August 27, 2003

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), UNIT 3 - RE: REQUEST FOR RELIEF FROM THE REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE (CODE) CONCERNING PRESSURE RETAINING PIPING WELDS (TAC NO. MB6773)

Dear Mr. Ray:

By letter dated November 19, 2002, Southern California Edison Company requested relief (RR-B-2-06 and RR-B-2-07) from the requirements of ASME Code, Section XI, Appendix VIII, to use alternative procedures for examination of pressure retaining piping welds.

The ASME Code, Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 10 requires qualification of procedures, personnel, and equipment for examination of Category B-F, pressure retaining, dissimilar metal welds. Supplement 3 also has similar requirements for inside surface examination of Class 1 pressure retaining Category B-J piping welds. In lieu of these requirements, RR-B-2-06 and RR-B-2-07 request the use of Performance Demonstration Initiative (PDI) developed alternative qualification requirements for inspection of the pressure retaining welds.

The U.S. Nuclear Regulatory Commission staff concludes that the proposed alternative to use PDI developed alternative qualifications for inspection of pressure retaining welds, in lieu of existing Code requirements under ASME Code, Section XI, Appendix VIII, Supplements 10 and 3, provides an acceptable level of quality and safety. Therefore, the licensee's proposed relief is authorized pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations*, for the second 10-year inservice inspection interval at SONGS, Unit 3.

Sincerely,

/RA/

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

Docket No. 50-362

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PRESSURE RETAINING PIPING WELDS EXAMINATION

REQUEST FOR RELIEF NO. RR-B-2-06 AND RR-B-2-07

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE NUCLEAR GENERATING STATION (SONGS), UNIT 3

DOCKET NO. 50-362

1.0 INTRODUCTION

By letter dated November 19, 2002, Southern California Edison Company submitted requests for relief (RR-B-2-06 and RR-B-2-07) for SONGS, Unit 3, proposing alternative requirements to certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) requirements for inspection of Class 1 pressure retaining piping welds. These requests pertain to the qualification procedures for personnel conducting weld inspections. RR-B-2-06 requests using the Dissimilar Metal Weld criteria of the Electric Power Research Institute (EPRI) - Performance Initiative Program (PDI) in lieu of select provisions of Section XI, Appendix VIII, Supplement 10 of the ASME Code. RR-B-2-07 requests use of PDI developed alternative qualification requirements for inside surface inspection of pressure retaining piping welds in lieu of certain requirements of ASME Code, Section XI, Appendix VIII, Supplement 3. These relief requests are needed for SONGS, Unit 3, to comply with the revised 10 CFR 50.55a(g)(6)(ii)(C)(1), which requires implementation of ASME Code, Section XI, Appendix VIII, Supplements 3 and 10, and are consistent with the overall PDI effort.

2.0 BACKGROUND

The inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is to be 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 NRC pursuant to 10 CFR 50.55a(g)(6)(i). Section 10 CFR 50.55a(a)(3) of Title 10 of the *Code of Federal Regulations*, 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 10-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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of record for the second 10-year interval for SONGS, Unit 3, is the 1989 Edition. 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 REQUEST (RR-B-2-06)

3.1 Component for Which Relief is Requested:

ASME Section XI, 1989 Edition, no Addenda, Class 1, Category B-F, Pressure Retaining Piping Welds, Item Numbers B5.40, B5.130, subject to ultrasonic examination using procedures, personnel, and equipment qualified to ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 10 criteria.

3.2 Code Requirement:

The following paragraphs or statements are from ASME Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 10, Qualification Requirements for Dissimilar Metal Piping Welds, and identify the specific requirements that are included in this request for relief:

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% of the cracks shall be in austenitic material. At least 50% of the cracks in austenitic material shall be contained wholly in weld or buttering material. At least 10% 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% of the nominal pipe wall thickness. Paragraph 1.4(b) distribution table requires 20% of the flaws to have depths between 10% and 30%.

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% 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.

3.3 Licensee's Proposed Alternative:

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes to use the PDI program in lieu of the requirements of ASME Section XI, Appendix VIII, Supplement 10, 1995 Edition with 1996 Addenda. The EPRI PDI program is described in an attachment to Enclosure 1 of the licensee's submittal.

3.4 Licensee's Basis for Relief (as stated):

Item 1 - The proposed alternative to Paragraph 1.1(b) states:

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 1/2 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% is acceptable.

