



**Pacific Gas and
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PG&E Letter DCL-10-103

10 CFR 50.55a

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-323, OL-DPR-82
Diablo Canyon Power Plant (DCPP) Unit 2
ASME Section XI Inservice Inspection Program Relief Request NDE-RCS-SE-2R16
Use of Alternate Sizing Qualification Criteria Through a Protective Clad Layer

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.55a(g)(5)(iii), Pacific Gas and Electric Company (PG&E) hereby requests NRC approval of Inservice Inspection (ISI) Relief Request NDE-RCS-SE-2R16 for the DCPP Unit 2 Sixteenth Refueling Outage (2R16). Relief is requested from the 0.125 inch root mean square error depth sizing accuracy requirement of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Appendix VIII, Supplement 10 as modified by Code Case N-695 "Qualification Requirements for Dissimilar Metal Piping Welds." Relief is also requested from the Code Case N-695 exclusion for examinations performed through corrosion resistant clad. Based on discussions with the NRC staff, PG&E is requesting this relief due to impracticality pursuant to 10 CFR 50.55a(g)(5)(iii) rather than as an alternative that provides acceptable levels of quality and safety pursuant to 10 CFR 50.55a(a)(3)(i).

The details of the request and the technical basis for it are included in Enclosures 1 and 2.

Enclosure 2 contains information proprietary to Westinghouse Electric Company LLC ("Westinghouse"). Accordingly, Enclosure 4 includes a Westinghouse authorization letter, CAW-10-2851, an accompanying affidavit, a Proprietary Information Notice, and a Copyright Notice. The affidavit is signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the Westinghouse proprietary information contained in Enclosure 2 may be withheld from public disclosure by the Commission, and it addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390 of the Commission's regulations. PG&E requests that the Westinghouse proprietary information be withheld from public disclosure in accordance with 10 CFR 2.390. A nonproprietary version of Enclosure 2 is provided in Enclosure 3.

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Correspondence with respect to the copyright or proprietary aspects of the application for withholding related to the Westinghouse proprietary information, or the Westinghouse affidavit provided in Enclosure 4, should reference Westinghouse Letter CAW-10-2851 and be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

To support the examinations to be performed in the upcoming 2R16 refueling outage scheduled for May 2011, PG&E requests approval of Relief Request NDE-RCS-SE-2R16 by April 1, 2011.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter.

If you have any questions or require additional information, please contact Mr. Tom Baldwin at (805) 545-4720.

Sincerely,

James R. Becker
Site Vice President

tcg/4231/50302468

Enclosures

cc: Diablo Distribution

cc/enc: Elmo E. Collins, Regional Administrator, NRC Region IV

Michael S. Peck, NRC Senior Resident Inspector

Alan B. Wang, Project Manager, Office of Nuclear Reactor Regulation
State of California, Pressure Vessel Unit

10 CFR 50.55a Relief Request NDE-RCS-SE-2R16

in Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected

Relief is requested for reactor vessel nozzle-to-safe-end welds when examined from the inside diameter (ID) with procedures, personnel and equipment qualified to American Society of Mechanical Engineering (ASME) Section XI, Appendix VIII, Supplement 10, as modified by Code Case N-695. The affected components are shown below. See Enclosure 2, Figure 1.2 for safe-end general configuration and materials.

Code Cat./ Item No.	Description	Weld Number	Line Inside Diameter
R-A, R1.20	Loop 1 outlet nozzle-to-safe-end	WIB-RC-1-1(SE)	29"
	Loop 1 inlet nozzle-to-safe-end	WIB-RC-1-16(SE)	27.5"
	Loop 2 outlet nozzle-to-safe-end	WIB-RC-2-1(SE)	29"
	Loop 2 inlet nozzle-to-safe-end	WIB-RC-2-16(SE)	27.5"
	Loop 3 outlet nozzle-to-safe-end	WIB-RC-3-1(SE)	29"
	Loop 3 inlet nozzle-to-safe-end	WIB-RC-3-16(SE)	27.5"
	Loop 4 outlet nozzle-to-safe-end	WIB-RC-4-1(SE)	29"
	Loop 4 inlet nozzle-to-safe-end	WIB-RC-4-16(SE)	27.5"

2. Applicable Code Edition and Addenda

The Diablo Canyon Third Inservice Inspection Interval Program Plan is based on the ASME Boiler and Pressure Vessel Code, Section XI, 2001 Edition with 2003 Addenda. Ultrasonic piping examinations are performed in accordance with Appendix VIII of Section XI, 2001 Edition without Addenda.

