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Dwight E. Nunn
Vice President

July 23, 2004

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C., 20555-0001

Subject: **Docket Nos. 50-361 and 50-362**
60-day Response to NRC Bulletin 2004-01: Inspection Of Alloy 82/182/600 Materials Used In The Fabrication Of Pressurizer Penetrations And Steam Space Piping Connections At Pressurized-Water Reactors
San Onofre Nuclear Generating Station, Units 2 and 3

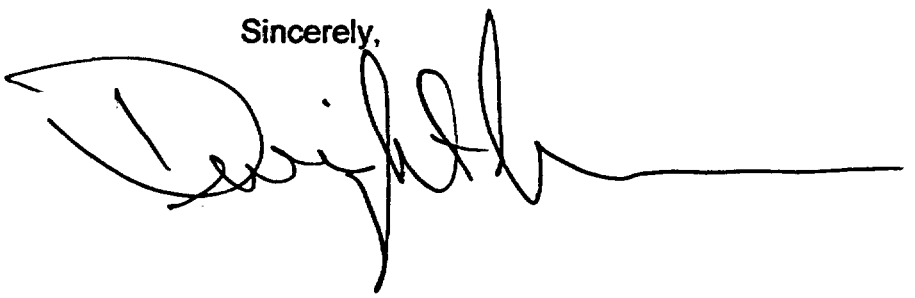
Reference: NRC Bulletin 2004-01: Inspection Of Alloy 82/182/600 Materials Used In The Fabrication Of Pressurizer Penetrations And Steam Space Piping Connections At Pressurized-Water Reactors, Issued May 28, 2004

Dear Sir or Madam:

This letter provides the Southern California Edison Company (SCE) 60-day response to the referenced NRC Bulletin 2004-01, in accordance with 10 CFR 50.54(f). The information requested in NRC Bulletin 2004-01 is provided as an enclosure with this letter.

If you have any questions or would like additional information concerning this subject, please call Mr. Jack Rainsberry (949) 368-7420.

Sincerely,



Enclosure:

cc: B. S. Mallett, Regional Administrator, NRC Region IV
B. M. Pham, NRC Project Manager, San Onofre Units 2 and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3

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State of California
County of San Diego

Subscribed and sworn to (or affirmed) before me this 23rd day of July, 2004, by

Dwight E. Nunn
Vice President

Notary Public

MARIANE SANCHEZ
Commission # 1375470
Notary Public - California
San Diego County
My Comm. Expires Oct 14, 2006

SCE Response to NRC Bulletin 2004-01

Requested Information:

(a) A description of the pressurizer penetrations and steam space piping connections at your plant. At a minimum, this description should include materials of construction (e.g., stainless steel piping and/or weld metal, Alloy 600 piping/sleeves, Alloy 82/182 weld metal or buttering, etc.), joint design (e.g., partial penetration welds, full penetration welds, bolted connections, etc.), and, in the case of welded joints, whether or not the weld was stress-relieved prior to being put into service. Additional information relevant with respect to determining the susceptibility of your plant's pressurizer penetrations and steam space piping connections to PWSCC should also be included.

Southern California Edison (SCE) Response:

The following table lists each type of pressurizer penetration and steam space piping connection for the pressurizers at the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3, excluding the surge line nozzle.

Description of SONGS 2/3 Pressurizer Penetrations and Steam Space Piping Connections

Item	Quantity		Joint Materials	Joint Type	PWHT See Note 1
	Unit 2	Unit 3			
Pressurizer Heater Sleeves	30	29	Bot. Hd. Clad: Alloy 82 J-Weld: Alloy 82/182 Sleeve: Alloy 600	Partial Penetration J-groove on Bottom Head inside surface	No See Note 2
Repaired Pressurizer Heater Sleeve	0	1	Vessel: Low Alloy Steel Pad: Alloy 52 J-Weld: Alloy 52 Sleeve: Alloy 690	Temper bead Pad w/ Partial Penetration J-groove on Bottom Head exterior surface	No
Pressurizer Heaters	30	28	Sleeve: Alloy 600 Weld: Alloy 82 Heater: Stainless Steel	Fillet Weld, sleeve to heater sheath	No
Pressurizer Heater @ Repaired Sleeve	0	1	Sleeve: Alloy 690 Weld: Alloy 52 Heater: Stainless Steel	Fillet Weld, sleeve to heater	No
Capped Heater Sleeve	0	1	Sleeve: Alloy 600 Weld: Alloy 52 Cap: Alloy 690	Fillet Weld, sleeve to cap	No