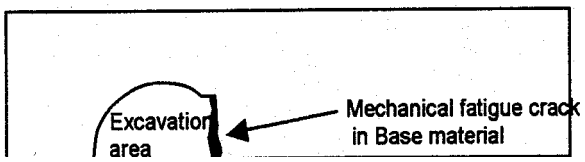
Technical Basis - The change in the minimum pipe diameter tolerance from 0.9 times the diameter to the nominal diameter minus 0.5 inch provides tolerances more in line with industry practice. Though the alternative is less stringent for small pipe diameters [these small pipes] typically have a thinner 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 - The proposed alternative to Paragraph 1.1(d) states:

At least 60% of the flaws shall be cracks, the remainder shall be alternative flaws. Specimens with IGSCC [intergranular stress-corrosion cracking] 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 - As illustrated below, 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% 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 - The proposed alternative to Paragraph 1.1 (d)(1) states:

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

Technical Basis - Under the current Code, as few as 25% 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 - The proposed alternative to Paragraph 1.2(b) states:

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 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 VIII-S10-1.

Item 5 - 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% of the flaws shall be in the range of 10 to 60% 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% of the flaws shall be in the range of 10 to 60% 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 - The proposed alternative to Paragraph 2.0 first sentence states:

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 [pressurized-water reactor] nozzle to safe end welds) impractical. The proposed alternative differentiates between ID [inside diameter] and OD [outside diameter] 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 - The proposed alternatives to Paragraph 2.2(b) and 2.2(c) state:

“... 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 "gradingunits" - 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 - The proposed alternative to Paragraph 2.3(a) and 2.3(b) state:

"... 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 - The proposed alternative modifies the acceptance criteria of TableVIII-S2-1 as follows:

10

TABLE VIII-S2-1
PERFORMANCE DEMONSTRATION DETECTION TEST
ACCEPTANCE CRITERIA

Detection Test Acceptance Critera		False Call Test Acceptance Criteria	
No. of Flawed Grading Units	Minimum Detection Criteria	No. of Unflawed Grading Units	Maximum Number of False Calls
~~5~~	~~5~~	~~10~~	~~0~~
~~6~~	~~6~~	~~12~~	~~1~~
~~7~~	~~6~~	~~14~~	~~1~~
~~8~~	~~7~~	~~16~~	~~2~~
~~9~~	~~7~~	~~18~~	~~2~~
10	8	~~20~~ 15	~~3~~ 2
11	9	~~22~~ 17	~~3~~ 3
12	9	~~24~~ 18	~~3~~ 3
13	10	~~26~~ 20	~~4~~ 3
14	10	~~28~~ 21	~~5~~ 3
15	11	~~30~~ 23	~~5~~ 3
16	12	~~32~~ 24	~~6~~ 4
17	12	~~34~~ 26	~~6~~ 4
18	13	~~36~~ 27	~~7~~ 4
19	13	~~38~~ 29	~~7~~ 4
20	14	~~40~~ 30	~~8~~ 5

Technical Basis - The proposed alternative is identified as new Table S10-1 above. It was modified 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 of these revisions and offered the revised Table S10-1.

3.5 Evaluation:

The licensee proposes to use the program developed by PDI that is similar to the Code requirements. The differences between the Code and the PDI program are discussed below.

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 pipe diameter. 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. The difference between ASME Code and the proposed alternative for diameters less than 5-inches is not significant because of shorter metal path and beam spread associated with smaller diameter piping, which reduces the detrimental effects of the curvature during ultrasonic testing. For pipe diameters larger than 5-inch, the proposed alternative is considered more conservative than current Code requirements, while for pipe diameters less than 5-inch, the alternative provides an equivalent range of coverage for tolerance. The NRC staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.1 (d)

The ASME 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 test 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 Nondestructive Examination Center, Charlotte, NC. The NRC 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 NRC staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.1(d)(1)

The code requires that at least 50% of the flaws be contained in austenitic material, 50% of the flaws in the austenitic material shall be contained fully in weld or buttering material. This means that at least 25% 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 material or austenitic base material. Flaws made in austenitic base material that are free of spurious reflectors and telltale indicators are difficult to create. The proposed alternative of 80% of the flaws located in the weld metal or buttering material provides a challenging testing scenario reflective of field experience and minimizes the inclusion of telltale reflectors commonly associated with placing flaws in austenitic base material. The NRC staff finds that the proposed alternative will provide an acceptable level of quality and safety and, therefore, is acceptable.

