



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

March 7, 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 FLIG-U1  
TO EXTEND THIRD 10-YEAR INSERVICE INSPECTION INTERVAL FOR  
PERFORMING REACTOR VESSEL STUD HOLE LIGAMENT EXAMINATIONS  
(CAC NO. MF6790)

Dear Mr. Halpin:

By letter dated October 7, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15280A505), as supplemented by letter dated October 12, 2015 (ADAMS Accession No. ML15285A021), Pacific Gas & Electric Company (the licensee) submitted relief request (RR) FLIG-U1 for an extension of the third 10-year inservice inspection (ISI) interval for Diablo Canyon Power Plant (DCPP), Unit 1 by approximately 13 months beyond the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Paragraph IWA-2430(d)(1) Code-allowed end of interval 1-year extension. This extension is required to re-perform reactor vessel (RV) stud hole ligament examinations.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittal and determined that the proposed extension of the third 10-year ISI interval to complete the inspections of the RV stud holes provides reasonable assurance of the leak tightness and structural integrity of the components. The NRC staff has concluded that examining the RV stud holes in the current refueling outage (RFO) would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, paragraph 10 CFR 50.55a(z)(2). Therefore, the NRC authorizes the use of RR FLIG-U1 to extend the third 10-year ISI interval to the end of the 20th RFO at DCPP, Unit 1, which is currently scheduled to end in June 2017.

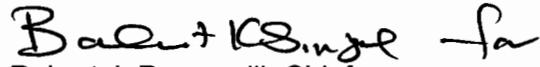
All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

E. Halpin

- 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](mailto:Siva.Lingam@nrc.gov).

Sincerely,

Handwritten signature of Robert J. Pascarelli in black ink.

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

cc w/encl: Distribution via ListServ



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NDE-FWNS-U1/U2 FOR FEEDWATER

NOZZLE-TO-SHELL WELD TO ALLOW USE OF ALTERNATE

EXAMINATION VOLUME COVERAGE REQUIREMENTS

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated October 7, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15280A505), as supplemented by letter dated October 12, 2015 (ADAMS Accession No. ML15285A021), Pacific Gas and Electric Company (the licensee) submitted Relief Request (RR) FLIG-U1 requesting to extend the third 10-year inservice inspection (ISI) interval to the end of the 20<sup>th</sup> refueling outage (RFO) at Diablo Canyon Power Plant (DCPP), Unit 1, which is currently scheduled to end in June 2017. This would extend the 10-year ISI interval by approximately 13 months beyond that which is allowed by the American Society for Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Paragraph IWA-2430(d)(1).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations*, Part 50 (10 CFR 50), paragraph 50.55a(z)(2), the licensee proposes to extend the third 10-year ISI interval on the basis that performing the reactor vessel (RV) stud hole ligament inspections in the current RFO would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Verbal authorization of this RR was granted on October 15, 2015 (ADAMS Accession No. ML15289A099).

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that repair and replacement activities comply with the requirements in the

Enclosure

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 inspection interval, subject to the conditions listed therein.

Paragraph 10 CFR 50.55a(z), "Alternatives to codes and standards requirements" states, in part, that alternatives to the requirements of 10 CFR 50.55a(g) may be used, when authorized by the U.S. Nuclear Regulatory Commission (NRC), if (1) the proposed alternative would provide an acceptable level of quality and safety or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(z)(2), the licensee is requesting to use an alternative to the requirements of Article IWA-2430 of the ASME Code, Section XI.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the Commission to authorize the alternative requested by the licensee.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Affected Components

The affected components are 54 threaded stud holes in the RV flange. The ASME Code, Section XI, Examination Category B-G-1, Item No. 86.40, "Threads in Flange," are applicable.

#### 3.2 ASME Code of Reference

ASME Code, Section XI, 2001 Edition through 2003 Addenda.

#### 3.3 Reason for the Request

During the 18<sup>th</sup> RFO (1R18) in February 2014, the licensee performed stud hole ligament ultrasonic (UT) examinations under water using specifically procured tooling and equipment to reduce personnel exposure, to improve safety, and to move the examinations off the critical path refueling schedule.

The adequacy of coverage using this tooling versus the Code-required volume depicted in Figure IWB-2500-12 was questioned by the NRC inspector. The tooling positions the UT transducer relative to the stud hole using the installed stud hole plug or RV head alignment pin for centering an associated long-handled tool for moving the transducer and scanning the examination volume. It was considered that the use of the tooling would not result in the maximum achievable examination volume coverage due to occlusion by the plug or pin. It was noted that although NRC Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements," dated December 1, 1998 (ADAMS Accession No. ML031040542), and ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and 2 Welds, Section XI, Division 1," allows for crediting "essentially 100 percent" when greater

than 90 percent coverage is obtained, this only applies when the inspection is limited by geometry or other restrictions caused by design or configuration issues.

### 3.4 Proposed Alternative

Refueling outage 1R19 is the last outage in the third ISI interval. The third interval was extended beyond May 7, 2015, the 30<sup>th</sup> anniversary of commercial operation, to November 6, 2015, as allowed by Section XI, Paragraph IWA-2430(d)(1), to include 1R19. In the event that the NRC concludes that the examinations of the RV stud hole ligaments were not in compliance with ASME Code, Section XI, requirements and that re-performance of the examinations is required, the proposed alternative will allow time to re-perform the UT examinations for all 54 RV stud hole ligaments in 1R20, which is currently scheduled from April 30 to June 2, 2017. This additional extension will exceed the 1-year allowable extension provided by IWA-2430(d)(1) by 13 months. In accordance with 10 CFR 50.55a(z)(2), this interval extension is requested on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

This request for extension allows time for further consideration and resolution of the Code requirements. However, if it is determined that the examinations which have been performed do not meet ASME Code requirements and are required to be re-performed, this request for extension will give the licensee time to perform proper planning to ensure that the examinations are done safely, to minimize radiation exposure, and to ensure that the examinations are in complete compliance with the ASME Code.