Item	Quantity		Joint Materials	Joint Type	PWHT See Note 1
	Unit 2	Unit 3			
Steam Space Instrument Nozzles to Pressurizer	4	4	Vessel: Low Alloy Steel Butter: Alloy 82/182 J-Weld: Alloy 52 Nozzle: Alloy 690	Partial Penetration J-groove on Upper Head inside surface	Butter: Yes J-weld: No See Note 3
Replaced Temperature Nozzle	0	1	Vessel: Low Alloy Steel Butter: Alloy 82/182 Weld: Alloy 82 Nozzle: Alloy 600	Partial Penetration J-groove on Side Shell inside surface	Butter: Yes J-weld: No See Note 3
Repaired Temperature Nozzle	1	0	Vessel: Low Alloy Steel Pad: Alloy 52 J-Weld: Alloy 52 Nozzle: Alloy 690	Temper bead Pad w/ Partial Penetration J-groove on Side Shell exterior surface	No
Lower Level Nozzles	2	2	Vessel: Low Alloy Steel Butter: Alloy 182 J-Weld: Alloy 82/182 Nozzle: Alloy 600	Partial Penetration J-groove on Bottom Head inside surface	Butter: Yes J-weld: No See Note 3
Safety Valve (2) and Spare (1) Nozzles	3	3	Nozzle: Low Alloy Steel Butter: Alloy 182 Safe End: Stainless Steel Butt Weld: Alloy 82 &182	Full Penetration Butt Weld	Butter: Yes Butt-Weld: No See Note 4
Spray Nozzle	1	1	Nozzle: Low Alloy Steel Butter: Alloy 182 Safe End: Stainless Steel Butt Weld: Alloy 82 &182	Full Penetration Butt Weld	Butter: Yes Butt-Weld: No See Note 4

Note 1: PWHT is an acronym for "post weld heat treatment" and is the process that results in components being stress-relieved prior to being put in service.

Note 2: The internal surface of the pressurizer bottom head was clad using the submerged arc welding (SAW) process with 7/16" minimum deposit thickness of Alloy 82. This clad deposit was post weld heat treated and examined by ultrasonic testing (UT) and penetrant testing (PT). The heater sleeve j-groove weld preparation and weld were made within the clad volume. The cladding deposit serves as a corrosion resistant overlay and in the heater sleeve j-weld areas as a butter deposit. No additional PWHT was performed after completion of the j-welds.

Note 3: The small bore temperature/instrument nozzle j-groove weld preparations were machined into the vessel head/shell after the internal cladding was applied. An Alloy 182 butter deposit was applied over the exposed low alloy steel material and tied into the cladding at the surface. PWHT was then performed on the butter deposit concurrently with PWHT of the cladding. The butter deposit was PT examined before installation of the nozzle. The nozzle was then installed and j-groove welded using Alloy 182. A progressive PT examination was performed on the nozzle j-weld. No additional PWHT was performed after completion of the j-weld.

Note 4: The low alloy large bore nozzles are welded to the vessel with a low alloy weld material and are internally clad which isolates the vessel, nozzle and weld from the borated water environment. The ends of the low alloy nozzles are buttered with Alloy 182 weld deposit. PWHT was performed on the butter deposit followed by radiographic testing (RT) and PT examinations. The ends of the stainless steel safe ends that join to the safety valve nozzle ends have an Alloy 182 butter deposit applied and were examined by RT and PT. No PWHT was performed on the safe end butter deposit. The ends of the stainless steel safe ends that join to the spray nozzles do not have a butter deposit. The safe ends and nozzles were then fit-up and welded together with a full penetration butt weld. The butt weld was made using an Alloy 82 root pass and Alloy 182 fill passes. No additional PWHT was performed after completion of the butt weld. The completed butt weld and butter deposits were then examined by RT and PT. A UT exam was then performed to establish the baseline for subsequent ASME XI Inservice Inspections.

