

August 8, 2000

Mr. Gregory M. Rueger  
Senior Vice President and General Manager  
Pacific Gas and Electric Company  
Diablo Canyon Nuclear Power Plant  
P. O. Box 3  
Avila Beach, CA 93424

SUBJECT: INSERVICE INSPECTION PROGRAM SECOND 10-YEAR INTERVAL  
REQUESTS FOR RELIEF FOR PACIFIC GAS & ELECTRIC COMPANY,  
DIABLO CANYON NUCLEAR POWER PLANT, UNIT 1 (TAC NOS. MA5926  
AND MA5927)

Dear Mr. Rueger:

By letter dated June 18, 1999, Pacific Gas & Electric Company submitted requests for relief from the American Society of Mechanical Engineers (ASME) Code Section XI requirements for the second 10-year inservice inspection (ISI) interval for the Diablo Canyon Power Nuclear Plant, Unit 1 (DCPP-1). The staff has reviewed and evaluated the information provided in the relief requests and has considered the impracticality of performing the required testing and the burden on the licensee if the requirements were imposed. The staff concludes that the relief requests as evaluated by the enclosed safety evaluation provide reasonable assurance of structural integrity of the subject components in the licensee's requests for relief. The staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for the remainder of the second 10-year inservice inspection interval is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest. The granting of relief is based upon the fulfillment of any commitments made by the licensee in the basis for each relief request.

Sincerely,

*/RA/*

Stephen Dembek, Chief, Section 2  
Project Directorate IV and Decommissioning  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-275

Enclosure: Safety Evaluation

cc w/encl: See next page

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Diablo Canyon Power Plant, Units 1 and 2

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE INSPECTION PROGRAM

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-275

1.0 INTRODUCTION

By letter dated June 18, 1999, Pacific Gas & Electric Company (PG&E or the licensee), submitted Requests for Relief NDE-11.1R9, NDE-12.1R9, NDE-13.1R9, NDE-14.1R9 and NDE-21.1R9 from the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, to perform 100 percent volumetric examination of welds. The welds for which relief is requested are certain pressurizer nozzle-to-vessel welds, steam generator nozzle-to-safe end welds, Class 1 system circumferential pipe welds, Class 1 system branch connection welds, and Class 2 stainless steel pipe welds. These requests for relief were submitted pursuant to 10 CFR 50.55a(g)(5)(iii) for the second 10-year inservice inspection (ISI) program interval. The NRC staff reviewed and evaluated the licensee's proposed relief requests pursuant to 10 CFR 50.55a(g)(6)(i).

2.0 BACKGROUND

Inservice inspection of the ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific written 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) shall meet the requirements, except the design and access provisions and the preservice 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 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 Code of record for the Diablo Canyon Unit 1 second 10-year ISI interval is the 1989 Edition of the ASME Code.

Pursuant to 10 CFR 50.55a(g)(5)(iii), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request

made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose requirements that are determined to be authorized by law, will not endanger life, 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.

### 3.0 EVALUATION

The information provided by the licensee in support of the Requests for Relief NDE-11.1R9, NDE-12.1R9, NDE-13.1R9, NDE-14.1R9 and NDE-21.1R9, has been evaluated and the bases for disposition are documented below.

#### 3.1 Request for Relief NDE-11.1R9, Examination Category B-F, Item B5.40, Pertaining to Pressurizer Nozzle-to-Safe End Butt Welds

##### Code Requirement

Item B5.40 of the 1989 Edition of the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-F, requires 100 percent volumetric and surface examinations, once during the 10-year interval, of pressurizer nozzle-to-safe end butt welds per methods shown in Figure IWB-2500-8, with acceptance standard IWB-3514.

##### Licensee's Code Relief Request

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code required 100 percent volumetric examination coverage for pressurizer nozzle-to-safe end welds (WIB-322 SE and WIB-313 SE) for those portions where access was limited by surface configuration.

##### Licensee's Basis for Relief Request (as stated)

Design of the [pressurizer] nozzles and safe ends (316 stainless steel safe end is attached to the nozzles with an inconel weld) limits access for ultrasonic examination due to compound curvature of the nozzle transition radius, weld crown reinforcement and safe end surface bevel geometry adjacent to the welds. These conditions restrict scan lengths and cause transducer liftoff. Redesign and modification of the nozzles and safe ends would be required to provide additional access. Accessible portions of each weld volume, based on examinations conducted during the 1R9 refueling outage, are described below:

<u>Unit 1 Weld</u>	<u>Line</u>	<u>NPS</u>	<u>Limitation</u>	<u>% Accessible</u>
WIB-322 SE	728	6	OD surface contour	67%
WIB-313 SE	729	6	OD surface contour	67%

##### Licensee's Proposed Alternative Examination (as stated)

All accessible areas of the nozzle-to-safe end welds were completely examined as required, using refracted longitudinal (45 and 60 degree) and 47 degree shear

wave techniques with manual scanning methods to assure the most complete coverage possible. In addition to the volumetric examination, the welds received full surface examination and visual examination is conducted during pressure test per Code Category B-P.

