September 28, 2000

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

SUBJECT: DIABLO CANYON POWER PLANT UNITS 1 AND 2 - SAFETY EVALUATION FOR INSERVICE INSPECTION RELIEF REQUESTS - #CNT-E1, #CNT-E2, #CNT-E3, #CNT-E4, #CNT-E5, AND #CNT-L1 REGARDING CONTAINMENT EXAMINATION REQUIREMENTS (TAC NOS. MA8630 AND MA8631)

Dear Mr. Rueger:

By letter dated March 31, 2000, as supplemented by letters dated June 16, July 12, and September 8, 2000, Pacific Gas and Electric Company submitted relief requests for the Containment Inspection Program, for the second 10-year interval for Diablo Canyon Power Plant, Units 1 and 2, Inservice Inspection (ISI) Program. The NRC staff reviewed the proposed alternative examinations against the containment examination requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI, 1992 Edition through 1992 Addenda of Section XI. Subsections IWE and IWL of the ASME Code Section XI provide the ISI requirements for Class MC (metallic containments, including the metallic liners of Class CC containments) and Class CC (concrete containment) components, respectively.

The alternatives proposed in relief requests #CNT-E3, #CNT-E4, #CNT-E5, and #CNT-L1 are authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that they provide an acceptable level of quality and safety. The alternatives proposed in relief requests #CNT-E1 and #CNT-E2 are authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The ISI program relief requests, which are authorized herein, are acceptable for implementation beginning with the first inspection interval of the second ten-year interval that commenced prior to the end of the first inspection period (September 8, 2001).

The NRC staff's evaluation and conclusions are contained in the enclosed safety evaluation.

Sincerely,

/RA/

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

Docket Nos. 50-275
and 50-323

Enclosure: Safety Evaluation

cc w/encl: See next page

The NRC staff's evaluation and conclusions are contained in the enclosed safety evaluation.

Sincerely,

/RA/

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

Docket Nos. 50-275
and 50-323

Enclosure: Safety Evaluation

cc w/encl: See next page

DISTRIBUTION:
PUBLIC
PDIV-2 Reading
SRichards (RidsNrrDlpmLpdiv)
EPeyton (RidsNrrLAEPeyton)
SBloom (RidsNrrPMSBloom)
OGC (RidsOgcRp)
ACRS (RidsAcrsAncwMailCenter)
LSmith, Region IV
EImbro
HAshar
GHill (4)
DLange, EDO

Accession No. ML003755754 *See Previous Concurrence

OFFICE	PDIV-2/PM	PDIV-2/LA	EMEB/BC*	OGC	PDIV-2/SC
NAME	SBloom:lcc	EPeyton	EImbro	KBarber	SDembek
DATE	09/13/00	09/13/00	08/18/00	09/15/00	09/28/00

OFFICIAL RECORD COPY

cc:
NRC Resident Inspector
Diablo Canyon Nuclear Power Plant
c/o U.S. Nuclear Regulatory Commission
P.O. Box 369
Avila Beach, CA 93424

Dr. Richard Ferguson, Energy Chair
Sierra Club California
1100 11th Street, Suite 311
Sacramento, CA 95814

Ms. Nancy Culver
San Luis Obispo
Mothers for Peace
P.O. Box 164
Pismo Beach, CA 93448

Chairman
San Luis Obispo County Board of
Supervisors
Room 370
County Government Center
San Luis Obispo, CA 93408

Mr. Truman Burns
Mr. Robert Kinosian
California Public Utilities Commission
505 Van Ness, Room 4102
San Francisco, CA 94102

Mr. Steve Hsu
Radiologic Health Branch
State Department of Health Services
P.O. Box 942732
Sacramento, CA 94327-7320

Diablo Canyon Independent Safety
Committee
ATTN: Robert R. Wellington, Esq.
Legal Counsel
857 Cass Street, Suite D
Monterey, CA 93940

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Harris Tower & Pavilion
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Christopher J. Warner, Esq.
Pacific Gas & Electric Company
Post Office Box 7442
San Francisco, CA 94120

Mr. David H. Oatley, Vice President
Diablo Canyon Operations and
Plant Manager
Diablo Canyon Nuclear Power Plant
P.O. Box 3
Avila Beach, CA 93424

Telegram-Tribune
ATTN: Managing Editor
1321 Johnson Avenue
P.O. Box 112
San Luis Obispo, CA 93406

Mr. Ed Bailey, Radiation Program Director
Radiologic Health Branch
State Department of Health Services
P.O. Box 942732 (MS 178)
Sacramento, CA 94327-7320

Mr. Robert A. Laurie, Commissioner
California Energy Commission
1516 Ninth Street (MS 31)
Sacramento, CA 95814

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, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated March 31, 2000, as supplemented by letters dated June 16, July 12, and September 8, 2000, Pacific Gas and Electric Company (the licensee) proposed alternatives to the requirements of IWE and IWL of the ASME Boiler and Pressure Vessel Code Section XI requirements for inservice inspection for Diablo Canyon Nuclear Power Plant, Units 1 and 2.

