



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 14, 2014

Mr. Edward D. Halpin
Senior Vice President and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56, Mail Code 104/6
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NO. 2 – RELIEF REQUEST
NDE-PNS-U2, ASSOCIATED WITH THE THIRD INSERVICE INSPECTION
INTERVAL, REGARDING PRESSURIZER NOZZLE-TO-HEAD WELD
EXAMINATIONS (TAC NO. MF2441)

Dear Mr. Halpin:

By letter dated July 10, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13192A082), Pacific Gas and Electric Company (PG&E, the licensee) submitted a relief request for U.S. Nuclear Regulatory Commission (NRC) approval. In the relief request, PG&E identifies the limited examination of three pressurizer relief nozzle welds at Diablo Canyon Power Plant, Unit 2 (DCPP-2) for the third inservice inspection (ISI) interval. According to the licensee, the achievable coverage for the welds in question ranges from 65-71 percent, as compared to a specification of essentially 100 percent, in accordance with provisions of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Plant Components." This request was submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 50.55a(g)(5)(iii) on the basis that conducting the examinations as required by the ASME Code would be impractical.

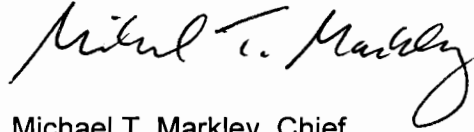
The NRC staff has completed its review of the relief request as discussed in the enclosed safety evaluation. The NRC staff review concludes that the ASME Code examination coverage requirements are impractical for the subject welds, and imposition of the ASME Code requirements would create a burden on the licensee. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Further, the NRC staff concludes that the examinations performed, as described in the request for relief, provide reasonable assurance of the structural integrity and leak tightness of the subject welds. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), the NRC staff grants relief for the subject examinations of the items contained in NDE-PNS-U2, as requested, at DCPP-2, for the third 10-year ISI interval, which ends on March 12, 2016. No alternative requirements beyond those specified in the request for relief are being imposed by the NRC staff.

E. Halpin

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If you have any questions, please contact the NRC Project Manager, Mr. Peter J. Bamford, at 301-415-2833 or via e-mail at Peter.Bamford@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael T. Markley". The signature is written in a cursive style with a large, looping final flourish.

Michael T. Markley, Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-323

Enclosure:
Safety Evaluation

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UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELIEF REQUEST ASSOCIATED WITH THE THIRD INSERVICE INSPECTION INTERVAL
PRESSURIZER NOZZLE-TO-HEAD WELD EXAMINATIONS, REQUEST NO. NDE-PNS-U2
PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT, UNIT NO. 2
DOCKET NO. 50-323

1.0 INTRODUCTION

By letter dated July 10, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13192A082), Pacific Gas and Electric Company (PG&E, the licensee) submitted a relief request for U.S. Nuclear Regulatory Commission (NRC) approval. In the request, PG&E identified the limited examination of three pressurizer relief nozzle welds at Diablo Canyon Power Plant, Unit 2 (DCPP-2) for the third inservice inspection (ISI) interval. According to the licensee, the coverage for the welds in question ranges from 65-71 percent, as compared to a specification of essentially 100 percent, in accordance with provisions of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Plant Components." This request was submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 50.55a(g)(5)(iii) on the basis that conducting the examinations as required by the ASME Code would be impractical.

2.0 REGULATORY EVALUATION

The ISI of ASME Code Class 1, 2, and 3 components is to be performed in accordance with the applicable edition and addenda of ASME Code, Section XI, as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements set forth in the ASME Code, Section XI 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

Enclosure

third 10-year ISI inspection interval at DCP-2 is the 2001 Edition, 2003 Addenda, of the ASME Code, Section XI. The third 10-year ISI interval began on January 1, 2006, and is planned to end (nominally) on March 12, 2016.

3.0 TECHNICAL EVALUATION

The licensee's request for relief and the NRC staff evaluation is described below. The request is proposed to apply through the end of the DCP-2 third ISI interval.

3.1 ASME Code Component Affected and ASME Code Requirement

The three pressurizer nozzle-to-head welds affected by this relief request are listed in the following table. The last column of the table shows the average combined coverage that was actually achieved by the licensee for each weld using ultrasonic testing (UT).

ASME Code, Section XI, Examination Category B-D Pressurizer Nozzle-to-Head Welds		
ASME Code Item	Weld Identifier	ASME Coverage Obtained
B3.110	WIB-346	66%
B3.110	WIB-422A	71%
B3.110	WIB-368	65%

The ASME Code, Section XI, Table IWB-2500-1, Category B-D, Item B3.110 requires that pressurizer nozzle-to-head welds be volumetrically examined once during each 10-year ISI interval. Essentially 100 percent of the weld and adjacent base material is to be examined in accordance with the requirements of Appendix I, I-2100. The applicable examination volume is defined by Figure IWB-2500-7(b) and the examination is performed per the rules of the ASME Code, Section V, Article 4.