This relief request will be implemented during the Unit 1 second ISI interval. This request is based on examinations conducted during the Unit 1 ninth refueling outage.

#### Staff Evaluation

The Code requires that the subject welds be 100 percent volumetrically examined once during the inspection interval. As reported by the licensee, only partial volumetric examination coverage is possible due to geometry considerations which limited access for ultrasonic examination. Based on the information provided in this request for relief, the staff has determined that it is impractical to volumetrically examine the subject welds to the extent required by the Code. For complete examination coverage, redesign and modification of the pressurizer nozzles and safe ends would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee stated that volumetric examination was conducted on all accessible areas of the subject welds to the maximum extent practical. Full surface examination was conducted on the entire examination area, and visual examination is conducted, as required, by Code Category B-P. Based on the volumetric examinations completed and the complete surface and visual examinations performed, the staff concludes that a pattern of degradation, if present, would have been detected, and as a result, reasonable assurance of continued structural integrity has been provided. Therefore, request for relief NDE-11.1R9 is granted pursuant to 10 CFR 50.55a(g)(6)(ii).

#### 3.2 Request for Relief NDE-12.1R9, Examination Category B-F, Item B5.70, Pertaining to Steam Generator Nozzle-to-Safe End Butt Welds

#### Code Requirement

Item B5.70 of the 1989 Edition of the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-F, requires 100 percent surface and volumetric examinations of nozzle-to-safe end butt weld per methods as shown in Figure IWB-2500-8, with acceptance standard IWB-3514, once each 10-year ISI interval.

#### Licensee's Code Relief Request

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code required 100 percent volumetric examination coverage for steam generator (SG) nozzle-to-safe end welds (WIB-RC-1-5SE and WIB-RC-1-6SE) for those portions where access was limited by surface configuration.

Licensee's Basis for Relief Request (as stated)

Design of the SG nozzles and safe ends (stainless steel piping is welded directly to the nozzles) limits access for ultrasonic examination due to abrupt machined bevel geometry adjacent to the welds. These conditions restrict scan lengths and cause transducer liftoff. Redesign and modification of the nozzles and safe ends would be required to provide additional access. Accessible portions of each weld volume, based on examinations conducted during the 1R9 refueling outage, are described below:

<u>Unit 1 Weld</u>	<u>Line</u>	<u>NPS</u>	<u>Limitation</u>	<u>% Accessible</u>
WIB-RC-1-5SE	1	29	OD surface contour	72%
WIB-RC-1-6SE	5	31	OD surface contour	73%

Licensee's Proposed Alternative Examination (as stated)

All accessible areas of the nozzle-to-safe end welds were completely examined as required, using refracted longitudinal (37.5 degree) and 43 degree shear wave techniques with manual scanning methods to assure the most complete coverage possible. In addition to the volumetric examination, the welds received full surface examination and visual examination is conducted during pressure test per Code Category B-P.

This relief request will be implemented during the Unit 1 second ISI interval. This request is based on examinations conducted during the Unit 1 ninth refueling outage.

Staff Evaluation

The Code requires that the subject nozzle-to-safe end welds be 100 percent surface and volumetrically examined during each inspection interval. As reported by the licensee, volumetric examination coverage is limited to 72 to 73 percent due to design configuration of the SG nozzles and safe ends, which limited access for ultrasonic examination. Based on the information provided in this request for relief, the staff has determined that it is impractical to volumetrically examine the subject welds to the extent required by the Code. For complete examination coverage, redesign and modification of the configuration of the nozzles and safe ends would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee stated that volumetric examination was conducted on all accessible areas of each subject weld to the maximum extent practical. Surface examination was performed on the entire examination area and visual examination is conducted, as required, by Code Category B-P. Based on the volumetric examinations completed and the complete surface and visual examinations performed, the staff concludes that a pattern of degradation, if present, would have been detected, and as a result, reasonable assurance of continued structural integrity has been provided. Therefore, request for relief NDE-12.1R9 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.3 Request for Relief NDE-13.1R9, Examination Category B-J, Item B9.11, Pertaining to Class 1 Systems, Circumferential Pipe Welds

Code Requirement

Item B9.11 of the 1989 Edition of the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, requires 100 percent surface and volumetric examinations of selected circumferential pipe welds, NPS 4 or larger, per methods as shown in Figure IWB-2500-8, with acceptance standard IWB-3514, once during each 10-year ISI interval.