3. Applicable Code Requirement

Examination Category R-A, Item R.120 (formerly Code Category B-F, B5.10 in the 2001 Edition through 2003 Addenda) specifies volumetric examination. This volumetric examination is to be conducted in accordance with Appendix VIII, Supplement 10 in the 2001 Edition of Section XI, no Addenda.

Diablo Canyon Power Plant (DCPP) will perform examinations of both hot and cold leg safe-end welds in the Unit 2 Sixteenth refueling outage to satisfy the requirements of MRP-139 R1, "Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline." MRP-139 specifies that ASME XI, Appendix VIII criteria be used for volumetric examination of safe-end dissimilar metal welds.

4. Impracticality of Compliance

Relief is requested from the 0.125 inch root mean square error (RMSE) depth sizing accuracy requirement of Appendix VIII, Supplement 10, as modified by the requirements of Code Case N-695. In addition, relief is requested from the Code Case N-695 exclusion for examinations performed through corrosion resistant clad (CRC).

RMSE Error

To date, although examination vendors have qualification for detection and length sizing in accordance with the requirements for examinations from the ID, the vendors have not met the established RMSE of 0.125 inch for depth sizing. The examination vendor contracted to perform reactor coolant system nozzle-to-safe-end examinations at DCPP has demonstrated the ability to depth size indications in dissimilar metal welds with a RMSE of 0.189 inches instead of the 0.125 inch RMSE required by Appendix VIII Supplement 10 and Code Case N-695.

The numerous attempts by Inservice inspection vendors to meet the Supplement 10 and Code Case N-695 required RMSE value for depth sizing when examining from the inside diameter have been unsuccessful. Several process enhancements including new delivery systems, new search units and software modifications have been implemented but did not achieve the desired improvements in performance. This result indicates that the Code accuracy

standard is impractical for use with the ID ultrasonic examination technology employed in the qualification efforts. At this time, additional attempts to improve the depth sizing RMSE value are not warranted since the technology has not evolved significantly since the most recent efforts.

Code Case N-695 CRC Exclusion

Code Case N-695 contains an exclusion in the scope section that states: "This Case is not applicable to piping welds containing supplemental CRC applied to mitigate intergranular stress corrosion cracking." The DCCP Unit 2 safe-end welds and safe-end forgings have a thin (0.073 inch to 0.125 inch in thickness) protective clad layer applied to the inside surface (exam surface) and outside surface of the dissimilar metal weld and the safe-end forging.

During the DCCP Unit 2 reactor vessel fabrication process, the stainless steel safe-end forgings were welded to the low alloy steel reactor nozzle forgings and heat treated with the entire vessel. This method resulted in the stainless steel safe-end forging becoming "furnace sensitized." The protective clad layer is intended to act as a barrier to isolate the sensitized safe-end dissimilar metal weld and stainless steel safe-end forging from the surrounding environment. Sketches of the DCCP Unit 2 safe-end general configuration and material types are included in Enclosure 2.

The DCCP reactor coolant system (RCS) safe-end configuration with the protective ID and outside diameter (OD) clad layers applied to the dissimilar metal weld and safe-end forgings is unique to a small number of Westinghouse designed units. Suitable "blind" test samples are not available to support Supplement 10 qualification for this configuration. Removing the protective clad from either the ID or OD of the RCS safe-ends in order to create a configuration bounded by the performance demonstration initiative (PDI) sample sets would result in extensive personnel exposure and potentially reduce the overall structural integrity of the component. General area dose rates in the vicinity of the subject welds (ex-core annulus area) averages 200 millirem per hour. Considering that OD machining to remove the overlay and achieve the required surface finish could exceed 20 man hours per nozzle, the total personnel exposure could surpass 32 rem. ID machining of these locations would remove the protective layer and any protection that it might afford to the underlying materials.

