

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

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

## OF THE SECOND TEN YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

## **REQUEST FOR RELIEF PRS-1B**

### PACIFIC GAS AND ELECTRIC COMPANY

#### DIABLO CANYON POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

### **1.0** INTRODUCTION

The Technical Specifications (TS) for Diablo Canyon Power Plant, Units 1 and 2 states that the inservice inspection of the American Society of Mechanical Engineers (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). Section 50.55a(a)(3) of 10 CFR Part 50 states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

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 inservice examination of components and system pressure tests conducted during the first ten-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) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Diablo Canyon Power Plant, Units 1 and 2, second ten-year inservice inspection (ISI) interval is the 1989 Edition. Pursuant to 10 CFR 50.55a(g)(5), 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.

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requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative 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.

In a letter dated November 19, 1996, Pacific Gas and Electric Company submitted the Diablo Canyon Power Plant, Units 1 and 2, second 10-year interval inservice inspection program. The licensee submitted Relief Request PRS-1B (subpart of Relief Request PRS-1, which was submitted as a request for relief in the program) for expedited review in a letter dated May 2, 1997. This safety evaluation (SE) provides an evaluation of Relief Request PRS-1B.

#### 2.0 EVALUATION

The staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has evaluated the information provided by the licensee in support of its Second Ten-Year Inservice Inspection Interval Program Plan Request for Relief PRS-1B for Diablo Canyon Power Plant, Units 1 and 2. Based on the information submitted, the staff adopts the contractor's conclusions and recommendations presented in the attached Technical Letter Report (TLR).

For Relief Request PRS-1B, the Code, Paragraph IWA-5242(a), System Pressure Tests for Insulated Bolted Connections, requires that for systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure-retaining bolted connections for a direct VT-2 visual examination.

The licensee has proposed an alternative in accordance with 10 CFR 50.55a(a)(3)(i), regarding the insulation removal requirements for the pressurizer relief valves. The licensee stated:

"Following return to NOP/NOT, the system leakage test (or system hydrostatic test) on the relief valves will be performed with a 4 hour hold time to assure that any leakage will be detectable without the removal of the insulation. The pressurizer relief valve joint insulation will not be removed for performance of VT-2 visual examination until the next scheduled maintenance on the relief valves during the following refueling outage, as allowed per Code Case N-533."

The licensee has proposed to implement the alternative to Code requirements contained in Code Case N-533, Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections, for the pressurizer relief valve bolted connections. This Case allows the VT-2 visual examination to be performed in conjunction with startup following a 4-hour hold time at operating pressure with the insulation in place. A VT-2 visual examination is then performed each refueling outage during cold . . •

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shutdown with the insulation removed. Use of this Case will significantly reduce the personnel hazards associated with the extreme heat and the radiation exposure potential required to perform the VT-2 with the insulation removed and subsequent replacement of the insulation prior to the run cycle.

When the examination of pressurizer relief valve bolted connections is performed in accordance with Code Case N-533, the joints are VT-2 visually examined at operating pressure with the insulation in place during the startup pressure test and again each refueling outage with the insulation removed. Based on this frequency of examinations, the staff concludes that the bolted joint integrity will be verified at the same frequency currently required by the Code. Significant leakage during the pressure test would be detected by the VT-2 visual examination performed with the insulation in place. Therefore, the staff concludes that an acceptable level of quality and safety is provided by the proposed alternative.

### 3.0 <u>CONCLUSION</u>

Based on the information provided, the staff has concluded that the proposed alternative to use Code Case N-533, for the pressurizer relief value bolted connections provides an acceptable level of quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the Diablo Canyon Power Plant, Units 1 and 2.

Attachment: Technical Letter Report

Principal Contributor: T. McLellan

Date: May 23, 1997

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ATTACHMENT

## TECHNICAL LETTER REPORT ON THE SECOND 10-YEAR

## INSERVICE INSPECTION INTERVAL

## **REQUEST FOR RELIEF PRS-1B**

## PACIFIC GAS AND ELECTRIC COMPANY

### DIABLO CANYON POWER PLANT, UNITS 1 AND 2

### DOCKET NUMBERS 50-275 & 50-323

### 1.0 INTRODUCTION

By letter dated November 19, 1996, the licensee submitted the Diablo Canyon Power Plant, Units 1 and 2, second 10-year interval inservice inspection program. In a letter dated May 2, 1997, the licensee submitted Relief Request PRS-1B (subpart of Relief Request PRS-1, which was submitted as a request for relief in the program) for expedited review. This Technical Letter Report provides expedited evaluation of Relief Request PRS-1B. The Idaho National Engineering and Environmental Laboratory (INEEL) staff has evaluated the subject request for relief in the following section:

## 2.0 EVALUATION

The Code of record for the Diablo Canyon Power Plant, Units 1 and 2, second 10-year interval is the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition. The information provided by the licensee in support of the request has been evaluated and the basis for disposition is documented below.