Licensee's Code Relief Request

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code required 100 percent volumetric examination coverage for Class 1 systems circumferential pipe welds (WIB-RC-1-12, WIB-RC-2-14, WIB-RC-1-13, WIB-151, WIB-210, WIB-276, WIB-1 and WIB-171) for those portions where access was limited by surface configuration.

Licensee's Basis for Relief Request (as stated)

Design of the pipe welds limits access for ultrasonic examination due to abrupt machined bevel geometry or valve, pump body or pipe fitting contours adjacent to the welds. These conditions restrict scan lengths and cause transducer liftoff. Redesign and modification of the pump case, valve body, and pipe fittings would be required to provide additional access. Accessible portions of each weld volume, based on examinations conducted during the 1R9 refueling outage, are described below:

<u>Unit 1 Weld</u>	<u>Line</u>	<u>NPS</u>	<u>Limitation</u>	<u>% Accessible</u>
WIB-RC-1-12	5	31	OD surface contour	74%
WIB-RC-2-14	6	31	OD surface contour	62%
WIB-RC-1-13	6	27.5	OD surface contour	75%
WIB-151	254	10	OD surface contour	70%
WIB-210	255	10	OD surface contour	72%
WIB-276	256	10	OD surface contour	81%
WIB-1	235	6	OD surface contour	70%
WIB-171	3845	6	OD surface contour	83%

Licensee's Proposed Alternative Examination (as stated)

All accessible areas of the circumferential pipe welds were completely examined as required, using combinations of refracted longitudinal and/or shear wave techniques with manual scanning methods to assure the most complete coverage possible. In addition to the volumetric examination, the welds received full surface examination and visual examination is conducted during pressure test per Code Category B-P.



This relief request will be implemented during the Unit 1 second ISI interval. This request is based on examinations conducted during the Unit 1 ninth refueling outage.

#### Staff Evaluation

The Code requires that the subject pipe welds be 100 percent surface and volumetrically examined during each inspection interval. As reported by the licensee, volumetric examination coverage is limited to 62 to 83 percent due to the sharp angled machined surface bevels associated with pump casings, valve bodies or pipe fittings adjacent to the welds, which limited access for ultrasonic examination. Based on the information provided in this request for relief, the staff has determined that it is impractical to volumetrically examine the subject welds to the extent required by the Code. For complete examination coverage, redesign and modification of the configuration of the pump casing, valve body, and pipe fittings would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee stated that volumetric examination was conducted on all accessible areas of each subject weld to the maximum extent practical. Surface examination was performed on the entire examination area and visual examination is conducted, as required, by Code Category B-P. Based on the volumetric examinations completed and the complete surface and visual examinations performed, the staff concludes that a pattern of degradation, if present, would have been detected, and as a result, reasonable assurance of continued structural integrity has been provided. Therefore, request for relief NDE-13.1R9 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

#### 3.4 Request for Relief NDE-14.1R9, Examination Category B-J, Item B9.31, Pertaining to Class 1 Systems, Branch Connection Pipe Welds

#### Code Requirement

Item B9.31 of the 1989 Edition of the ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, requires 100 percent surface and volumetric examinations of selected branch connection pipe welds, NPS 4 or larger, per methods as shown in Figure IWB-2500-9, with acceptance standard IWB-3514, once during each 10-year ISI interval.

#### Licensee's Code Relief Request

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code required 100 percent volumetric examination coverage for Class 1 systems branch connection pipe welds (WIB-RC-2-16 and WIB-RC-1-15) for those portions where access was limited by surface configuration.

#### Licensee's Basis for Relief Request (as stated)

Design of the branch connection pipe welds limits access for ultrasonic examination due to the transition blend radius geometry of the branch connection adjacent to the welds. These conditions restrict scan lengths and cause transducer liftoff. Redesign and modification of the branch connection pipe

fittings would be required to provide additional access. Accessible portions of each weld volume, based on examinations conducted during the 1R9 refueling outage, are described below:

<u>Unit 1 Weld</u>	<u>Line</u>	<u>NPS</u>	<u>Limitation</u>	<u>% Accessible</u>
WIB-RC-2-16	254	10	OD surface contour	54%
WIB-RC-1-15	13	4	OD surface contour	50%

Licensee's Proposed Alternative Examination (as stated)

All accessible areas of the branch connection pipe welds were completely examined as required, using combinations of refracted longitudinal and shear wave techniques with manual scanning methods to assure the most complete coverage possible. In addition to the volumetric examination, the welds received full surface examination and visual examination is conducted during pressure test per Code Category B-P.

This relief request will be implemented during the Unit 1 second ISI interval. This request is based on examinations conducted during the Unit 1 ninth refueling outage.