2.0 BACKGROUND

In the *Federal Register* dated August 8, 1996, the Commission amended Section 50.55a of Title 10 of the *Code of Federal Regulations* (10 CFR 50.55a) to incorporate by reference Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (the Code), 1992 Edition through 1992 Addenda of Subsections IWE and IWL. Subsection IWE provides the requirements for inservice inspection (ISI) of Class MC (metallic containment) components and the metallic liner of Class CC (concrete containment) components. Subsection IWL provides the requirements for ISI of Class CC components.

The regulations require that ISI of certain Code Class MC and CC components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (g)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility.

Pursuant to 10 CFR 50.55a(g)(6)(ii)(B), for ASME Code Class MC And CC components (including integral attachments of MC and metallic liners of CC components), licensees will expedite the ISI requirements of Subsection IWE and IWL of the 1992 Edition with the 1992 Addenda and complete the first inspection by September 9, 2001. Section 50.55a(g)(6)(ii)(B)(1) states that the inservice examinations specified for the first period of the first inspection interval in Subsection IWE of the 1992 Edition and addenda as modified in

10 CFR 50.55a(b)(2)(x) will serve the same purpose for operating plants as the preservice examination. Section 50.55a(g)(6)(ii)(B)(2) allows licensees to implement the inservice examinations which correspond to the number of years of operation which are specified in Subsection IWL of the 1992 Edition and addenda as modified in 10 CFR 50.55a(b)(2)(ix) and will serve the same purpose for operating plants as the preservice examination specified for plants not yet in operation.

3.0 EVALUATION

3.1 Relief Request #CNT-E1

The licensee requests relief from the requirements of IWE-2500, Table-IWE 2500-1, Category E-D, Item Numbers E5.10 and E5.20. The Code requires seal and gaskets on airlocks, hatches, and other devices including penetrations to be visually examined, VT-3, once each interval to ensure containment leak-tight integrity. The licensee proposes to use 10 CFR 50, Appendix J, Option B testing to assure leak-tight integrity. This relief request applies to (1) electrical penetrations fitted with seal assemblies, (2) air lock door seals, including door operating mechanism penetrations which are part of the containment pressure boundary, (3) containment penetrations whose design incorporates resilient seals, gaskets, sealant compounds or flexible metal seal assemblies, and (4) doors with resilient seals or gaskets except for seal-welded doors.

3.1.1 Licensee's Basis for Requesting Relief (as stated):

> Practical VT-3 visual examination considerations of these seals and gaskets would require the joints to be disassembled, since many of the surfaces of seals and gaskets are normally inaccessible. The ASME Code Committee recognized that disassembly of the joints to perform visual examinations was not warranted, and the 1998 Edition of ASME Section XI removed the examination requirement. The proposed alternative examination (Appendix J, Option B) provides a periodic, non-intrusive test method which will ensure that the integrity of the seals and gaskets is being maintained.
>
> As noted in 10 CFR 50 Appendix J, the purpose of the testing is to ensure that leakage of containment penetrations whose design incorporates resilient seals, gaskets, sealant compounds, and electrical penetrations fitted with seal assemblies remains below established limits. Damage to seals or gaskets, which could affect containment integrity, is best detected with this type of test and will be performed as follows:
>
> - Electrical Penetrations And Containment Penetrations Whose Design Incorporates Resilient Seals, Gaskets, Or Sealant Compounds:
>
> Those penetrations that are not disassembled during the 10-year interval will receive an Appendix J, Option B test at least once in the 10-year interval. For those penetrations that are disassembled or opened, an Appendix J test is required upon final assembly (prior to start-up).

Additionally, if a seal (including O-rings) or gasket is replaced, it will be visually inspected by maintenance personnel before re-assembly or closure. These tests and inspections will assure the leak tightness of primary containment and provide an acceptable level of quality and safety.