Paragraph 1.2(b)

The ASME 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% detection. The current ASME Code also requires the number of unflawed grading units to be two times the number of flawed grading units. The proposed alternative would follow the detection criteria of the table beginning with a minimum number of flaws in a test set being 10, and reducing the number of false calls to one and a half times the number of flawed grading units. The NRC staff has determined that the proposed alternative satisfies the pass/fail objective established for Appendix VIII performance demonstration. The NRC 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, the ASME Code requires at least 1/3 of the flaws be located between 10 and 30% through the wall thickness and at least 1/3 located greater than 30% through the wall thickness. The remaining flaws would be located randomly through the pipe 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% of the flaws be located in each of the increments of 10-30%, 31-60% and 61-100%. The remaining 40% would be located randomly through the wall thickness. With the exception of the 10-30% increment, the proposed alternative is a subset of the current Code requirements. The 10-30% increment would be in the subset if it contained at least 30% of the flaws. The change simplifies assembling test sets for detection and sizing qualifications and is more indicative of conditions in the field. The NRC 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 NRC staff finds this to be appropriate, and therefore, acceptable.

Paragraph 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 alternative is more conservative than Code requirements and is, therefore, acceptable.

Paragraph 2.3(a) and 2.3(b)

The Code requires that 80% of the flaws be sized in a specific location that is identified to the candidate. The proposed alternative 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 alternative is more conservative than the Code requirements and is, therefore, acceptable.

Paragraph 2.3(b)

The Code 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 alternative is more conservative than the ASME Code requirements and is, therefore, acceptable.

Paragraph 3.1 - Table VIII-S2-1

The ASME Code requirements, discussed in Paragraph 1.2(b) above, are based on statistical parameters for screening personnel. The proposed alternative increases the minimum number of flawed grading units and reduces the number of unflawed grading units while maintaining the same statistical parameters as the ASME Code. The staff finds that the proposed alternative provides the same pass/fail screening criteria used to develop the test size tables in Appendix VIII are also used to create the PDI alternative Supplement 10, Table VIII-S10-1. Therefore, the staff determined that the alternative does not significantly impact the false call criteria established in the table and, therefore, is acceptable.

3.6 Conclusion of Relief Request (RR-B-2-06):

The NRC staff has determined that use of the proposed alternative to Supplement 10 as administered by the PDI program will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the proposed alternative to the Code requirement in Relief Request RR-B-2-06 for SONGS, Unit 3, for the second 10-year ISI Interval. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

4.0 EVALUATION OF RELIEF REQUEST (RR-B-2-07)

4.1 Component for Which Relief is Requested:

ASME Code, Section XI, 1989 Edition, no Addenda, Class 1, Category B-J,
Item Numbers B9.11 and B9.12, Pressure Retaining Piping Welds ultrasonically examined from the inside surface of Pressurized Water Reactors using procedures, personnel, and equipment qualified to ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 3 criteria.

4.2 Code Requirement:

Table VIII-3110-1 of Appendix VIII to ASME Section XI, 1995 Edition, 1996 Addenda, Supplement 3 criteria.

4.3 Licensee's Proposed Alternative:

The licensee proposes to use the alternative program discussed below for implementation of Appendix VIII, Supplement 3, as coordinated with the proposed alternative for the Supplement 10 implementation program. The PDI Program alternative is described in the submittal.

4.4 Licensee's Basis for Relief (as stated):

> Depending upon the particular design, the nozzle to main coolant piping may be fabricated using ferritic, austenitic, or cast stainless components and assembled using ferritic, austenitic, or dissimilar metal welds. Additionally, differing combinations of these assemblies may be in close proximity, which typically means the same ultrasonic essential variables are used for each weld and the most challenging ultrasonic examination process is employed (e.g., the ultrasonic examination process associated with a dissimilar metal weld would be applied to a ferritic or austenitic weld.) San Onofre Unit 3 is a Combustion Engineering (CE) designed plant, and the piping and welds connected to the reactor vessel are ferritic material with stainless steel clad.
>
> Separate qualifications to Supplements 2, 3, and 10 are redundant when done in accordance with the PDI Program. For example, during a personnel qualification to the PDI Program, the candidate would be exposed to a minimum of 10 flawed grading units for each individual supplement. Personnel qualification to Supplements 2, 3, and 10 would therefore require a total of 30 flawed grading units. Test sets this large and tests of this duration are impractical. Additionally, a full procedure qualification (i.e. 3 personnel qualifications) to the PDI Program requirements would require 90 flawed grading units. This is particularly burdensome for a procedure that will use the same essential variables or the same criteria for selecting essential variables for all 3 supplements.
>
> To resolve these issues, the PDI Program recognizes the Supplement 10 qualification as the most stringent and technically challenging ultrasonic application. The essential variables used for the examination of