Staff Evaluation

The Code requires that the subject pipe welds be 100 percent surface and volumetrically examined during each inspection interval. As reported by the licensee, volumetric examination coverage is limited to 50 to 54 percent due to the transition blend radius geometry of the branch connection adjacent to the welds, which limited access for ultrasonic examination. Based on the information provided in this request for relief, the staff has determined that it is impractical to volumetrically examine the subject welds to the extent required by the Code. For complete examination coverage, redesign and modification of the branch connection pipe fittings would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee stated that volumetric examination was conducted on all accessible areas of each subject weld to the maximum extent practical. Surface examination was performed on the entire examination area and visual examination is conducted, as required, by Code Category B-P. Based on the volumetric examinations completed and the complete surface and visual examinations performed, we conclude that a pattern of degradation, if present, would have been detected, and as a result, reasonable assurance of continued structural integrity has been provided. Therefore, request for relief NDE-14.1R9 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.5 Request for Relief NDE-21.1R9, Examination Category C-F-1, Items C5.10 and C5.20, Pertaining to Class 2 Pipe Welds in Stainless Steel Piping

Code Requirement

Items C5.10 and C5.20 of the 1989 Edition of the ASME Code, Section XI, Table IWC-2500-1, Examination Category C-F-1, require 100 percent surface and volumetric examinations of selected pipe welds per methods as shown in Figure IWC-2500-7, with acceptance standard IWC-3514, once during each 10-year ISI interval.

Licensee's Code Relief Request

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code required 100 percent volumetric examination coverage for pipe welds (WIC-189A, WIC-48A, WIC-54B, WIC-264A, and WIC-265A) for those portions where access was limited by surface configuration or adjacent structure.

Licensee's Basis for Relief Request (as stated)

Design of certain pipe welds limits access for volumetric examination due to various geometric conditions on or adjacent to the welds such as pipe fitting transition bevels, or due to the presence of physical obstructions such as welded supports; Code nameplates; and adjacent piping, structures, or penetrations. These conditions restrict scan lengths and cause transducer liftoff. Redesign and modification of the pipe welds would be required to provide additional access. Accessible portions of each weld volume, based on examinations conducted during the 1R9 refueling outage, are described below:

<u>Unit 1 Weld</u>	<u>Line</u>	<u>NPS</u>	<u>Limitation</u>	<u>% Accessible</u>
WIC-189A	111	14	OD surface contour, flange-pump	47%*
WIC-48A	48	3	OD surface contour, tee	85%*
WIC-54B	54	2	OD surface contour, penetration	87%
WIC-264A	264	8	OD surface contour, elbow	83%
WIC-265A	265	8	OD surface contour, elbow/welded attach	77%

\* Accessible percentages revised upward from request #NDE-21.1R8 and includes coverage from scans performed during the 1R8 refueling outage.

Licensee's Proposed Alternative Examination (as stated)

All accessible areas of each pipe weld were completely examined as required, using combinations of refracted longitudinal and/or shear wave techniques with manual scanning methods to assure the most complete coverage possible. In addition to the volumetric examination, the welds received full surface examination (except for containment spray system welds) and visual examination is conducted during pressure test per Code Category C-H.

This relief request will be implemented during the Unit 1 second ISI interval. This request is based on examinations conducted during the Unit 1 ninth refueling outage.

#### Staff Evaluation

The Code requires that the subject selected pipe welds be 100 percent surface and volumetrically examined once during the inspection interval. As reported by the licensee, volumetric examination coverage is limited to 47 to 87 percent due to limited access for ultrasonic examination. Based on the information provided in this request for relief, the staff has determined that it is impractical to volumetrically examine the subject welds to the extent required by the Code. For complete examination coverage, redesign and modification of the pipe welds would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee stated that volumetric examination was conducted on all accessible areas of the subject welds to the maximum extent practical. Surface examination was performed on the entire examination area except containment spray system welds, and visual examination is conducted, as required, by Code Category C-H. Based on the volumetric examinations completed and the complete surface and visual examinations performed, the staff concludes that a pattern of degradation, if present, would have been detected, and as a result, reasonable assurance of continued structural integrity has been provided. Therefore, request for relief NDE-21.1R9 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

#### 4.0 CONCLUSION

The staff concludes that the Code requirements pertaining to Requests for Relief NDE-11.1R9, NDE-12.1R9, NDE-13.1R9, NDE-14.1R9 and NDE-21.1R9 as evaluated by this Safety Evaluation are impractical, and the proposed alternatives provide reasonable assurance of structural integrity of the subject components in the licensee's requests for relief. Therefore, relief is granted for Requests for Relief NDE-11.1R9, NDE-12.1R9, NDE-13.1R9, NDE-14.1R9 and NDE-21.1R9 pursuant to 10 CFR 50.55a(g)(6)(i) for the second ten-year ISI interval. The staff has determined 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 would result if the requirements were imposed on the facility. In making this determination, the staff has considered the impracticality of performing the required testing and the burden on the licensee if the requirements were imposed.

Principal Contributor: S. Hou

Date: August 8, 2000