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

July 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. 1 – RELIEF REQUEST NDE-SIF-U1 TO ALLOW USE OF ALTERNATE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE SECTION XI EXAMINATION REQUIREMENTS FOR THE THIRD INSERVICE INSPECTION INTERVAL (CAC NO. MF7552)

Dear Mr. Halpin:

By letter dated March 31, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16091A238), Pacific Gas & Electric Company (the licensee) submitted relief request (RR) NDE-SIF-U1 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 1, Class 2 seal injection filter pressure vessel 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-2210. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), 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 determined that the ASME Code examination coverage requirements for the subject seal injection filter shell-to-flange and shell-to-head welds are impractical and considered the burden upon the licensee if the ASME Code requirement was imposed. Accordingly, the NRC 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-SIF-U1, as requested for DCPP, Unit 1, for the third 10-year ISI interval, which ended on November 6, 2015. 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.

If you have any questions, please contact the Senior Project Manager, Balwant K. Singal, at 301-415-3016 or via e-mail at Balwant.Singal@nrc.gov.

Sincerely,

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

Docket No. 50-275

Enclosure:
Safety Evaluation

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NDE-SIF-U1

SEAL INJECTION FILTER VESSEL SHELL-TO-HEAD AND SHELL-TO-FLANGE WELD

TO ALLOW USE OF ALTERNATE

EXAMINATION VOLUME COVERAGE REQUIREMENTS

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT NO. 1

DOCKET NOS. 50-275

1.0 INTRODUCTION

By letter dated March 31, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16091A238), Pacific Gas & Electric Company (the licensee) submitted relief request (RR) NDE-SIF-U1 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 1, Class 2 seal injection filter pressure vessel 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-2210. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), 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. Inservice inspection is required by 10 CFR 50.55a(g), except where specific relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). The regulations in 10 CFR 50.55a(g)(5)(iii) state that the licensee must notify the 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 Class 1, Class 2, and Class 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 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 successive 120-month inspection intervals (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 10 CFR 50.55a(b).

3.0 TECHNICAL EVALUATION

3.1 Affected Components

The following table lists the two affected Unit 1, ASME Section XI, Code Class 2 seal injection filter pressure vessel welds that are addressed in the relief request. Both welds were examined in the DCPP Unit 1 19th refueling outage (1R19).

Code Category	Item Number	Description	Weld Number
C-A	C1.10	Seal Injection Filter Shell-to-Flange Weld	GA
C-A	C1.20	Seal Injection Filter Shell-to-Head Weld	GB

3.2 ASME Code Requirement

In its letter dated March 31, 2016, the licensee stated that:

> ASME Section XI, Table IWC-2500-1, Category C-A, Item No. C1.10 and Item No. C 1.20 each require that seal injection filter vessel welds be volumetrically examined once during each ISI interval. Essentially 100 percent of the full volume of the weld and adjacent base material is to be examined in accordance with the requirements of Appendix I, 1-2210. The applicable examination volume is identified in Figure IWC-2500-1 and the examination is to be performed per the rules of ASME Section XI, Appendix III, as supplemented by Table 1-2000-1.

The DCPP Unit 1 third interval ISI program is based on the 2001 Edition through 2003 Addenda of the ASME Code, Section XI.

3.3 Reason for the Request

In its letter dated March 31, 2016, the licensee stated that,

> The Unit 1 seal injection filter vessel shell-to-head and shell-to-flange weld configurations are such that essentially 100 percent coverage of the ASME Code required examination volume from the outside diameter is not feasible, as determined during the third interval examinations conducted in the DCPP Unit 1 nineteenth refueling outage (1R19).

3.4 Licensee's Proposed Alternative and Basis

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

The licensee provided graphics and a detailed explanation as to why the DCPP Unit 1 seal injection filter shell-to-flange and shell-to-head weld configurations prevent examination of essentially 100 percent coverage of the ASME Code-required examination volume as determined during the third interval examinations conducted in the DCPP Unit 1 19th refueling outage (1R19), in support of the claim of impracticality.

For the shell-to-flange weld GA, the proximity of the weld to the transition in the flange creates geometric restrictions that prevents both axial examination from the flange side of the weld outward as well as scanning back from the weld with skewing during circumferential scans on the flange side. Additionally, examination of the full circumference of this weld was limited due to a nameplate and a support for the lid davit arm which are welded to the shell.

