



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

January 27, 2016

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 – THIRD 10-YEAR INTERVAL
AMERICAN SOCIETY OF MECHANICAL ENGINEERS SECTION XI
INSERVICE INSPECTION PROGRAM RELIEF REQUEST NDE-PNS-U2A,
PRESSURIZER NOZZLE-TO-HEAD WELDS EXAMINATION IMPRACTICALITY
(CAC NO. MF6073)

Dear Mr. Halpin:

By letter dated April 9, 2015 (Agencywide Documents Access and Management System Accession No. ML15099A409), Pacific Gas and Electric Company (the licensee) submitted a request for relief from the requirements set forth in American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," for the Diablo Canyon Power Plant (DCPP), Unit 2, pressurizer nozzle-to-vessel [head] welds. Specifically, the ASME Code requires that essentially 100 percent of each subject weld and adjacent base metal be volumetrically examined once during each inservice inspection (ISI) interval in accordance with the requirements of Appendix I, I-2100. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, paragraph 50.55a(g)(5)(iii), the licensee requested relief on the basis that meeting the code requirement would be impractical for the facility.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittal and concludes that the ASME Code examination coverage requirements for the subject nozzle-to-vessel welds are impractical and imposition of the ASME Code requirements would create an unnecessary burden for the licensee without a compensating increase in safety. Therefore, the NRC staff grants relief for the subject examinations of the items contained in relief request NDE-PNS-U2A, as requested for DCPP, Unit 2, for the third 10-year ISI interval, which is nominally scheduled to end on March 12, 2016.

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.

E. Halpin

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If you have any questions, please contact the Project Manager, Siva P. Lingam, at 301-415-1564 or via e-mail at Siva.Lingam@nrc.gov.

Sincerely,



Robert J. Pascarelli, 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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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NDE-PNS-U2A FOR THE PRESSURIZER NOZZLE-TO-HEAD

WELDS EXAMINATION IMPRACTICALITY

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT NO. 2

DOCKET NO. 50-323

1.0 INTRODUCTION

By letter dated April 9, 2015 (Agencywide Documents Access and Management System Accession No. ML15099A409), Pacific Gas and Electric Company (the licensee) submitted a request for relief from the requirements set forth in American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," for the Diablo Canyon Power Plant (DCPP), Unit 2, pressurizer nozzle-to-vessel [head] welds. Specifically, the ASME Code requires that essentially 100 percent of each subject weld and adjacent base metal be volumetrically examined once during each inservice inspection (ISI) interval in accordance with the requirements of Appendix I, I-2100. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, paragraph 50.55a(g)(5)(iii), the licensee requested relief on the basis that meeting the code requirement would be impractical for the facility.

2.0 REGULATORY EVALUATION

Inservice inspection of ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable addenda as a way to detect anomaly and degradation indications so that structural integrity of these components can be maintained. This is 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). Paragraph 10 CFR 50.55a(g)(5)(iii) states that the licensee must notify the U.S. Nuclear Regulatory Commission (NRC) and submit information to support its determinations that conforming with an ASME Code requirement is impractical for its facility. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the Code requirements during the ISI interval for which the request is being submitted.

Pursuant to 10 CFR 50.55a(g)(4), components (including supports) that are classified as ASME Code Classes 1, 2, and 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions and addenda of the

Enclosure

ASME Code, that become effective subsequent to editions specified in paragraphs (g)(2) and (3) of this section, 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 successive 120-month inspection interval (following the initial 120-month inspection interval) must comply with the requirements in the latest edition and addenda of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(a) 12 months before the start of the 120-month interval (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," August 2014; ADAMS Accession No. ML13339A689), subject to the conditions listed in 50.55a(b).

3.0 TECHNICAL EVALUATION

3.1 ASME Code Components Affected

The following table lists the three affected pressurizer nozzle-to-head welds that are addressed in the relief request along with the combined examination coverages achieved by the licensee.