5. Burden Caused by Compliance

RMSE Error and Code Case N-695 CRC Exclusion

The DCCP Unit 2 reactor vessel was fabricated in the 1970 timeframe, prior to implementation of Appendix VIII qualification requirements. The distinctive DCCP Unit 2 reactor coolant system safe-end weld configuration is not

encompassed by the industry's PDI program used to implement ASME XI, Appendix VIII requirements. Consequently, no inservice inspection vendor is qualified to examine the DCPD configuration. Additionally, the vendors are incapable of meeting the stringent 0.125 inch RMSE sizing accuracy requirement when examining from the inside surface.

Compliance with the PDI qualification program without alternative implementation would necessitate significant modification to the reactor coolant system safe end welds. Alterations such as this may result in reduced structural integrity of the reactor coolant pressure boundary. Even with such modifications, the vendor depth sizing accuracy issue would not be addressed.

6. Proposed Alternative and Basis for Use

RMSE Error

PG&E proposes to use approved Code Case N-695 with the demonstrated RMSE of 0.189 inches for ID examination of the nozzle-to-safe-end welds in lieu of the specified 0.125 inch RMSE. In the event an indication that requires sizing is detected, the 0.064 inch difference between the demonstrated RMSE and the required RMSE (0.189 inches - 0.125 inches = 0.064 inches) will be added to the measured through-wall extent for comparison with the applicable acceptance criteria.

If advances in technology are realized and the contracted examination vendor demonstrates an improved RMSE for the Supplement 10 prior to the examinations, the difference of the improved RMSE over the 0.125 inch RMSE requirement, if any, will be added to the measured through-wall dimension of indications requiring sizing before comparison to the applicable acceptance criteria.

Code Case N-695 CRC Exclusion

PG&E proposes to use vendor procedures, personnel and equipment qualified in accordance with the PDI implementation of Appendix VIII, Supplement 10 as modified by the requirements of Code Case N-695 to examine the nozzle-to-safe-end dissimilar metal welds from the ID through the protective clad layer.

PG&E's inspection vendor has conducted additional demonstration activities in order to validate the ability to detect, length size and depth size flaws through a clad layer and ID weld inlays. Although not identical, the open test samples clad and weld layer thicknesses conservatively encompass the DCPD configuration. The test samples include flaws of various depth and lengths oriented in both the axial and circumferential directions. When examining the test specimens, the vendor used the same PDI qualified (detection and length sizing) procedure that will be employed in the 2R16 examinations. The results of these activities verify

that the vendor has the capability to accurately detect, length and depth size the test sample flaws in each of the samples and configurations examined.

The DCPD inspection vendor has created a technical justification, WDI-TJ-1044, Rev. 1, "Demonstration Report/Technical Basis Document: Ultrasonic Examination of Diablo Canyon Unit 2 Reactor Pressure Vessel Nozzle to Safe End Welds from the ID Surface Through A Welded Protective Layer" to document the process and results of the additional demonstration activities. The vendor report is contained in Enclosure 2.

Conclusion

All welds included in this request have been previously examined from the ID with the Appendix VIII qualified (PDI implementation) exam process in the thirteenth refueling outage. The ultrasonic examinations were supplemented by surface profilometry and eddy current testing. Greater than 90 percent coverage of the required exam areas was achieved in all cases. This history confirms that the inside surface profile of these welds is suitable for ultrasonic examination from the ID in accordance with the referenced requirements. PG&E will use the same ultrasonic exam process supplemented by surface profilometry and eddy current testing for safe-end dissimilar metal weld examinations in the Unit 2 sixteenth refueling outage.

The supplemental vendor demonstration activities establish that the existing PDI qualified inspection procedure and process is effective in all aspects for examining dissimilar metal welds through welded layers on the pipe inside surface such as the DCPD configuration. The potential sizing variation will be addressed by addition of the difference between demonstrated and required RMSE values.

The proposed alternatives assure that ID ultrasonic examinations of the DCPD Unit 2 reactor coolant nozzle-to-safe-end welds are performed using personnel, procedures and equipment that are effective in all aspects and provide an acceptable level of quality and safety in accordance with 10 CFR 50.55a(g)(5)(iii).

7. Duration of Proposed Alternative

The duration of the proposed alternative is for safe-end weld examinations in the Unit 2 Sixteenth Refueling Outage in the event sizing of indications is required.

8. Precedent

The proposed alternate method of adding the difference between the demonstrated and required RMSE values to the measured indication depth was

approved for the Seabrook Station by NRC letter Dated May 19, 2009 (ADAMS
Accession No. ML090850504).