3.2 Licensee's Proposed Alternative and Basis

The licensee proposed the following alternative examination:

PG&E proposes that the alternative ultrasonic examinations conducted to the maximum extent practicable provide reasonable assurance that the structural integrity of the subject welds remains intact.

In order to support its determination of impracticality, the licensee's application includes the following excerpts:

The Unit 2 pressurizer nozzle-to-head weld configurations are such that essentially 100 percent coverage of the ASME Code required examination volume is not practicable, as determined during the third 10-year ISI interval examinations conducted in the DCP Unit 2 sixteenth and seventeenth refueling outages (2R16 and 2R17).

An inherent design characteristic of the DCPD nozzle configuration is that there is insufficient setback distance for the radial-out scan beam to reach the inside surface of the exam area. The nozzle reinforcement also prevents the positioning of circumferential scan search units to allow full coverage of the exam volume in the nozzle base material.

Additionally, the WIB-346 weld reinforcement causes search unit lift-off resulting in small reductions in coverage, primarily in the upper region of the examination volume.

"Essentially 100 percent" coverage of the exam volume would require redesign of the pressurizer to (a) machine away the nozzle reinforcement, (b) move the weld farther back from the nozzle reinforcement, or (c) eliminate the weld by integrally incorporating the nozzle into the head. Either of the latter two modifications would effectively result in having to replace the entire pressurizer to accommodate full coverage of the exam area as specified by ASME Code.

In addition to the potential modifications noted above, the licensee also stated that:

Removing the weld reinforcement on WIB-346 would result in only small incremental increases in exam volume coverage at the cost of reducing the pressurizer head structural margin, and significant personnel exposure. It is estimated that 20-30 man hours would be required to remove the reinforcement and produce a surface contour required to prevent lift-off of the search units. This effort in a 20 millirem (mR) dose rate field would result in total exposure of 400-600mR.

3.3 NRC Staff Evaluation

The ASME Code, Section XI requires 100 percent volumetric examination of pressurizer nozzle-to-head welds. As indicated in the above table, the licensee was unable to obtain the volumetric code coverage of 100 percent of the subject welds. The licensee stated that examinations of the ASME Category B-D, Full Penetration Welds of Nozzles in Vessels listed were limited due to the nozzle geometry/configurations. The NRC staff evaluated the relief request determination in accordance with 10 CFR 50.55a(g)(6)(i), which permits relief pursuant to impracticality under 10 CFR 50.55a(g)(5)(iii). Based on the licensee's assessment that to accommodate full coverage of the examination area as specified by the ASME Code could result in having to machine away nozzle reinforcements or perform modifications that would result in having to replace the entire pressurizer, the NRC staff concluded that it is impractical for the licensee to comply with these specific ASME Code requirements, and imposing them would be a burden on the licensee.

The licensee obtained 65-71 percent volumetric examination coverage for the three pressurizer nozzles. The NRC staff examined the schematics of the pressurizer nozzle geometry and the areas covered by the 45 degree (°) and 60 ° UT radial and circumferential scans from both directions as shown in Figures 1 to 15 of the submittal for the three nozzles and verified that this coverage is the best that can be achieved practically without altering the nozzle geometries. Since the coverage is more than 65 percent and the volume examined for all of the subject

nozzle-to-head welds includes the most vulnerable locations for crack initiation based on stresses and environment (i.e., the weld and base material near the inside surface of the nozzles), the NRC staff concluded that the coverage achieved is sufficient to detect any existing patterns of degradation. Hence, it is reasonable to expect that if significant service-induced degradation had occurred, evidence would have been detected by the UT examinations that were performed. This conclusion is supported by prior inspection results which showed no flaw indications. Finally, in addition to the examinations proposed, the affected welds are subject to the pressure testing requirements of the ASME Code, Section XI, which provides an independent means to evaluate structural integrity and leak tightness.

The NRC staff concludes that the licensee has acceptably demonstrated that the essentially 100 percent ASME Code-required examination requirement is impractical for these welds. Further, based on the above, the NRC staff concludes that there is reasonable assurance that the structural integrity and leak tightness of the subject welds will be maintained by the alternative examinations proposed. Therefore, the NRC staff concludes that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) 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.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that ASME Code examination coverage requirements are impractical for the subject welds, and imposition of the ASME Code requirements would create a burden on the licensee. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Further, the NRC staff concludes that the examinations performed, as described in the application, provide reasonable assurance of the structural integrity and leak tightness of the subject welds. Therefore, the NRC staff grants relief for the subject examinations of the items contained in relief request NDE-PNS-U2, as requested, at DCCP-2 for the third 10-year ISI interval, which ends (nominally) on March 12, 2016. No alternative requirements beyond those specified in the relief request are being imposed by the NRC staff.

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

Principal Contributor: S. Sheng, NRR

Date: May 14, 2014

E. Halpin

- 2 -

If you have any questions, please contact the NRC Project Manager, Mr. Peter J. Bamford, at 301-415-2833 or via e-mail at Peter.Bamford@nrc.gov.

Sincerely,

/RA/

Michael T. Markley, Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-323

Enclosure:
Safety Evaluation

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