July 22, 2004

Mr. Harold B. Ray
Executive Vice President
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION (SONGS) UNITS 2 AND 3: REQUEST FOR RELIEF FROM REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE (CODE) CONCERNING INSERVICE INSPECTION (ISI) PROGRAM UPDATES FOR THE THIRD 10-YEAR INSPECTION INTERVAL (TAC NOS. MC0334 AND MC0335)

Dear Mr. Ray:

By letter dated July 2, 2003, Southern California Edison (SCE) requested an update of the licensee's ISI Program for the third 10-year interval for SONGS Units 2 and 3. This update requests relief from certain ASME Code requirements for Class 1, 2, and 3 components at SONGS Units 2 and 3. The NRC staff has reviewed relief requests ISI-3-1, ISI-3-2, ISI-3-3, ISI-3-4, ISI-3-5, ISI-3-6 and ISI-3-7. Relief requests ISI-3-1, ISI-3-6, and ISI-3-7 will be evaluated and documented in separate reports.

Based on the enclosed safety evaluation, the staff concludes that performing the Code-required volumetric examination is impractical for ISI-3-2 and ISI-3-3 and that the proposed alternatives provide reasonable assurance of structural integrity and an acceptable level of quality and safety. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) in that the relief is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility for the third 10-year ISI interval at SONGS Units 2 and 3. For ISI-3-4, the staff concludes that the proposed alternative includes all related requirements of the ASME Section XI 1998 Edition through 2000 Addenda, Table IWD-2500-1, Category D-B requirements. Therefore, pursuant to 10 CFR 50.55a(g)(4)(iv), the staff authorizes the proposed alternative for the third 10-year ISI interval at SONGS Units 2 and 3. For ISI-3-5, the licensee's proposed alternative to use Supplement 10, as administered by the EPRI-PDI program, provides an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval at SONGS Units 2 and 3.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in these relief requests remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

/RA/

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

Docket Nos. 50-361 and 50-362

Enclosure: Safety Evaluation

cc w/encl: See next page

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in these relief requests remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Sincerely,
/RA/

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

Docket Nos. 50-361 and 50-362

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEFS ISI-3-2 THROUGH ISI-3-5

SOUTHERN CALIFORNIA EDISON

SAN ONOFRE NUCLEAR GENERATING STATION (SONGS), UNITS 2 AND 3

DOCKET NOS. 50-361 AND 50-362

1.0 INTRODUCTION

By letter dated July 2, 2003, Southern California Edison (SCE) requested an update of the licensee's inservice inspection (ISI) program for the third 10-year interval at SONGS Units 2 and 3. This update requests relief from certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) requirements for Class 1, 2, and 3 components at SONGS Units 2 and 3.

2.0 BACKGROUND

The ISI of the ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 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 licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements 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) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of record for San Onofre Nuclear Generating Station, third 10-year ISI interval, starting August 18, 2003, is the 1995 Edition with 1996 Addenda. The components (including supports) may meet the

requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to commission approval.

3.0 EVALUATION OF RELIEF REQUESTS

3.1 Request for Relief ISI-3-2 – Alternative Examinations in lieu of Ultrasonic Examination of Cast Austenitic Stainless Steel

Item for Which Relief Is Requested

The licensee requests relief from the required volumetric examination of various B-M-1 welds.

Code Requirements from which Relief is Requested

ASME Code Section XI, Class 1, Table IWB-2500-1, Examination Category B-M-1, Pressure Retaining Welds in Valve Bodies. Item B12.40 requires volumetric examination of Class 1 welds in valve bodies nominal piping size (NPS) 4 inches or larger per Figure IWB-2500-17.

Proposed Alternative

In its July 2, 2003, submittal, the licensee requested relief from performing the Code required volumetric examination of the following B-M-1 welds.