ASME Code Category	ASME Code Item	Weld Number	Average ASME Coverage Obtained
B-D	B3.110	WIB-358	72.3%
B-D	B3.110	WIB-379	72.3%
B-D	B3.110	WIB-439A	73.8%

3.2 ASME Code Requirement (as stated by the licensee)

ASME 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 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 to be performed per the rules of ASME Section V, Article 4.

3.3 Licensee's Proposed Alternative and Basis

The licensee proposed that performing the alternative ultrasonic examinations to the maximum practical extent provides reasonable assurance that the structural integrity of the subject welds is maintained.

To support the claim of impracticality, in its letter dated April 9, 2015, the licensee stated, in part:

The DCP 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 ISI interval examinations conducted in the DCP Unit 2 eighteenth refueling outage (2R18).

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 entire exam area. In the case of the surge line nozzle (Weld WIB-439A), the pressurizer heater tube penetrations also restrict the setback distance for the radial-in scans.

“Essentially 100 percent” coverage of the exam volume would require redesign of the pressurizer to either: (a) change the nozzle forging design to move the weld farther from the nozzle boss, or; (b) eliminate the weld by integrally incorporating the nozzle into the head. Either of the 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.

3.4 NRC Staff Evaluation

Section XI of the ASME Code requires essentially 100 percent volumetric examination of all pressurizer nozzle-to-head welds and adjacent base metal. As shown in the table above, the licensee was unable to obtain the volumetric requirements for the subject welds. Pursuant to 10 CFR 50.55a(g)(4), the licensee attributed the inability to achieve the required examinations to the geometry/configuration of the nozzle. Therefore, the NRC staff evaluated the licensee’s relief request in accordance with 10 CFR 50.55a(g)(6)(i), which permits the staff to grant such relief and impose such alternative requirements as it determines are authorized by law, will not endanger life or property or the common defense and security, and are 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. Based on the NRC staff’s independent evaluation and the licensee’s assessment that obtaining essentially 100 percent exam volume coverage would ultimately require replacing the entire pressurizer, the staff concludes that it is impractical for the licensee to comply with this ASME Code requirement and its imposition would cause an unnecessary burden without an increase in safety.

The licensee’s submittal provided schematics of the pressurizer nozzle geometries, which included their welds, their heat affected zones, and the coverage obtained by the 60°, 45° and 30° ultrasonic (UT) radial and circumferential exams. From the combined average of the various UT examinations, the licensee was able to obtain 72.3, 72.3, and 73.8 percent volumetric coverage for WIB-358, WIB-379, and WIB-439A, respectively. The licensee also noted in the submittal that no reportable flaws were found during the examinations. The NRC staff evaluated the licensee’s schematics and verified that the licensee achieved the maximum coverage practical with the existing nozzle configurations. Since at least 72 percent coverage of each nozzle-to-head weld was obtained and the coverages included practically all of the most vulnerable locations for crack initiation based on stress and environment (i.e., the weld and base material near the inside surface of the nozzles), the NRC staff concludes that the coverage achieved is sufficient to detect any existing patterns of degradation. Therefore, 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. Furthermore the affected welds are also 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 adequately demonstrated that the essentially 100 percent ASME Code-required examination requirement is impractical for the subject nozzle-to-vessel welds. Furthermore, based on the above, the NRC staff concludes that there is reasonable assurance that the structural integrity and leak tightness of the 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 reviewed the licensee's submittal and concludes that the ASME Code examination coverage requirements for the subject nozzle-to-vessel welds are impractical and imposition of the ASME Code requirements would create an unnecessary burden for the licensee without a compensating increase in safety. Accordingly, the staff evaluated the licensee's submittal in accordance with the provisions set forth in 10 CFR 50.55a(g)(6)(i) and found that the licensee complied with the regulation. Furthermore, the NRC staff concludes that the examinations performed by the licensee 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 for DCCP Unit 2 for the third 10-year ISI interval, which is nominally scheduled to end 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: A. Young

Date: January 27, 2016

E. Halpin

- 2 -

If you have any questions, please contact the Project Manager, Siva P. Lingam, at 301-415-1564 or via e-mail at Siva.Lingam@nrc.gov.

Sincerely,

/RA/

Robert J. Pascarelli, Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-323

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