent undue sensitization of the heat-affected zones of the weldments. Surface cleanness is addressed in the SQN UFSAR, Section 5.2.5, and by General Engineering Specification G-29 P.S. 4.M.4.1 and related site implementing procedures (TI-29, "Determination of Surface Chloride, Fluoride and Boron Contamination on Stainless Steel Surfaces" and TI-70, "Cleanliness of Fluid Systems"). These requirements ensure that the external surface is left in a condition where detrimental halides are minimized to reduce the possibility of cracking such as chloride stress corrosion cracking. Temperature differentials are reduced by applying insulation where applicable and the appropriate supports when necessary. This reduces the possibility of

temperature fluctuations which could lead to OD initiated thermal fatigue. In addition, plant system operation is performed in a manor to minimize thermal stratification.

The ASME Code Committee has revised and published Code Case N-577 to allow a VT-2 examination of socket welds for all failure mechanisms. The revised code case is identified as N-577-1. Code Case N-577-1 allows the performance of the VT-2 examination of socket welds in note 12 of Table 1. It is understood that NRC has not yet published results of a review of Code Case N-577-1.

TVA currently performs a self imposed augmented ultrasonic examination of piping base metal adjacent to selected socket welds located in piping which is not isolatable from the Reactor Coolant System main loop piping. These areas are selected due to potential thermal stratification. The base metal areas are ultrasonically examined for cracks located circumferentially on the pipe ID on a best effort basis. The socket weld is not included in these examinations. The augmented ultrasonic examinations of these areas are not affected by this request for relief.

Performance of a volumetric examination of branch connection welds $\leq$ 2 inches NPS and/or socket welds will not result in an examination which achieves meaningful results due to the size and geometric configuration of the weld joint. The required volumetric examination would result in a hardship without a compensating increase in the level of quality and safety. Performance of a VT-2 examination of branch connection welds $\leq$ 2 inches NPS and/or socket welds in HSS segments, or portions of HSS segments, is the most reasonable alternative to the required volumetric examination.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), it is requested that relief be granted.

IMPLEMENTATION SCHEDULE:

This request for relief will be implemented after NRC approval of the SQN RI-ISI program submittal and this request for relief.

ENCLOSURE 3

SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2
REQUESTS FOR RELIEF 1- RI-ISI-3 AND 2- RI-ISI-3

EXECUTIVE SUMMARY:

The SQN Risk Informed Inservice Inspection (RI-ISI) Program was developed using Westinghouse Topical Report, WCAP-14572 Revision 1-NP-A. The NRC previously published Information Notice (IN) 98-44, "Ten-Year Inservice Inspection (ISI) Program Update for Licensees That Intend to Implement Risk-Informed ISI of Piping." This document states that "…NRC will consider authorizing a delay of 2 years in implementation of the next 10-year ISI program for piping only to allow licensees to develop and obtain approval for their RI-ISI program at the next available opportunity using the staff-approved topical reports." IN 98-44 does not specifically address programs that may choose to implement a RI-ISI Program mid-interval.

SQN Units 1 and 2 are presently in the second inspection period of the second inspection interval (December 16, 1995 to December 15, 2005). Prior to performing the examinations required by the Risk-Informed ISI (RI-ISI) program, TVA must obtain NRC approval of the RI-ISI program and prepare outage planning for the weld examinations. A NRC approval date of July 1, 2001, would provide sufficient time to plan for the next refueling outage for SQN Units 1 and 2. If the RI-ISI program is not approved by NRC with sufficient time to perform outage planning, the required minimum number of 50% of second inspection interval examinations must be completed by the end of the second inspection period as required by Tables IWB-2412-1 and IWC-2412-1 of ASME Section XI.

The RI-ISI program will result in a substantial reduction in the required number of piping weld examinations. Performance of the required percentage of ASME Section XI examinations during the second inspection period of the second inspection interval will result in unnecessary examinations and in unnecessary radiation exposure to personnel. However, should NRC be unable to approve the RI-ISI program by July 1, 2001, performance of a sample of the ASME Section XI examinations required to be conducted during the second inspection period would be adequate to ensure an acceptable level of quality and safety is maintained. The RI-ISI program would be fully implemented for SQN Units 1 and 2 during the third inspection period of the second inspection interval after NRC approval. The third inspection period is scheduled to begin for SQN Units 1 and 2 on December 16, 2002.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), it is requested that relief be granted on the basis that the proposed alternative to

perform examinations of a smaller sample size as an interim program sample until the RI-ISI Program is approved, will provide an acceptable level of quality and safety.