- Airlocks and the Containment Equipment Hatch:

  The personnel airlocks are opened as needed for routine operations access and during refueling outages. Prior to final closure, the accessible portions of gaskets and the door sealing faces are inspected for damage that could affect the leak tightness of the seal. If gasket replacement is necessary, the new gasket will be visually inspected by maintenance personnel before reassembly or closure. Door seals will be Appendix J tested in accordance with Technical Specification requirements within seven days of opening and once every 30 days during periods of frequent opening.

The Containment Equipment Hatch is normally removed during refueling outages. If gasket replacement is necessary, the new gasket will be visually inspected by maintenance personnel before reassembly or closure. Prior to establishing containment integrity following the refueling outage, the containment equipment hatch is leak rate tested in accordance with Appendix J.

These tests and inspections will assure the leak tightness of primary containment and provide an acceptable level of quality and safety.

3.1.2 Proposed Alternative

The leak-tightness of the seals and gaskets identified above will be tested in accordance with 10 CFR 50, Appendix J. If a seal or gasket becomes visually accessible, it will be visually inspected by maintenance personnel before reassembly or closure and 10 CFR Part 50, Appendix J leakage testing.

3.1.3 Evaluation

The Code requires that seals and gaskets on airlocks, hatches, and other devices be VT-3 visually examined once each interval to assure containment leak-tight integrity. The licensee proposes to use 10 CFR Part 50, Appendix J, Option B Type B testing as a verification of containment integrity rather than disassembly and reassembly of the subject components for the sole purpose of examination. The 1993 Addenda to Section XI has recognized that disassembly of the subject component to visually examine the seals and gaskets is unwarranted. The staff agrees that the functionality of the containment penetration seals and gaskets would be verified during the Type B testing as required by 10 CFR Part 50, Appendix J.

On the basis discussed above, the staff concludes that the alternative proposed by the licensee will provide reasonable assurance of the functionality and integrity of the containment

penetration seals and gaskets during the testing required by 10 CFR Part 50, Appendix J. Therefore, the staff authorizes the use of the proposed alternative pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the Code would result in hardship without a compensating increase in the level of quality and safety.

3.2 Relief Request #CNT-E2

The licensee requests relief from the requirements of IWE-2420(b). The Code requires that when component examination results require evaluation of flaws, areas of degradation, or repairs in accordance with IWE-3000, and the component is found to be acceptable for continued service, the areas containing such flaws, degradation, or repairs shall be reexamined during the next inspection period listed in the schedule of the inspection program of IWE-2411 or IWE-2412, in accordance with Table IWE-2500-1, Examination Category E-C. This relief applies to Class MC metallic components.

3.2.1 Licensee's Basis for Requesting Relief (as stated):

> The purpose of a repair is to restore the component to an acceptable condition for continued service in accordance with the acceptance standards of IWE-3000. When making repairs, IWA-4150 requires the owner to conduct an evaluation of the suitability of the repair including consideration of the cause of failure.
>
> Repairs are performed in accordance with IWA-4000, the intent of which is to use the construction code to restore the component to its original condition where practical. If a repair has restored the component to an acceptable condition, successive examinations are not warranted. If the repair was not suitable, then the repair does not meet code requirements and the component is not acceptable for continued service; further repair work would be necessary. No similar requirement is found for Class 1, 2, or 3 ASME Section XI repairs. Conducting successive examinations on components that have been repaired would result in hardship without a compensating level of quality and safety. In addition, if the repair area is subject to accelerated degradation, the repair would still require augmented examination in accordance with Table IWE-2500-1, Examination Category E-C.

3.2.2 Proposed Alternative

Repairs will be performed in accordance with IWA-4000, to restore the component to an acceptable condition. Successive examinations as required by IWE-2420(b) will not be performed; however, successive examinations will continue to be done on those flaws or areas of degradation which have been accepted for continued service by evaluation.

3.2.3 Evaluation

Paragraph IWE-2420(b) requires that when examination results in evaluation of flaws or areas of degradation (per IWE-3000), and the component is acceptable for continued service, or when examinations result in performance of a repair/replacement activity, the items containing such flaws, areas of degradation, or areas subjected to a repair/replacement, will be re-

examined during the next inspection period. The licensee is proposing not to perform any reexaminations on repaired components during the next or successive inspection periods. However, the licensee will perform successive examinations on those flaws or areas of degradation which have been accepted for continued service by evaluation (IWE-2420(c)).