Weld ID	Description
02-019-013	Valve Body Upper Section Weld
02-019-014	Valve Body Lower Section Weld
02-019-010	Valve Body Lower Section Weld
02-019-010A	Valve Body Upper Section Weld
02-019-010	Valve Body Lower Section Weld
02-019-010A	Valve Body Upper Section Weld
02-019-010	Valve Body Lower Section Weld
02-019-010A	Valve Body Upper Section Weld
02-021-026	16" Valve Body Upper Section Weld
02-021-027	16" Valve Body Lower Section Weld
02-021-034	16" Valve Body Lower Section Weld
02-021-035	16" Valve Body Upper Section Weld
02-021-044A	10" Valve Body Lower Section Weld

Weld ID	Description
02-021-044	10" Valve Body Upper Section Weld
02-021-054E	10" Valve Body Lower Section Weld
02-021-054B	10" Valve Body Upper Section Weld

In lieu of the volumetric examination, the following alternatives were proposed:

1. Surface examination (PT) of the weld and heat affected zone.

2. Visual examination (VT-3) of the valve internals when valve is disassembled.

3. Visual examination (VT-3) of the component in conjunction with the reactor coolant system pressure test following each refueling or repairs to this component.

Basis for Relief

The licensee's July 2, 2003, letter referred to a previous submittal by the licensee dated October 4, 1993, which made the same relief request for the second 10-year inspection interval. The licensee's October 4, 1993, request was approved in an NRC letter dated February 13, 1996, to use alternatives to the requirements of ASME Code Section XI, Class 1, Table IWB-2500-1. The licensee's bases for relief were stated as follows.

> These valves are made of cast austenitic stainless steels with body welds using the electroslag welding process. The large grain structure of the cast material results in sound dispersion and attenuation that will not provide meaningful examinations for the component being inspected.
>
> Ultrasonic Test of cast austenitic stainless steel materials have not provided meaningful results as of this date. If and when a newly developed technique becomes available, it will be used and adopted for this examination.

In its July 2, 2003, letter the licensee stated that the volumetric examination technology has not changed in regard to cast austenitic steels since the last submittal in 1993. Therefore, this relief request from the ASME Code is still required.

Evaluation

The Code requires volumetric examinations of Class 1 welds in valve bodies NPS 4 inches or larger. The licensee proposed to perform a surface examination of the weld and heat affected zone, a VT-3 visual examination of the valve internals when the valve is disassembled for maintenance or repair, and the Code required VT-2 visual examination in conjunction with the reactor coolant system pressure test following each refueling outage or repairs to this component.

The attenuative properties of the cast austenitic stainless steel valve body and of electroslag welds make the Code-required volumetric examination impractical for the subject welds. To obtain complete volumetric coverage, modification of the valves would be required. Imposition of this requirement would cause a considerable burden on the licensee. The licensee's proposed alternative, to perform a surface examination in conjunction with visual examinations, provides reasonable assurance of structural integrity and will provide an acceptable level of quality and safety.

Conclusion

Based on the above evaluation, the staff concludes that performing the Code-required volumetric examination is impractical and that the licensee's proposed alternative provides reasonable assurance of structural integrity and will provide an acceptable level of quality and safety. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI interval at SONGS Units 2 and 3. The staff has determined that relief is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

3.2 Request for Relief ISI-3-3 – Alternative Volumetric Examination Coverage of Pressurizer and Steam Generator Category B-D Welds

Item for Which Relief Is Requested

The licensee requests relief from performing 100 percent of the Code-required volumetric examination for various nozzle-to-vessel welds.