### 3.5 Hardship

To perform the examinations on the RV stud hole ligaments the outage schedule would need to be changed to extend a RV head lift for the duration of the examinations, install blocking of the suspended load to allow safe personnel access underneath, perform inspections of the accessible portions, lift and secure the RV head, and complete the examinations. The process is estimated to exceed 600 milli roentgen equivalent man (mrem).

### 3.6 Duration of Proposed Relief

The third interval was originally scheduled to end on May 7, 2015. However, per ASME Code, Section XI, Paragraph IWA-2430(d)(1), the third interval was extended past the nominal end date to November 6, 2015, to coincide with the dates of the 19<sup>th</sup> RFO. The alternative is requested to extend the third ISI interval by approximately 13 months past the ASME Code, Section XI, Paragraph IWA-2430(d)(1) allowed extension of 1 year for the potential re-performance of the examinations. This request is applicable for the third ISI interval. If this RR is approved, the third ISI interval for these subject examinations will end at the conclusion of the 20<sup>th</sup> RFO, which is currently scheduled to end in June 2017.

### 3.7 NRC Staff Evaluation

Pursuant to 10 CFR 50.55a(z)(2), the licensee is proposing to extend its 10 year inspection interval by 13 months to accommodate an inspection of 54 RV stud hole ligaments. The licensee poses that performing the inspections under the current schedule would create a hardship without a compensating increase in the level of quality and safety.

Inspecting the RV stud holes in the third 10-year ISI interval would require the licensee to extend an RV head lift for the duration of the examinations, preparation for and installing blocking of the suspended load to allow safe personnel access underneath, performance of the accessible portion of the examinations (around the blocking), and lifting the RV head. The inspection and associated manipulation of the head is estimated to result in doses that exceed 600 mrem.

The licensee inspected the RV stud hole ligaments in February 2014 using tooling designed to perform the inspections underwater. The inspection using this tooling was not able to achieve 100 percent of the volumetric coverage required by the ASME Code, Section XI. ASME Code Case N-460, which is listed in Regulatory Guide 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," August 2014 (ADAMS Accession No. ML13339A689), as acceptable for use without conditions, allows for reduced coverage of inspections "due to interference by another component or part geometry." There are no provisions allowing reduced coverage in ASME Code Case N-460 or IN 98-42 for tooling.

The licensee stated that the 2014 inspection achieved a coverage value of 98 percent. The NRC staff is still evaluating the effectiveness of this examination and the code coverage obtained. The NRC staff has determined that based on operational experience with RV stud holes and the coverage obtained that there is reasonable assurance that significant cracking has not occurred in the RV stud holes.

As described in the licensee's letter dated October 12, 2015, the inspections currently scheduled for the 20<sup>th</sup> RFO will be conducted as normal and credited to the fourth 10-year ISI interval. Thus, extending the third 10-year ISI interval will only affect the RV stud hole inspections.

A 600 mrem radiation dose for an examination is often not considered sufficient by the NRC staff to cancel or significantly delay a required inspection. The licensee has recently conducted an inspection with significant coverage and the licensee will either perform an RV stud hole inspection with 100 percent coverage or demonstrate that the inspection performed in February 2014 met the Code requirements. The NRC staff has determined that this hardship is sufficient to permit the extension of the third 10-year ISI interval to the end of the 20<sup>th</sup> RFO.

### 4.0 CONCLUSION

As set forth above, the NRC staff has determined that the proposed extension of the third 10-year ISI interval to complete the inspections of the RV stud holes provides reasonable assurance of the leak tightness and structural integrity of the components. The NRC staff has concluded that examining the RV stud holes in the current RFO would result in a hardship or

unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC authorizes the use of RR FLIG-U1 to extend the third 10-year ISI interval to the end of the 20<sup>th</sup> RFO at DCP, Unit 1, which is currently scheduled to end in June 2017.

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. Cumblidge

Date: March 7, 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](mailto:Siva.Lingam@nrc.gov).

Sincerely,

***/RA by BSingal for/***

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

cc w/encl: Distribution via ListServ

**DISTRIBUTION:**

PUBLIC  
LPL4-1 R/F  
RidsACRS\_MailCTR Resource  
RidsNrrDeEpn Resource  
RidsNrrDorIDpr Resource  
RidsNrrDorLpl4-1 Resource  
RidsNrrLJBurkhardt Resource  
RidsNrrPMDiabloCanyon Resource  
RidsRgn4MailCenter Resource  
Rlyengar, EDO RIV  
SCumblidge, NRR/DE/EPNB

**ADAMS Accession No. ML16056A513**

\*SE via email

OFFICE	NRR/DORL/LPL4-1/PM	NRR/DORL/LPL4-1/LA	NRR/DE/EPNB/BC*	NRR/DORL/LPL4-1/BC
NAME	SLingam	JBurkhardt	DAlley	RPascarelli (BSingal for)
DATE	2/29/16	2/29/16	2/25/16	3/7/16

**OFFICIAL RECORD COPY**