The pressurizer heaters were originally attached to the heater sleeves with an Alloy 82 fillet weld. Replacement heaters may be welded in place with either Alloy 82 or Alloy 52. At Unit 3, one heater sleeve has been repaired with an Alloy 690 half sleeve and one Alloy 600 heater sleeve has been capped with an Alloy 690 cap. The fillet welds on these two heater sleeves are Alloy 52.

The instrument nozzles include four steam space nozzles installed in the upper head, one nozzle in the side shell, and two nozzles in the bottom head at each unit. The four nozzles in the upper head provide pressure taps to monitor pressurizer pressure and two of them double as upper level taps. All four of the steam space instrument nozzles at each unit have been replaced with full length Alloy 690 nozzles. The two nozzles in the bottom head are the lower level taps and the side shell nozzle contains a thermowell for pressurizer temperature measurement. The side shell nozzle at Unit 2 has been repaired with an Alloy 690 half nozzle. As a proactive measure, mechanical nozzle seal assemblies (MNSA) were installed on the instrument nozzles on the bottom head of at both Unit 2 and Unit 3 and on the side shell nozzle at Unit 3.

There are three (3) six inch piping connections to the pressurizer steam space in the upper head. Two of these are used for safety valves and one is a spare connection. The spray line is connected to a four inch nozzle located in the top center of the upper head.

SONGS Unit 2 and Unit 3 pressurizers have each accumulated approximately 20 years of service at pressurizer operating conditions. There are no other known factors that would significantly affect primary water stress corrosion cracking (PWSCC) susceptibility of the pressurizer penetrations and attached piping.

Requested Information:

(b) A description of the inspection program for Alloy 82/182/600 pressurizer penetrations and steam space piping connections that has been implemented at your plant. The description should include when the inspections were performed; the areas, penetrations and steam space piping connections inspected; the extent (percentage) of coverage achieved for each location which was inspected; the inspection methods used; the process used to resolve any inspection findings; the quality of the documentation of the inspections (e.g., written report, video record, photographs); and, the basis for concluding that your plant satisfies applicable regulatory requirements related to the integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections were found, indicate what follow-ups NDE [non-destructive examination] was performed to characterize flaws in the leaking penetrations.

SCE Response:

A description of the SONGS inspection program is provided in Appendix A.

Leakage has been identified by visual examination at six pressurizer instrument penetrations. Eight follow up Liquid Penetrant examinations of the J-groove attachment welds for steam space instrument penetrations have been performed and five rejectable indications were identified. No circumferential cracking was detected.

One heater sleeve was examined with eddy current to determine if cracking had initiated as a result of a swollen heater within the sleeve. A short axial crack like indication was identified and the penetration was replaced. No other pressurizer penetrations have been non-destructively examined to characterize the flaws.

For a discussion of the basis for concluding that SONGS Units 2 and 3 will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections, see the response to Question (d) below.

Requested Information:

(c) A description of the Alloy 82/182/600 pressurizer penetration and steam space piping connection inspection program that will be implemented at your plant during the next and subsequent refueling outages. The description should include the areas, penetrations and steam space piping connections to be inspected; the extent (percentage) of coverage to be achieved for each location;

inspection methods to be used; qualification standards for the inspection methods and personnel; the process used to resolve any inspection indications; the inspection documentation to be generated; and the basis for concluding that your plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections are found, indicate what follow-up NDE will be performed to characterize flaws in the leaking penetrations. Provide your plans for expansion of the scope of NDE to be performed if circumferential flaws are found in any portion of the leaking pressurizer penetrations or steam space piping connections.

SCE Response:

Appendix A includes a description of the future inspection schedule for the Alloy 82/182/600 pressurizer penetration and steam space piping connection inspection program.

For a discussion of the basis for concluding that SONGS Units 2 and 3 will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections, see the response to Question (d) below.

Requested Information:

(d) In light of the information discussed in this bulletin and your understanding of the relevance of recent industry operating experience to your facility, explain why the inspection program identified in your response to item (1)(c) above is adequate for the purpose of maintaining the integrity of your facility's RCPB [Reactor Coolant Pressure Boundary] and for meeting all applicable regulatory requirements which pertain to your facility.