Code Requirements from which Relief is Requested

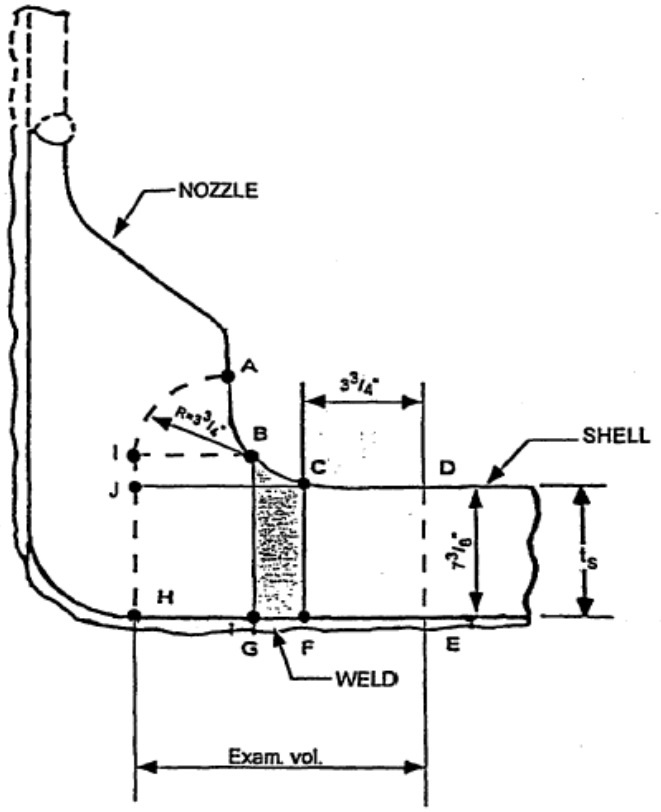
ASME Section XI, Class 1, Table IWB-2500-1, Examination Category B-D, Item B3.110 requires a 100 percent volumetric examination of pressurizer nozzle-to-vessel welds per Figure IWB-2500-7; Item B3.130 requires a 100 percent volumetric examination of steam generator (primary side) nozzle-to-vessel welds per Figure IWB-2500-7.

Proposed Alternative

The Code requires volumetric examination for volume A-B-C-D-E-F-G-H-I as shown on Figure IWB-2500-7. The licensee requests relief from performing the Code-required 100 percent volumetric examination for the following of nozzle-to-vessel welds.

Weld ID	Description
03-005-009	Surge Nozzle-to-Bottom Head Weld
03-005-010	Spray Nozzle-to-Top Head Weld
03-005-011	Safety Nozzle-to-Top Head Weld
03-005-012	Safety Nozzle-to-Top Head Weld
03-005-013	Safety Nozzle-to-Top Head Weld
03-003-010	Inlet Nozzle-to-Head Weld
03-003-011	Outlet Nozzle-to-Head Weld
03-003-012	Outlet Nozzle-to-Head Weld
03-004-010	Inlet Nozzle-to-Head Weld
03-004-011	Outlet Nozzle-to-Head Weld
03-004-012	Outlet Nozzle-to-Head Weld

In lieu of the Code requirements, the licensee proposed to perform ultrasonic testing (UT) of volume D-E-H-J (Sketch 4-1).



A-B-C-D-E-F-G-H-I

SKETCH 4-1

Basis for Relief

The licensee's July 2, 2003, letter referred to a previous submittal by the licensee dated October 4, 1993, which made the same relief request for the second 10-year inspection interval. The licensee's October 4, 1993, request was approved in an NRC letter dated February 13, 1996, to use alternatives to the requirements of ASME Code Section XI, Class 1, Table IWB-2500-1. The licensee's bases for relief were stated as follows:

> To achieve full UT coverage of the whole volume required by the Code, examination has to be performed on the shell side to scan Volume D-E-H-J (Sketch 4-1) and on the nozzle side to scan volume A-B-C-J. The nozzle design of the San Onofre pressurizer and steam generator has a geometric configuration that precludes achieving the required volume A-B-C-J.

In its July 2, 2003, letter, the licensee stated that the volumetric examination technology has not changed in regard to cast austenitic steels since the last submittal in 1993. Therefore, this relief request from the ASME Code is still required.

Evaluation

The Code requires volumetric examinations of pressurizer and steam generator nozzle-to-vessel welds. However, the SONGS Units 2 and 3 pressurizer and steam generator nozzles have a geometric configuration that precludes achieving 100 percent of the required examination from the outside. The design configuration restrictions make the Code-required volumetric examination impractical. To obtain complete volumetric coverage, modification of the components would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee proposed no additional examinations. However, based on the significant amount of volumetric coverage that has been obtained, it is reasonable to conclude that a pattern of degradation, if present, would have been detected. Thus, reasonable assurance of structural integrity and an acceptable level of quality and safety is provided.

