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U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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Docket No. 50-323 OL-DPR-82  
Diablo Canyon Power Plant Unit 2  
Auxiliary Feedwater Piping Line 567 - Flaw Analytical Evaluation

Dear Commissioners and Staff:

In accordance with ASME Code 1989 Edition, Section XI, paragraph IWB-3134, "Review by Authorities," enclosed is a flaw evaluation for Unit 2 auxiliary feedwater pumps recirculation header, Line 567. This is an ASME Class 3 line evaluated in accordance with Class 1 requirements, as recommended in the Code, because there are no acceptance criteria for Class 3 components. Section XI, paragraph IWB-3132.4, allows analytical analysis in lieu of repair or replacement of identified flaws. PG&E has performed an analytical evaluation and verified this flaw is acceptable for continued service in compliance with ASME Code, paragraphs IWB-3620 and IWB-3610.

This report provides the analytical evaluation results performed to accept the defect as allowed by ASME Code, paragraph IWB-3132.4, and is provided for review in accordance with paragraph IWB-3134.

Sincerely,



David H. Oatley

cc: Steven D. Bloom  
Ellis W. Merschoff  
David L. Proulx  
Diablo Distribution

Enclosure

DDM/469

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AC47/1

## **AUXILIARY FEEDWATER LINE 567 - ANALYTICAL EVALUATION RESULTS**

### System and Component Description

During the Unit 2 eighth refueling outage (2R8), while performing a nonroutine surface examination prior to maintenance, PG&E identified a flaw indication in the auxiliary feedwater (AFW) pumps recirculation header, Line 567 that exceeds Section XI, Table IWB-3410-1 criteria. Line 567 is an ASME Class 3, 2 in nominal diameter seamless carbon steel pipe, schedule 80 (ASTM A 53 or A 106 Gr. B, 0.218 in nominal thickness) with maximum operating conditions of 35 psig at 90°F. Inspection results show the indication to extend intermittently along the full length of the approximate 12 ft length of this single pipe run. The best estimate of actual defect depth is 0.040 in. The indication is believed to be an original manufacturer's defect (a lap in the pipe), with no evidence of propagation since original installation (circa 1974).

PG&E accepted the flaw for continued operation following 2R8 based upon engineering judgment that: 1) the minimum pipe wall thickness was adequate to support design loading, 2) there was little vibration loading, and 3) there was no service-related propagation. PG&E examined the defect during the Unit 2 ninth refueling outage (2R9) and confirmed that the defect is not service induced and no further degradation has occurred.

The flaw has been characterized as 0.100 in. deep in accordance with the generally-accepted accuracy limitations associated with the ultrasonic testing (UT) technique used under field conditions, and a fracture mechanics evaluation analysis has been performed in accordance with IWB-3620 and IWB-3610. Based upon the acceptance of the defect by analysis, PG&E has accepted the piping for continued operation.

### ASME Code Section XI Requirements

The applicable edition of Section XI of the ASME Code for Diablo Canyon Power Plant (DCPP) Unit 2 Second Ten Year Inservice Inspection Interval is the 1989 Edition with no Addenda. Section XI specifies the inservice inspection acceptance requirements applicable to Class 3 AFW piping including Line 567.

In the absence of acceptance criteria for Class 3 components, Class 1 criteria are referenced. IWB-3000 specifies that for inservice volumetric and surface examinations, acceptance for continued service shall be in accordance with IWB-3132, "Acceptance."

Paragraph IWB-3132.4, "Acceptance by Analytical Evaluation," specifies the conditions applicable to PG&E's analytical acceptance of the defect in Line 567.

*(a) Components whose volumetric or surface examination reveals flaws that exceed the acceptance standards listed in Table IWB-3410-1 shall be acceptable for service without the flaw removal, repair, or replacement if an analytical evaluation, as described in IWB-3600, meets the acceptance criteria of IWB-3600.*

*(b) Where the acceptance criteria of IWB-3600 are satisfied, the area containing the flaw shall be subsequently reexamined in accordance with IWB-2420(b) and (c).*

Paragraph IWB-3620, "Acceptance Criteria for Ferritic Components, Less than 4 in. in Thickness," specifies that the criteria of IWB-3610, "Acceptance Criteria for Ferritic Steel Components 4 in. and Greater in Thickness," may be used for the evaluation.

Paragraph IWB-3134, "Review by Authorities,"

*(b) Analytical evaluation of examination results as required by IWB-3132.4 shall be submitted to the regulatory authority having jurisdiction at the plant site.*

#### Alternatives

ASME Code, Section XI, paragraph IWB-3132, specifies that flaws may be accepted by repair, replacement, or evaluation.

Weld repair or replacement would require flaw removal, welding, inspection, and pressure testing of the AFW system. This work would require draining of the AFW piping, breaching of the system, welding, inspecting, and pressure testing the system and would require the system to be inoperable for approximately 4 days. The repair activities would provide no increase in plant or public safety, as the result would be a system equally able to perform all design functions as that presently installed.

Based upon acceptance of the fracture mechanics analysis performed, PG&E has accepted the defective condition as allowed by IWB-3132.4 for continued operation.

#### Justification for Acceptance

Analytical evaluation of the flaw was performed using linear elastic fracture mechanics, assuming pressure plus deadload in addition to 250 cycles of future seismic and thermal loading corresponding to the remaining plant life. The predicted crack growth was 0.001 inch. Therefore, this flaw meets the ASME Section XI allowable size criteria of IWB-3620 and IWB-3610 and the line is acceptable for continued service.

The indication will be reexamined during the Unit 2 tenth refueling outage (2R10). No additional examinations are planned if the 2R10 examination verifies that there is no flaw growth. The requirement of IWB 2420 (b) and (c) to examine the flaw during the next three inspection periods will not be implemented because this is a Class 3 item that contains a manufacturing defect that has been in service since plant start up.

#### Implementation Schedule

The analytical method of acceptance specified in ASME Code 1989 Edition, Section XI, paragraph IWB-3132.4, has been implemented by DCPD for the AFW pumps recirculation header, piping Line 567.

The results of the analytical evaluation performed to accept the flaw identified in Line 567 are provided for NRC review in accordance with ASME Code 1989 Edition, Section XI, paragraph IWB-3134.