SCE Response:

The following Regulatory Requirements establish criteria applicable to the inspection program outlined in our response to item 1(c), and contribute to ensuring that the integrity of the Reactor Coolant Pressure Boundary (RCPB) is maintained:

General Design Criteria

- GDC 14 Reactor Coolant Pressure Boundary
- GDC 31 Fracture Prevention of Reactor Coolant Pressure Boundary
- GDC 32 Inspection of Reactor Coolant Pressure Boundary

Code of Federal Regulations

- 10CFR50.55a Codes and Standards
- 10CFR50 Appendix B Criterion V, Instructions, Procedures and Drawings
- 10CFR50 Appendix B Criterion IX, Control of Special Processes
- 10CFR50 Appendix B Criterion XVI, Corrective Action

SONGS 2 and 3 Technical Specifications

Compliance with the General Design Criteria specified above was achieved by design, fabrication, construction, and Inservice Inspection of the Reactor Coolant System in accordance with 10CFR50.55(a) and the ASME Code. Inservice Inspection is performed to ensure continued compliance with these requirements under the SONGS Inservice Inspection Program and is consistent with ASME Section XI requirements. The SONGS Inservice Inspection Program is implemented under the SONGS Quality Assurance Program. That program ensures that 10CFR50 Appendix B requirements are also met.

SCE continuously monitors industry events, including the information discussed in NRC Bulletin 2004-01, and has expanded the RCPB inspections to include inspections that are not required under the existing ASME Section XI program or other regulatory requirements. These supplemental inspections (Alloy 600 Inspection procedure and Boric Acid inspection procedure) are implemented under the SONGS Appendix B Quality Assurance Program. The supplemental inspections include directed inspection of RCPB locations where PWSCC susceptibility may not have been fully envisioned by the ASME Code inspection requirements. These inspections include Bare Metal Visual examination of pressurizer external surfaces associated with Alloy 82/182 welds and Alloy 600 components every refueling outage. These inspections are capable of detecting minimal amounts of through wall leakage. It is SCE's position that these inspections are adequate to ensure that integrity of RCPB is maintained and the potential for challenging plant safety systems is minimized. This assessment is supported by technical evaluations performed by EPRI and the Westinghouse Owners group, and it is consistent with NRC expectations set forth in Bulletin 2004-01.

Nomenclature:

For the purpose of this response, SCE considers the material description in the left column to be equivalent to the corresponding material description in the right column:

Welding Filler Materials

Alloy 82	ASME II, Part C, SFA 5.14, AWS Class ERNiCr-3
Alloy 182	ASME II, Part C, SFA 5.11, AWS Class ENiCrFe-3
Alloy 52	ASME II, Part C, SFA 5.14, AWS Class ERNiCrFe-7
Alloy 152	ASME II, Part C, SFA 5.11, AWS Class ENiCrFe-7

Base Materials

Alloy 600	ASME II, Part B, SB-166, UNS No. N06600 or ASME II, Part B, SB-167, UNS No. N06600
Alloy 690	ASME II, Part B, SB-166, UNS No. N06690 or ASME II, Part B, SB-167, UNS No. N06690

Appendix A
SONGS Units 2 and 3 Inspection Program for 82/182/600
Pressurizer Penetrations and Steam Space Pipe Connections

Penetration Type	Inspection Method	Times of in-service Inspections		Inspection Area and Coverage	Qualification	Process for resolving indications	Documentation method
		Previously Implemented Inspections	Next and Future Inspections See Note 1				
Pressurizer safety valve header -and- Pressurizer Spray Line to pressurizer	ASME Section XI ISI UT	Unit-2 Cycle- 6 refueling Cycle-12 refueling Unit-3 Cycle- 6 refueling	See Note 2	Each inspection 100% of weld volume	In accordance with ASME Section XI requirements in effect during inspection	10 CFR 50.55a and ASME Code Section XI	Written report In accordance with ASME Section XI requirements in effect during inspection
	ASME Section XI ISI UT (PDI)	Unit-2 None Unit-3 Cycle-12 refueling	See Note 2	Each inspection 100% of weld volume	In accordance with Code and PDI requirements	10 CFR 50.55a and ASME Code Section XI	Written report In accordance with ASME Section XI requirements in effect during inspection
	ASME Section XI ISI PT	Unit-2 Cycle- 6 refueling Cycle-12 refueling Unit-3 Cycle- 6 refueling Cycle-12 refueling	See Note 2	Each Inspection 100% of weld surface	In accordance with ASME Section XI requirements in effect during inspection	10 CFR 50.55a and ASME Code Section XI	Written report In accordance with ASME Section XI requirements in effect during inspection
	ASME Section XI ISI VT-2	Each Refueling outage	Each Refueling outage	100% per ASME Section XI Code	In accordance with ASME Section XI requirements in effect during inspection	10 CFR 50.55a and ASME Code Section XI	Written report In accordance with ASME Section XI requirements in effect during inspection
	Engineering Bare Metal Visual (BMV)	Unit-2 3/04 Unit-3 none	Unit-2 Each Refueling outage Unit-3 Each Refueling outage	Each Inspection 100% of weld surface	SCE Qualification Standard	10 CFR 50.55a and ASME Code Section XI	Engineering Inspection Procedure