Conclusion

Based on the above evaluation, the staff concludes that the design configuration restrictions make the Code-required volumetric examination impractical. Based on the significant amount of volumetric coverage obtained, reasonable assurance of structural integrity and an acceptable level of quality and safety has been provided. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI interval at SONGS Units 2 and 3. The staff has determined that relief is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

3.3 Request for Relief ISI-3-4 – Alternative Identification of Category D-B Items

Item for Which Relief Is Requested

ASME Section XI, Class 3, Examination Category D-B, Item Nos. D2.10, D2.20, D2.30, D2.40, D2.50, D2.60, D2.70 and D2.80 - Pressure Retaining Components.

Code Requirements from which Relief is Requested

ASME Code Section XI, 1995 Edition, 1996 addenda, Subsection IWD, Table IWD-2500-1, Examination Category D-B, all Pressure Retaining Components, Item Nos. D2.10, D2.20, D2.30, D2.40, D2.50, D2.60, D2.70 and D2.80 specific grouping of Pressure Vessels, Piping, Pumps and Valves.

Proposed Alternative

As an alternative to the ASME Section XI 1995 Edition, 1996 Addenda, Table IWD-2500-1, Category D-B requirements to uniquely group components by specific item numbers for

Vessels, Piping, Pumps, and Valves, the requirements of the 1998 Code, Table IWD-2500-1, Category D-B will be utilized. The unique identification of components such as pressure vessels, piping, pumps and valves as applicable will continue to be contained in the inservice inspection functional test procedures.

Basis for Relief

For the third 10-year inspection interval, the licensee has updated its ASME Code Section XI ISI program to the 1995 Edition, 1996 Addenda. This 1995 Edition, 1996 Addenda, Table IWD-2500-1, Examination Category D-B, provides unique item numbers for groups of components such as pressure vessels, piping, pumps, and valves. In lieu of the grouping requirements of Examination Category D-B in the 1995 Edition, 1996 Addenda, the licensee proposes to use the applicable section in the 1998 Edition with Addenda through 2000. The alternative request will allow the licensee to continue its current practice of meeting Section XI Code requirements for pressure testing and visual examination through the particular system functional test procedure, without having to revise and uniquely identify in its inspection database the specific item numbers for a grouping of components.

Evaluation

The NRC has approved the 1998 Edition with Addenda through 2000 of the ASME Code as reflected in 10 CFR 50.55a(b)(2), which, in part, revised the identification of item numbers for components in Examination Category D-B. The 1998 Edition with Addenda through 2000 groups the components as pressure retaining components without the unique use of item numbers for each particular grouping as is the current practice at SONGS Units 2 and 3 through the use of Section XI 1989 edition. The requirements of the 1998 Edition with Addenda through 2000, Table IWD-2500-1, Category D-B will be utilized as an alternative to the 1995 Edition to 1996 Addenda, Table IWD-2500-1, Category D-B requirements to uniquely group components by specific item numbers for vessels, piping, pumps, and valves. The staff has reviewed the licensee's proposed alternative and finds that the proposed alternative includes all related requirements of the ASME Section XI 1998 Edition through 2000 Addenda, Table IWD-2500-1, Category D-B. Therefore, pursuant to 10 CFR 50.55a(g)(4)(iv), which allows for the adoption of applicable sections in subsequent editions of the Code, the staff finds that the proposed alternative is acceptable.

Conclusion

Based on its review, the staff has determined that the proposed alternative in Request Relief ISI-3-4 includes all related requirements of the ASME Section XI 1998 Edition through 2000 Addenda, Table IWD-2500-1, Category D-B requirements. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(g)(4)(iv) for the third 10-year ISI interval at SONGS Units 2 and 3.

3.4 Request for Relief ISI-3-5 – Alternative Requirements for Implementation of Appendix VIII, Supplement 10

Item for Which Relief Is Requested

Dissimilar metal piping welds that are subject to examination using procedures, personnel, and equipment qualified to the 1995 Edition, 1996 Addenda of the ASME Code, Section XI, Appendix VIII, Supplement 10, "Qualification Requirements for Dissimilar Metal Piping Welds."

Code Requirements from which Relief is Requested

The licensee requested relief from the following Supplement 10 requirements.

Item 1 - Paragraph 1.1(b) states in part - Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent.

