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PG&E Letter DCL-13-078

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

10 CFR 50.55a

Docket No. 50-275, OL-DPR-80  
Diablo Canyon Power Plant Unit 1  
Response to NRC Request for Additional Information Regarding Request for Relief  
NDE-RCS-SE-1R18 to Allow Use of Alternative Depth Sizing Criteria

Reference: 1. PG&E Letter DCL-13-038, "ASME Section XI Inservice Inspection Program Relief Request NDE-RCS-SE-1R18 to Allow Use of Alternative Depth Sizing Criteria," dated April 11, 2013

In Reference 1, Pacific Gas and Electric Company (PG&E) submitted a request for relief to use an alternate root mean square error criteria for sizing flaws that are greater than the requirements of American Society of Mechanical Engineers Code (ASME Code) Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds," and ASME Code Case N-696, "Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface" at Diablo Canyon Power Plant, Unit 1.

The NRC Staff provided a request for additional information (RAI) via e-mail, dated July 9, 2013. The Enclosure to this letter provides PG&E's response to the NRC RAI.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter.

If you have any questions or require additional information, please contact Mr. Tom Baldwin at (805) 545-4720.

Sincerely,

Barry S. Allen



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Enclosure

cc: Diablo Distribution

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State of California, Department of Occupational Safety and Health,

Pressure Vessel Unit

PG&E Response to NRC Request for Additional Information Regarding Request for Relief NDE-RCS-SE-1R18 to Allow Use of Alternative Depth Sizing Criteria

**NRC Question 1:**

*No procedures or personnel are able to depth-size cracks with an RMS error of 0.125 inches or less from the inner diameter for dissimilar metal or austenitic welds; however, there are procedures and personnel qualified to examine and depth-size these welds from the outer diameter. Please describe the difficulties (if any) in inspecting the subject welds from the outer diameter of the welds.*

**PG&E Response:**

Access and General Considerations

The outside diameter (OD) of the Diablo Canyon Power Plant Unit 1 reactor safe-end welds can only be accessed through removable covers in the refueling cavity floor that lead to an annulus that surrounds the reactor vessel. The annulus is a relatively confined area and does not allow unrestricted work access to the welds. Attempts to reduce dose levels by shielding are impractical due to the essentially omnidirectional source from the reactor and coolant piping.

OD examination of the reactor nozzle to safe-end welds and safe-end to reactor coolant system (RCS) piping welds are addressed separately below.

Reactor Nozzle to Safe-End Welds

Automated Examination

The 8 nozzle to safe-end dissimilar metal welds are accessible for OD examination. The American Society of Mechanical Engineers (ASME) Section XI, Appendix VIII, Supplement 10 qualified vendor has estimated that automated OD examination of the nozzle to safe-end welds would require 6 man-hours of duration for each of the 8 welds, in the annulus area. The 6 hour duration includes various inspection-related activities, including installation and removal of scanner tracks, search unit tending and change out, and calibrations.

Review of previous reactor annulus work activities indicates that the average dose accrual rate to be approximately 0.050 rem per hour. Based on the 6 man-hour annulus time per weld estimate, the accumulated dose for automated examinations of the eight welds would be 2.4 rem.

When the related support activities such as access cover removal/restoration, insulation removal/restoration, radiation protection support, etc. are included, the total dose estimate for automated examination of reactor nozzle to safe-end welds is 3.45 rem.

### Manual Examination

Qualified manual examination of the reactor nozzle to safe-end dissimilar welds from the OD is possible; the dose estimate based on historical data exceeds 4.25 rem for examination and related support activities for these eight welds.

### Safe-End to RCS Piping Welds

#### Automated Examination

The four hot leg safe-end to RCS pipe welds are accessible from the OD for examination. PG&E estimates that automated examination of these four welds would accrue dose at a rate similar to the nozzle to safe-end welds for a total dose of 1.2 rem.

The four cold leg safe-end to RCS pipe welds join to cast elbows; the OD configuration of the welds and elbows are not suitable for OD examination. Furthermore, no ASME XI, Appendix VIII ultrasonic examination techniques have been qualified for OD detection or sizing through cast austenitic material. Examination of these welds would therefore be limited to the axial direction from the safe-end side only. PG&E estimates that accumulated dose for OD automated examination of these four welds would be 0.8 rem since examination is limited to a single side.

When including the related support activities such as insulation removal/restoration, radiation protection support, etc., the total dose estimate for automated examination of safe-end to RCS piping welds is 2.15 rem.

#### Manual Examination

Qualified manual examination of the hot leg safe-end and one side of the cold leg safe-end welds from the OD is possible although cold leg examinations are limited for the same reasons as automated examinations. PG&E estimates a total exposure of 2.55 rem for manual OD examination of these eight safe-end to RCS piping welds.

### Generic Examination Related Issues

Safe-end OD examinations result in added risk to plant equipment. The small diameter annulus personnel access portals also house the ex-core nuclear instrumentation cabling which is vulnerable to damage from contact with personnel or equipment. The multiple entries/exits with tracks, scanners, and related equipment pose an incremental damage threat to safety related equipment that is likely to be required to be in-service during examinations.

### Conclusion

The estimates of 5.6 rem total exposure associated with automated OD examinations and the 6.8 rem for manual OD examination of the 16 subject welds far exceeds the very small incremental exposure increase associated with automated inside diameter examinations (estimated by PG&E to be 0.1 rem) when included with the end of interval reactor vessel examination.

Limited examination coverage of the safe-end to cast elbow welds and increased risk to plant equipment are also significant considerations, in addition to as low as is reasonably achievable concerns that are described in this request for additional information response.