Appendix A
SONGS Units 2 and 3 Inspection Program for 82/182/600 Pressurizer Penetrations and Steam Space Pipe Connections

Penetration Type	Inspection Method	Times of In-service Inspections		Inspection Area and Coverage	Qualification	Process for resolving indications	Documentation Method
		Previously Implemented Inspections	Next and Future Inspections See Note 1				
Instrument Nozzles in Pressurizer	Liquid Penetrant (steam space penetrations)	Unit-2 none Unit-3 1992 1995	none none	100% of J-groove weld surface (vessel ID)	ANST Level II	10 CFR 50.55a and ASME Code Section XI	NDE Inspection Report
	ASME Section XI ISI VT-2	Each Refueling outage	Each Refueling outage	100% per ASME Section XI Code	In accordance with ASME Section XI requirements in effect during inspection	10 CFR 50.55a and ASME Code Section XI	Written report In accordance with ASME Section XI requirements in effect during inspection
	Engineering Bare Metal Visual (BMV) -or- Engineering MNSA inspection as applicable	Unit-2 Every refueling since 1993 Unit-3 Every refueling since 1993	MNSA inspection Each Refueling outage (all Alloy 600 penetrations now have MNSA)	100% of nozzles, 360 degrees of circumference including sealing surface or crevice as applicable.	SCE Qualification Standard	10 CFR 50.55a and ASME Code Section XI	Engineering Inspection Procedure

Appendix A
SONGS Units 2 and 3 Inspection Program for 82/182/600
Pressurizer Penetrations and Steam Space Pipe Connections

Penetration Type	Inspection Method	Times of In-service Inspections		Inspection Area and Coverage	Qualification	Process for resolving indications	Documentation Method
		Previously Implemented Inspections	Next and Future Inspections (1)				
Pressurizer Heater Sleeves to Pressurizer and Heater Sleeves to Heaters	ASME Section XI ISI VT-2	Each Refueling outage	Each Refueling outage	100% per ASME Section XI Code	In accordance with ASME Section XI requirements in effect during inspection	10 CFR 50.55a and ASME Code Section XI	Written report In accordance with ASME Section XI requirements in effect during inspection
	Engineering Bare Metal Visual (BMV)	Unit-2 Every refueling since 1993 Unit-3 Every refueling since 1993	Each Refueling outage	100% of external penetration, 360 degrees of circumference (including sleeve crevice and heater element weld)	SCE Qualification Standard	10 CFR 50.55a and ASME Code Section XI	Engineering Inspection Procedure

(1) If any indications of leakage are found in either an Alloy 600 penetration or a pressurizer piping connection weld, then follow-up nondestructive examination (NDE) will be performed to characterize the orientation of the crack prior to performing a repair or replacement activity other than the use of a MNSA. (SCE has requested relief to use MNSA 2 for pressurizer heater sleeves without first characterizing the crack orientation. If a MNSA 2 is installed, the characterization of crack orientation will be performed in accordance with the requirements of the relief request Safety Evaluation.) In addition, if circumferential cracking is found in any leaking pressurizer penetration or steam space piping connection, SCE will develop plans for expanded inspection scope and discuss those plans with the NRC prior to returning the affected unit to service.

(2) In Accordance with 10CFR50.55a(a)(3)(i), SONGS has submitted Relief Request ISI-3-1 for SONGS Units 2 and 3, Risk-Informed Inservice Selection and Examination for Class-1 piping welds Docket Nos. 50-361 and 50-362, dated July 2, 2003. Currently NRC is reviewing the relief request. After NRC approval SONGS will perform the examinations in accordance with the requirements of the relief request Safety Evaluation.