Item 2 - Paragraph 1.1(d) states - All flaws in the specimen set shall be cracks.

Item 3 - Paragraph 1.1(d)(1) states - At least 50 percent of the cracks shall be in austenitic material. At least 50 percent of the cracks in austenitic material shall be contained wholly in weld or buttering material. At least 10 percent of the cracks shall be in ferritic material. The remainder of the cracks may be in either austenitic or ferritic material.

Item 4 - Paragraph 1.2(b) states in part - The number of unflawed grading units shall be at least twice the number of flawed grading units.

Item 5 - Paragraph 1.2(c)(1) and 1.3(c) state in part - At least 1/3 of the flaws, rounded to the next higher whole number, shall have depths between 10 and 30 percent of the nominal pipe wall thickness. Paragraph 1.4(b) distribution table requires 20 percent of the flaws to have depths between 10 and 30 percent.

Item 6 - Paragraph 2.0 first sentence states - The specimen inside surface and identification shall be concealed from the candidate.

Item 7 - Paragraph 2.2(b) states in part - The regions containing a flaw to be sized shall be identified to the candidate.

Item 8 - Paragraph 2.2(c) states in part - For a separate length sizing test, the regions of each specimen containing a flaw to be sized shall be identified to the candidate.

Item 9 - Paragraph 2.3(a) states - For the depth sizing test, 80 percent of the flaws shall be sized at a specific location on the surface of the specimen identified to the candidate.

Item 10 - Paragraph 2.3(b) states - For the remaining flaws, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.

Item 11 - Table VIII-S2-1 provides the false call criteria when the number of unflawed grading units is at least twice the number of flawed grading units.

Proposed Alternative and Basis for Relief

The licensee proposed the following alternative requirements to selected provisions of the ASME Code, Section XI, Appendix VIII, Supplement 10 requirements for SONGS Units 2 and 3 for the third 10-year ISI interval. The proposed alternative, as implemented through the Performance Demonstration Initiative (PDI) Program, is attached to the licensee's July 2, 2003, submittal. The proposed alternative was incorporated in ASME Code Case N-695 which was approved by the ASME on May 21, 2003.

Item 1 - Paragraph 1.1(b) alternative:

The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Pipe diameters within a range of ½ in. (13 mm) of the nominal diameter shall be considered equivalent. Pipe diameters larger than 24 in. (610 mm) shall be considered to be flat. When a range of thicknesses is to be examined, a thickness tolerance of ±25 percent is acceptable.

Technical Basis – The change in the minimum pipe diameter tolerance from 0.9 times the diameter to the nominal diameter minus 0.5 inch provides tolerances more in line with industry practice. Though the alternative is less stringent for small pipe diameters they typically have a thinner wall thickness than larger diameter piping. A thinner wall thickness results in shorter sound path distances that reduce the detrimental effects of the curvature. This change maintains consistency between Supplement 10 and the recent revision to Supplement 2.

Item 2 - Paragraph 1.1(d) alternative:

At least 60 percent of the flaws shall be cracks, the remainder shall be alternative flaws. Specimens with intergranular stress-corrosion cracking (IGSCC) shall be used when available. Alternative flaws, if used, shall provide crack-like reflective characteristics and shall be limited to the case where implantation of cracks produces spurious reflectors that are uncharacteristic of actual flaws. Alternative flaw mechanisms shall have a tip width of less than or equal to 0.002 in. (.05 mm). Note, to avoid confusion the proposed alternative modifies instances of the term 'cracks' or 'cracking' to the term 'flaws' because of the use of alternative flaw mechanisms.

Technical Basis – Implanting a crack requires excavation of the base material on at least one side of the flaw. While this may be satisfactory for ferritic materials, it does not produce a useable axial flaw in austenitic materials because the

sound beam, which normally passes only through base material, must now travel through weld material on at least one side, producing an unrealistic flaw response. In addition, it is important to preserve the dendritic structure present in field welds that would otherwise be destroyed by the implantation process. To resolve these issues, the proposed alternative allows the use of up to 40 percent fabricated flaws as an alternative flaw mechanism under controlled conditions. The fabricated flaws are isostatically compressed which produces ultrasonic reflective characteristics similar to tight cracks.