UNITS: SQN Units 1 and 2

SYSTEM: Various

ASME CODE CLASS: 1 and 2

ASME SECTION XI CODE EDITION/ADDENDA: 1989 Edition

CODE TABLES: IWB-2412-1, IWB-2500-1, IWC-2412-1, and IWC-2500-1

EXAMINATION CATEGORIES: B-F, Pressure Retaining Dissimilar Metal Welds; B-J, Pressure Retaining Welds In Piping; C-F-1, Pressure Retaining Welds In Austenitic Stainless Steel Or High Alloy Piping; C-F-2, Pressure Retaining Welds In Carbon Or Low Alloy Steel Piping

EXAMINATION ITEM NUMBERS: B5.10, B5.40, B5.70, B9.11, B9.21, B9.31, B9.32, B9.40, C5.11, C5.21, C5.30, C5.41, C5.51, C5.61, C5.70, and C5.81 (Code Case N-524 is utilized for longitudinal welds)

CODE REQUIREMENTS:

The 1989 Edition of ASME Section XI requires that a minimum percentage of examinations in each examination category be completed during each successive inspection period of each inspection interval in accordance with Tables IWB-2412-1 and IWC-2412-1. For the first inspection period of the second inspection interval, a minimum of 16% and a maximum of 34% of the required inspection interval examinations must be completed. For the second period of the second inspection interval, additional examinations must be completed such that a minimum of 50% of the required inspection interval examinations have been completed.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED:

Relief is requested from performing examinations during the second inspection period of the second inspection interval such that the minimum of 50% of the required inspection interval examinations have been completed in accordance with Tables IWB-2412-1 and IWC-2412-1.

SYSTEM/COMPONENTS FOR WHICH RELIEF IS REQUESTED:

Piping welds of Class 1 and Class 2 systems.

BASIS FOR RELIEF:

The NRC previously published Information Notice (IN) 98-44, "Ten-Year Inservice Inspection (ISI) Program Update for Licensees That

Intend to Implement Risk-Informed ISI of Piping." This document states that "...NRC will consider authorizing a delay of 2 years in implementation of the next 10-year ISI program for piping only to allow licensees to develop and obtain approval for their RI-ISI program at the next available opportunity using the staff-approved topical reports." IN 98-44 does not specifically address programs that may choose to implement a RI-ISI Program mid-interval.

SQN Units 1 and 2 is presently in the second inspection period of the second inspection interval (December 16, 1995 to December 15, 2005). The second inspection period began on December 16, 1998 and ends on December 15, 2002. Each unit at SQN has one refueling outage remaining in the second inspection period. Prior to performing the examinations required by the Risk-Informed ISI (RI-ISI) program, TVA must obtain NRC approval of the RI-ISI program, and prepare outage planning for the weld examinations. An NRC approval date of July 1, 2001, would provide sufficient time to plan for the next refueling outage for SQN Units 1 and 2. If the RI-ISI program is not approved by NRC with sufficient time to perform outage planning, the remaining percentage of the required minimum number of 50% of second inspection interval examinations must be completed during the second inspection period as required by Tables IWB-2412-1 and IWC-2412-1 of ASME Section XI.

The RI-ISI program will result in a substantial reduction in the required number of piping weld examinations. Performance of the required ASME Section XI examinations during the second inspection period of the second inspection interval will result in unnecessary examinations and in an unnecessary radiation exposure to personnel.

ALTERNATIVE EXAMINATIONS:

If NRC approval of the SQN Units 1 and 2 RI-ISI program is not received by July 1, 2001, a 30% sample of the ASME Section XI examinations required to be conducted during the second inspection period will be conducted during the second inspection period of the second inspection interval. This will result in 19 B-F/B-J welds and 12 C-F-1/C-F-2 welds being examined for Unit 1 and 18 B-F/B-J welds and 12 C-F-1/C-F-2 being examined for Unit 2. The RI-ISI program will be fully implemented for SQN Units 1 and 2 during the third inspection period of the second inspection interval after NRC approval. The third inspection period is scheduled to begin for SQN Units 1 and 2 on December 16, 2002.