Supplements 2, 3, and 10 are equivalent and a coordinated implementation would be sufficiently stringent to qualify all 3 Supplements if the requirements used to qualify Supplement 10 are satisfied as a prerequisite. The basis for this conclusion is the fact that the majority of the flaws in Supplement 10 are located wholly in austenitic weld material, which is known to be challenging for ultrasonic techniques due to the variable dendritic structure of the weld material. Flaws in Supplements 2 and 3 are located in fine-grained base materials, which are known to be less challenging.

Additionally, the proposed alternative is more stringent than current Code requirements for a detection and length sizing qualification. For example, the current Code would allow a detection procedure, personnel, and equipment to be qualified to Supplement 10 with 5 flaws, Supplement 2 with 5 flaws, and Supplement 3 with 5 flaws, a total of only 15 flaws. The proposed alternative of qualifying Supplement 10 using 10 flaws and adding on Supplement 2 with 5 flaws and Supplement 3 with 3 flaws results in a total of 18 flaws which will be multiplied by a factor of 3 for the procedure qualification.

Based on the above, the use of a limited number of Supplement 2 or 3 flaws is sufficient to access the capabilities of procedures and personnel who have already satisfied Supplement 10 requirements. 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 proposed alternative is consistent with other coordinated qualifications currently contained in Appendix VIII.

The proposed alternate program is provided as Attachment 2 [to the licensee's November 19, 2002, submittal] and is identified as Supplement 14. It has been submitted to the ASME Code Committee for consideration as new Supplement 14 to Appendix VIII.

4.5 Evaluation:

The licensee proposes an alternative to the qualification requirements of ASME Section XI, Appendix VIII, Supplement 3 criteria. The Code currently requires separate qualifications for Supplement 2 for austenitic piping, Supplement 3 for ferritic piping, and Supplement 10 for austenitic-to-ferritic piping. Qualifications for each supplement would entail a minimum of 10 flaws each for a total of 30 flaws minimum. The minimum number of flaws requirement establishes a statistical-based pass\fail objective for each supplement, however, using separate qualification processes for each supplement when performed together would unnecessarily expand the number of ferritic and austenitic flaws required to be identified.

The ASME Code recognizes that flaws in austenitic material are more difficult to detect and size than flaws in ferritic material. In addition, Supplement 12 of the ASME Code established precedence for implementing Supplement 3 as an add-on to a Supplement 2 qualification in lieu of separate Supplements 2 and 3 qualifications. This add-on consists of a minimum of 3 flaws in ferritic material. A statistical evaluation of this approach and Supplement 12's acceptance criteria satisfies the pass/fail objective established for Appendix VIII performance demonstration acceptance criteria.

The licensee's proposed alternative builds upon the precedence and experiences of Supplement 12 by starting with the most challenging Supplement 10 qualifications, as implemented by the PDI program (PDI Supplement 10), and adding a sufficient number of flaws to demonstrate the personnel skills and procedure effectiveness of the less challenging Supplement 3 qualifications. A PDI Supplement 10 performance demonstration has at least 1 flaw with a maximum of 10% of the total number of flaws being in the ferritic material. The rest of the flaws are in the more challenging austenitic material. When expanding the PDI Supplement 10 qualification to include Supplement 3, the proposed alternative would add a minimum of 3 flaws in ferritic material to the performance demonstration. The performance demonstration results added to the appropriate PDI Supplement 10 results must satisfy the acceptance criteria of the PDI Supplement 10. A statistical evaluation performed by the Pacific Northwest National Laboratories, an NRC contractor, showed that the proposed alternative acceptance criteria satisfied the pass/fail objective established for Appendix VIII for an acceptable performance demonstration.

5.0 Conclusion of Relief Request (RR-B-2-07):

The NRC staff has determined that use of a limited number of flaws to qualify Supplement 3 as coordinated with the PDI developed alternative to Supplement 10, will provide equivalent flaw detection to that of the ASME Code-required technique for the piping welds. The staff finds that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the proposed alternative to the Code requirement in Relief Request RR-B-2-07 for SONGS, Unit 3, for the second 10-year ISI interval. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

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