Item 3 - Paragraph 1.1(d)(1) alternative:

At least 80 percent of the flaws shall be contained wholly in weld or buttering material. At least one and a maximum of 10 percent of the flaws shall be in ferritic base material. At least one and a maximum of 10 percent of the flaws shall be in austenitic base material.

Technical Basis – Under the current Code, as few as 25 percent of the flaws are contained in austenitic weld or buttering material. Recent experience has indicated that flaws contained within the weld are the likely scenarios. The metallurgical structure of austenitic weld material is ultrasonically more challenging than either ferritic or austenitic base material. The proposed alternative is therefore more challenging than the current Code.

Item 4 - Paragraph 1.2(b) alternative:

Detection sets shall be selected from Table VIII-S10-1. The number of unflawed grading units shall be at least one and a half times the number of flawed grading units.

Technical Basis - Table S-10-1 [replaced by new Table VIII-S10-1] provides a statistically based ratio between the number of unflawed grading units and the number of flawed grading units. The proposed alternative reduces the ratio to 1.5 times to reduce the number of test samples to a more reasonable number from the human factors perspective. However, the statistical basis used for screening personnel and procedures is still maintained at the same level with competent personnel being successful and less skilled personnel being unsuccessful. The acceptance criteria for the statistical basis are in Table Vlll-S10-1.

Item 5 - Paragraphs 1.2(c)(1) and 1.3(c) alternative:

The proposed alternative to the flaw distribution requirements of Paragraph 1.2(c)(1) (detection) and 1.3(c) (length) is to use the Paragraph 1.4(b) (depth) distribution table (see below) for all qualifications.

Flaw Depth (% Wall Thickness)	Minimum Number of Flaws
10-30%	20%
31-60%	20%
61-100%	20%

In addition the proposed alternative includes the following:

At least 75 percent of the flaws shall be in the range of 10 to 60 percent of wall thickness.

Technical Basis - The proposed alternative uses the depth sizing distribution for both detection and depth sizing because it provides for a better distribution of flaw sizes within the test set. This distribution allows candidates to perform detection, length, and depth sizing demonstrations simultaneously utilizing the same test set. The requirement that at least 75 percent of the flaws shall be in the range of 10 to 60 percent of wall thickness provides an overall distribution tolerance yet the distribution uncertainty decreases the possibilities for testmanship that would be inherent to a uniform distribution. It must be noted that it is possible to achieve the same distribution utilizing the present requirements, but it is preferable to make the criteria consistent.

Item 6 - Paragraph 2.0 alternative to the first sentence:

For qualifications from the outside surface, the specimen inside surface and identification shall be concealed from the candidate. When qualifications are performed from the inside surface, the flaw location and specimen identification shall be obscured to maintain a ’blind test.’

Technical Basis - The current Code requires that the inside surface be concealed from the candidate. This makes qualifications conducted from the inside of the pipe (e.g., PWR nozzle-to-safe end welds) impractical. The proposed alternative differentiates between ID and OD scanning surfaces, requires that they be conducted separately, and requires that flaws be concealed from the candidate. This is consistent with the recent revision to Supplement 2.

Items 7 and 8 - Paragraphs 2.2(b) and 2.2(c) alternative:

. . . containing a flaw to be sized may be identified to the candidate.

Technical Basis - The current Code requires that the regions of each specimen containing a flaw to be length sized shall be identified to the candidate. The candidate shall determine the length of the flaw in each region (note, that length and depth sizing use the term "regions" while detection uses the term "grading units" - the two terms define different concepts and are not intended to be equal or interchangeable). To ensure security of the samples, the proposed alternative modifies the first "shall" to a "may" to allow the test administrator the option of

not identifying specifically where a flaw is located. This is consistent with the recent revision to Supplement 2.

Items 9 and 10 - Paragraphs 2.3(a) and 2.3(b) alternative:

. . . regions of each specimen containing a flaw to be sized may be identified to the candidate.