If NRC approval of the SQN Units 1 and 2 RI-ISI program is received after July 1, 2001 and prior to the start of the third inspection period, TVA plans to implement the RI-ISI program during the second inspection period.

JUSTIFICATION FOR THE GRANTING OF RELIEF:

TVA has currently developed a Class 1 and 2 RI-ISI Program for SQN Units 1 and 2 based on Westinghouse Topical Report, WCAP-14572 Revision 1-NP-A (see 1-RI-ISI-1 and 2-RI-ISI-1). SQN Units 1 and 2 are presently in the second inspection period of the second inspection interval (December 16, 1995 to December 15, 2005). The second inspection period began on December 16, 1998 and ends on December 15, 2002.

The NRC previously published Information notice (IN) 98-44, "Ten-Year Inservice Inspection (ISI) Program Update for Licensees That Intend to Implement Risk-Informed ISI of Piping." This document states that "…NRC will consider authorizing a delay of 2 years in implementation of the next 10-year ISI program for piping only to allow licensees to develop and obtain approval for their RI-ISI program at the next available opportunity using the staff-approved topical reports." IN 98-44 does not specifically address programs that may choose to implement a RI-ISI Program mid-interval.

Each unit at SQN has one refueling outage remaining in the second inspection period of the second inspection interval. During the first inspection period of the second inspection interval, 81 Examination Category B-F/B-J (B-F/B-J) welds and 54 Examination Category C-F-1/C-F-2 (C-F-1/C-F-2) welds were examined for SQN Unit 1. During the first inspection period of the second inspection interval, 79 B-F/B-J welds and 55 C-F-1/C-F-2 welds were examined for SQN Unit 2. There have been two B-J welds examined during the second inspection period for SQN Unit 1. There have been no B-J welds examined during the second inspection period for SQN Unit 2. There have been no B-F/C-F-1/C-F-2 welds examined during the second period for either unit. For the second inspection period of the second inspection interval, 61 B-F/B-J welds and 39 C-F-1/C-F-2 welds are scheduled to be examined for SQN Unit 1. For the second inspection period of the second inspection interval, 57 B-F/B-J welds and 40 C-F-1/C-F-2 welds are scheduled to be examined for SQN Unit 2. The examinations conducted during the first inspection period and scheduled for the second inspection period includes volumetric and surface examinations as required by ASME Section XI. Code Case N-524 is utilized for examination of longitudinal welds.

As previously stated, each unit at SQN has one refueling outage remaining in the second inspection period. The SQN Unit 1 refueling outage is scheduled for Fall of 2001 and the Unit 2 refueling outage is scheduled for Spring 2002. Prior to performing the examinations required by the Risk-Informed ISI (RI-ISI) program, TVA must obtain NRC approval of the RI-ISI program and prepare outage plans for the weld examinations. An NRC approval date of July 1, 2001, would provide sufficient time to plan for the next refueling outage for SQN Units 1 and 2. If the RI-ISI program is not approved by NRC with sufficient time to perform outage planning, the remaining percentage of the required minimum number of 50% of second inspection interval examinations must be completed

during the second inspection period as required by Tables IWB-2412-1 and IWC-2412-1 of ASME Section XI.

The RI-ISI program will result in a substantial reduction in the required number of piping weld examinations. Performance of the required percentage of ASME Section XI examinations during the second inspection period of the second inspection interval will result in unnecessary examinations and unnecessary radiation exposure to personnel. Performance of a sample of the ASME Section XI examinations required to be conducted during the second inspection period would be sufficient to ensure that an acceptable level of quality and safety is maintained. The RI-ISI program would be fully implemented for SQN Units 1 and 2 during the third inspection period of the second inspection interval after NRC approval. The third inspection period is scheduled to begin for SQN Units 1 and 2 on December 16, 2002.

Based on the above justification and the provisions of 10 CFR 50.55a(a)(3)(i), it is requested that relief be granted.

IMPLEMENTATION SCHEDULE:

This request for relief will be implemented during the second inspection period of the second inspection interval for SQN Units 1 and 2.