Axial examination from the head side of the shell-to-head weld GB was limited due to the transition of the seal injection filter vessel to the curvature of the head which results in a loss of contact for the transducer and an accompanying change in sound angle. Furthermore, three support legs and an inlet nozzle that are welded to the vessel limit examination of the total circumference.

The licensee discussed the impracticality of obtaining additional coverage by referring to the difficulties in performing further outer and inner surface examinations. Meeting the ASME Code requirement of "essentially 100 percent" coverage of the exam volume from the outer surface would require either replacement or redesign and rework of the seal injection filter vessel to move the shell-to-flange welds farther from the flange and head or eliminate the weld by integrally incorporating the flange into the shell. Furthermore, the welded supports and the inlet nozzle would require relocation. Performing examinations from the inside of the seal injection filter would require accessing the 10-inch nominal diameter vessel below an external shielding structure and work in a high-contamination, high-risk, foreign material exclusion area. Additionally, an internal filter support structure limits access to the shell-to-head weld.

3.5 Duration of Proposed Relief

Relief is requested for the DCPP, Unit 1, third ISI interval, which ended on November 6, 2015, coincident with the completion date of 1R19 in accordance with ASME Code, Section XI, Paragraph IWA-2430(d)(1).

3.6 NRC Staff Evaluation

Section XI of the ASME Code requires essentially 100 percent volumetric examination of all seal injection filter shell-to-flange welds and adjacent base metal. The licensee made the claim that obtaining the volumetric requirements for the subject welds at DCPP Unit 1 was impractical. Pursuant to 10 CFR 50.55a(g)(4), the licensee attributed the inability to achieve the required examinations to the geometry/configuration of the seal injection filter vessel. Therefore the NRC staff evaluated the licensee's relief request in accordance with 10 CFR 50.55a(g)(6)(i), which permits the NRC 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 licensee's assessment that obtaining essentially 100 percent examination volume coverage would ultimately require redesign and replacement of the entire seal injection filter vessel and considering the burden upon the licensee if the requirement were to be imposed, the NRC staff concluded that it is impractical for the licensee to comply with this ASME Code requirement.

In its letter dated March 31, 2016, the licensee provided Figures 1 through Figure 5 to further support the argument of impracticality. Figure 1 provided a detailed schematic of the full seal injection filter layout. The Figures 2 and 3 focused on the aerial and side views of subject welds and surrounding appurtenances that precluded certain exam coverages. Figures 4 and 5 provided detailed drawings of the subject welds and their surrounding base metals, along with an image representing full examination coverage as required by the ASME Code, and images of the actual coverages obtained via the axial and circumferential 60 degree longitudinal wave and 45 degree shear wave UT examinations. Furthermore, the licensee included measurements and calculations to demonstrate that, from the combined average of the various UT exams, the licensee was able to obtain 55.4 and 52.4 percent volumetric coverage for welds GA and GB, respectively. The licensee also noted that no reportable flaws were found during the examinations. The NRC staff verified that the licensee achieved the maximum coverage practical without unnecessary alterations based on its evaluation of the licensee's schematics and calculations.

The licensee stated that the worst possible scenario would be a 360 degree circumferential crack of the weld which would result in a loss of seal injection water. In this case, the licensee would be able to isolate this seal injection filter manually and send water through the second redundant seal injection filter vessel. A flaw leading to this outcome would likely be detected under the examinations performed. Furthermore the affected welds are also subject to the pressure testing requirements of the ASME Code, Section XI, Table IWC-2500-1, Examination Category C-H, which provides an independent means to evaluate structural integrity and leak tightness; no flaws were detected when these tests were performed. Therefore, the NRC staff concludes that the coverage achieved is sufficient to detect any existing patterns of degradation.

The NRC staff concludes that the licensee adequately demonstrated that the essentially 100 percent ASME Code-required examination requirement is impractical for the subject seal injection filter shell-to-flange and shell-to-head welds and surrounding base metal. 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 examination coverage achieved. 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 seal injection filter shell-to-flange and shell-to-head welds are impractical and considered the burden upon the licensee if the ASME Code requirement was imposed. 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-SIF-U1, as requested for DCPP Unit 1 for the third 10-year ISI interval, which ended on November 6, 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: Austin Young

Date: July 27, 2016

If you have any questions, please contact the Senior Project Manager, Balwant K. Singal, at 301-415-3016 or via e-mail at Balwant.Singal@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. 50-275

Enclosure:
Safety Evaluation

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