Technical Basis - The current Code requires that a large number of flaws be sized at a specific location. The proposed alternative changes the "shall" to a "may" which modifies this from a specific area to a more generalized region to ensure security of samples. This is consistent with the recent revision to Supplement 2. It also incorporates terminology from length sizing for additional clarity.

Item 11 - Paragraph 3.1 alternative:

Uses the acceptance Table VIII-S10-1 (shown in the licensee's submittal) which is a modification of Table VIII-S2-1.

Technical Basis - The proposed alternative adds new Table VIII-S10-1. It is a modified version of Table VIII-S2-1 to reflect the reduced number of unflawed grading units and allowable false calls. As a part of ongoing Code activities, Pacific Northwest National Laboratory has reviewed the statistical significance to this new Table VIII-S10-1.

Evaluation

Since 2001, PDI has been developing a program to implement Supplement 10 to Appendix VIII of Section XI of the ASME Code. During the development process, certain aspects of Supplement 10 were identified as difficult or impossible to implement. To overcome the implementation difficulties, PDI researched, tested, and demonstrated the effectiveness of an alternative to selected paragraphs of the Code. PDI representatives presented the alternative before the appropriate ASME committees which formalize the alternative in Code Case N-695 which was approved on May 21, 2003. The NRC representatives on these committees participated in the consensus process and joined with the industry in approving Code Case N-695. The differences between the Code and the PDI program are discussed below for each case:

Paragraph 1.1(b)

The Code requirement of "0.9 to 1.5 times the nominal diameter are equivalent" was established for a single nominal diameter. When applying the Code-required tolerance to a range of diameters, the tolerance rapidly expands on the high side. Under the current code requirements, a 5-inch OD pipe would be equivalent to a range of 4.5-inch to 7.5-inch diameter pipe. Under the proposed PDI guidelines, the equivalent range would be reduced to 4.5-inch to 5.5-inch diameter pipe. With current Code requirements, a 16-inch nominal diameter pipe would be equivalent to a range of 14.4-inch to 24-inch diameter pipe. The proposed alternative

would significantly reduce the equivalent range to between 15.5-inch and 16.5-inch diameter pipe. The difference between Code and the proposed PDI program for diameters less than 5 inches is not significant because of shorter metal path and beam spread associated with smaller diameter piping. The staff considers the proposed alternative to be more conservative overall than current Code requirements. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.1(d)

The Code requires all flaws to be cracks. Manufacturing test specimens containing cracks free of spurious reflections and telltale indicators is extremely difficult in austenitic material. To overcome these difficulties, PDI developed a process for fabricating flaws that produce ultrasonic testing (UT) acoustic responses similar to the responses associated with real cracks. PDI presented its process for discussion at public meetings held June 12 through 14, 2001, and January 31 through February 2, 2002, at the EPRI NDE Center, Charlotte, NC. The staff attended these meetings and determined that the process parameters used for manufacturing fabricated flaws resulted in acceptable acoustic responses. PDI is selectively installing these fabricated flaws in specimen locations that are unsuitable for real cracks. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.1(d)(1) and Table VIII-S2-1

The code requires that at least 50 percent of the flaws be contained in austenitic material and 50 percent of the flaws in the austenitic material shall be contained fully in weld or buttering material. This means that at least 25 percent of the total flaws must be located in the weld or buttering material. Field experience shows that flaws identified during ISI of dissimilar metal welds are more likely to be located in the weld or buttering material. The grain structure of austenitic weld and buttering material represents a much more stringent ultrasonic scenario than that of a ferritic or austenitic base material. Flaws made in austenitic base material are difficult to create free of spurious reflectors and telltale indicators. The proposed alternative of 80 percent of the flaws in the weld metal or buttering material provides a challenging testing scenario reflective of field experience and minimizes testmanship associated with telltale reflectors common to placing flaws in austenitic base material. The staff considers the proposed alternative to be more conservative overall than current Code requirements. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.2(b), Paragraph 3.1