<u>Relief Request PRS-1B, IWA-5242(a), System Pressure Tests for Insulated</u> <u>Bolted Connections</u>

<u>Code Requirement</u>: IWA-5242(a) states that, for systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure-retaining bolted connections for a direct VT-2 visual examination.

<u>Licensee's Proposed Alternative</u>: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative to the insulation removal requirements for the pressurizer relief valves. The licensee stated: •

"Following return to NOP/NOT, the system leakage test (or system hydrostatic test) on the relief valves will be performed with a 4 hour hold time to assure that any leakage will be detectable without the removal of the insulation. The pressurizer relief valve joint insulation will not be removed for performance of VT-2 visual examination until the next scheduled maintenance on the relief valves during the following refueling outage, as allowed per Code Case N-533."

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# Licensee's Basis for the Proposed Alternative (as stated):

"At the completion of each refueling outage, prior to startup, a system leakage test (or system hydrostatic test) is required per IWB-5221 (or IWB-5222). This test will include the pressurizer relief valve joints which are normally insulated; therefore, the Code would require the insulation be removed for VT-2 visual examination.

"Code Case N-533 modifies the requirement for removal of insulation while pressurized and allows the removal of insulation and inspection of the bolted connections to be conducted after depressurization. The pressurizer relief valves are located at the top of the pressurizer on approximately the 165' elevation. The valves are bolted to the loop seal piping flanges using 1 3/8" diameter SA 564 Type 630 bolting. The environment in this application is not conducive to primary water stress corrosion cracking of this bolting material.

"The pressurizer relief valve insulation is critical in maintaining design basis temperature profiles in the pressurizer loop seal as required in NUREG 0737. The loop seal and its associated pressurizer nozzle is designed to provide a water seal under the safety valve seat. Condensate accumulates in this loop as a result of normal heat losses to ambient, forming the water seal in the looped piping. Temperature requirements for the loop seals are based on keeping the water on the loop seal near saturation temperature and at a lower density. This minimizes water hammer and allows most of the water to flash to steam when discharged through the safety valves, thus protecting the downstream piping from extreme stresses. The insulation surrounding the looped piping is designed to maintain the loop seal water temperature above 260°F and valve body temperatures to less than 350°F to meet these temperature requirements. Experience at Diablo Canyon Power Plant (DCPP) has found that establishing the proper temperature profiles requires precise installation of the insulation."

"Removal/replacement of this insulation poses considerable personnel hazards due to the limited accessibility and high operating temperatures. At normal operating temperature and pressure the pressurizer cubicle ambient temperature runs approximately 130°F. This requires personnel to use welder's gloves and protective footwear to avoid melting rubber anticontamination gloves and boots. Coupled with the narrow ladder access from the 140' elevation, this posed severe risks to personnel hauling insulation up the ladder and working in cumbersome protective apparel in this hot environment to reinstall insulation. Removal and reinstallation of the insulation in these extreme environmental conditions is impractical and would increase the potential for installation errors and personnel injury."

"The examinations conducted at NOP/NOT after a 4 hour hold time, as mandated by the previous Section XI Code edition used by DCPP, provide adequate assurance of detecting conditions that may be adverse to quality. The use of Code Case N-533 provides a reasonable approach to maintaining a high level of examination sensitivity without the hazards involved with insulation removal and replacement at high temperatures and pressures."

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"Requiring removal of the insulation for direct VT-2 is impractical and would cause an extreme burden on PG&E with no increase in quality and no commensurate benefit to health and safety of the public."

<u>Evaluation</u>: The licensee has proposed to implement the alternative to Code requirements contained in Code Case N-533, Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections, for the pressurizer relief valve bolted connections. This Case allows the VT-2 visual examination to be performed in conjunction with startup following a 4-hour hold time at operating pressure with the insulation in place. A VT-2 visual examination is then performed each refueling outage during cold shutdown with the insulation removed. Use of this Case will significantly reduce the personnel hazards associated with the extreme heat and the radiation exposure potential required to perform the VT-2 with the insulation removed and subsequent replacement of the insulation prior to the run cycle.

When the examination of pressurizer relief valve bolted connections is performed in accordance with Code Case N-533, the joints are VT-2 visually examined at operating pressure with the insulation in place during the start-up pressure test and again each refueling outage with the insulation removed. Based on this frequency of examinations, it can be concluded that the bolted joint integrity will be verified at the same frequency currently required by the Code. Significant leakage during the pressure test, would be detected by the VT-2 visual examination performed with the insulation in place. Therefore, it is concluded that an acceptable level of quality and safety is provided by the proposed alternative.

### 3.0 CONCLUSION

The INEL staff has reviewed the information provided by the licensee in support of the proposed alternative. The licensee proposes to implement Code Case N-533 for the examination of the pressurizer relief valve bolted connections. Based on the information provided, it has been determined that the proposed alternative, use of Code Case N-533, for the pressurizer relief valve bolted connections provides an acceptable level of quality and safety. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for Diablo Canyon Power Plant, Units 1 and 2. •

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