The Code requires that detection sets meet the requirements of Table VIII-S2-1 which specifies the minimum number of flaws in a test set to be 5 with 100 percent detection. The current Code also requires the number of unflawed grading units to be two times the number of flawed grading units. The proposed alternative, as shown in the licensee's submittal as Table VIII-S10-1, would follow the detection criteria of the table beginning with a minimum number of flaws in a test set starting at 10, and reducing the number of unflawed grading units to one and a half times the number of flawed grading units, while maintaining the same statistical design basis as the Code. The proposed alternative paragraphs satisfy the pass/fail objective established for

the Appendix VIII performance demonstration acceptance criteria. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.2(c)(1), Paragraph 1.3(c)

For detection and length sizing, Code requires at least one third of the flaws be located between 10 and 30 percent through the wall thickness and one third located greater than 30 percent through the wall thickness. The remaining flaws would be located randomly throughout the wall thickness. The proposed alternative sets the distribution criteria for detection and length sizing to be the same as the depth sizing distribution, which stipulates that at least 20 percent of the flaws be located in each of the increments of 10-30 percent, 31-60 percent and 61-100 percent. At least 75 percent of the flaws shall be in the range of 10 to 60 percent of the wall thickness with the remaining flaws located randomly throughout the pipe thickness. With the exception of the 10-30 percent increment, the proposed alternative is a subset of the current Code requirements. The 10-30 percent increment would be in the subset if it contained at least 30 percent of the flaws. The change simplifies assembling test sets for detection and sizing qualifications and is more indicative of conditions in the field. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 2.0

The Code requires the specimen inside surface be concealed from the candidate. This requirement is applicable for test specimens used for qualification performed from the outside surface. With the expansion of Supplement 10 to include qualifications performed from the inside surface, the inside surface must be accessible while maintaining the specimen integrity. The proposed alternative requires that flaws and specimen identifications be obscured from candidates, thus maintaining blind test conditions. The staff considers this to be consistent with the intent of ASME Code requirements. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraphs 2.2(b) and 2.2(c)

The Code requires that the location of flaws added to the test set for length sizing shall be identified to the candidate. The proposed alternative is to make identifying the location of additional flaws an option. This option provides an additional element of difficulty to the testing process because the candidate would be expected to demonstrate the skill of detecting and sizing flaws over an area larger than a specific location. The staff considers the proposed alternative to be more conservative than current Code requirements. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraphs 2.3(a) and 2.3(b)

In paragraph 2.3(a), the Code requires that 80 percent of the flaws be sized in a specific location that is identified to the candidate. The proposed alternative allows identification of the specific location to be an option. This permits detection and depth sizing to be conducted

separately or concurrently. In order to maintain a blind test, the location of flaws cannot be shared with the candidate. For depth sizing that is conducted separately, allowing the test administrator the option of not identifying flaw locations makes the testing process more challenging. The staff considers the proposed alternative to be more conservative than current Code requirements. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

In paragraph 2.3(b), the Code also requires that the location of flaws added to the test set for depth sizing shall be identified to the candidate. The proposed alternative is to make identifying the location of additional flaws an option. This option provides an additional element of difficulty to the testing process because the candidate would be expected to demonstrate the skill of finding and sizing flaws in an area larger than a specific location. The staff considers the proposed alternative to be more conservative than current Code requirements. The staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Conclusion

Based on the above evaluation, the staff concludes that the licensee's proposed alternative to use Supplement 10, as administered by the EPRI-PDI program, provides an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval at SONGS Units 2 and 3.

4.0 CONCLUSIONS

Based on the above evaluations, the staff concludes that performing the Code-required volumetric examination is impractical for ISI-3-2 and ISI-3-3 and that the proposed alternatives provide reasonable assurance of structural integrity and an acceptable level of quality and safety. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) in that the relief is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility for the third 10-year ISI interval at SONGS Units 2 and 3. For ISI-3-4, the staff concludes that the proposed alternative includes all related requirements of the ASME Section XI 1998 Edition through 2000 Addenda, Table IWD-2500-1, Category D-B requirements. Therefore, pursuant to 10 CFR 50.55a(g)(4)(iv), the staff authorizes the proposed alternative for the third 10-year ISI interval at SONGS Units 2 and 3. For ISI-3-5, the licensee's proposed alternative to use Supplement 10, as administered by the EPRI-PDI program, provides an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval at SONGS Units 2 and 3.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in these relief requests remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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