The staff finds that when repairs are complete, IWA-4150 requires licensees to evaluate the suitability of the repair. When a repair is required because of failure of an item, the evaluation will consider the cause of failure to ensure that the repair is suitable. Considering that the failure mechanism is identified and corrected as required and the repair receives pre-service examinations, as required, the proposed alternative will provide reasonable assurance of structural integrity. In doing this, the requirements of successive examinations are deemed to be unnecessary. Furthermore, IWB-2420(b), IWC-2420(b), and IWD-2420(b) do not require the successive inspection of repairs for ASME Code Class 1, 2, and 3 components as required in IWE-2420(b) for ASME Code Class MC components. The staff authorizes the use of the licensee's proposed alternative pursuant to 10 CFR 50.55a(a)(3)(ii), on the basis that compliance with the specific code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.3 Relief Request #CNT-E3

The licensee requests relief from the requirements of IWE-2500, Table IWE-2500-1, Category E-G, Item 8.20 for all Class MC pressure-retaining bolts. The Code requires bolt torque or tension testing on bolted connections that have not been disassembled and reassembled during the inspection interval. This relief applies to (1) bolted flanges on containment airlocks, (2) bolted flanges on small piping penetrations, and (3) bolted flanges on electrical penetrations.

3.3.1 Licensee's Basis for Requesting Relief (as stated):

> ASME Section XI, 1992 Edition, 1992 Addenda requires bolt torque or tension testing on IWE bolted connections that have not been disassembled and reassembled during the inspection interval, but does not require similar tests on any other ASME Section XI Class 1, 2, or 3 bolted connections. This type of testing was removed from the 1998 ASME Section XI Code.
>
> Bolted flanges on containment airlocks and bolted flanges on small piping penetrations each receive a 10 CFR Part 50, Appendix J, leak-rate test. The performance of the 10 CFR Part 50, Appendix J test itself proves that the bolt torque or tension remains adequate to provide a leak-rate that is within acceptable limits. The torque or tension value of bolts only becomes an issue if the leak-rate is excessive. Once a bolt is torqued or tensioned, it is not subject to dynamic loading that could cause it to experience significant change. Appendix J testing and visual inspection is adequate to demonstrate that the design function is met.

3.3.2 Proposed Alternative

The following examinations and tests required by Subsection IWE ensure the structural integrity and the leak-tightness of Class MC pressure-retaining bolting, and, therefore, no additional alternative examinations are proposed:

(1) Accessible, exposed surfaces of bolted connections shall be visually examined (VT-1) in accordance with the requirements of Table IWE-2500-1, Examination Category E-G, Pressure-retaining Bolting, Item No. E8.10, and

(2) Bolted connections shall meet the pressure test requirements of Table IWE-2500-1, Examination Category E-P, All Pressure-retaining Components (10 CFR Part 50, Appendix J, leak-rate test).

3.3.3 Evaluation

The Code requires that the pressure-retaining bolting that has not been disassembled and reassembled during the inspection interval be torque or tension tested. This examination is used to aid in the determination that a leak-tight seal exists and that the structural integrity of the subject bolted connection is maintained. The licensee proposed to use VT-1 visual examination once each inspection interval as required by Examination Category E-G, Item 8.10 and the 10 CFR Part 50, Appendix J leak rate testing as an alternative to the Code requirement to verify the integrity of the penetrations with bolted connections. The performance of Appendix J, Type B testing will prove that the bolt torque or tension remains adequate to provide a leak rate that is within acceptable limits. Appendix J testing and the VT-1 visual examination are adequate to demonstrate that the design function is met. In addition, overall containment leakage test in accordance with 10 CFR Part 50, Appendix J (Type A tests) will provide additional assurance that there is no significant leakage through the containment pressure boundary.

The adequacies of bolted connections are verified during Appendix J testing, or during routine disassembling and reassembling; therefore, the staff finds that the additional torque testing as per Table IWE-2500 (E8.20) is unwarranted. Moreover, the licensee's proposed alternative will provide an acceptable level of quality and safety. Therefore, the staff authorizes the licensee's proposed alternative in relief request #CNT-E3 pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that it provides an acceptable level of quality and safety.

3.4 Relief Request #CNT-E4

The licensee requests relief from the requirements of IWE-2200(g) for all Class MC components. IWE-2200(g) requires that when paint or coatings are reapplied, the condition of the new paint or coating shall be documented in the preservice examination records.

3.4.1 Licensee's Basis for Requesting Relief (as stated):

> The paint and coatings on the containment pressure boundary were not subject to Code rules when they were originally applied and are not subject to ASME Section XI rules for repair or replacement in accordance with IWA-4111(b)(5).

The Diablo Canyon Power Plant (DCPP) coating program, which is conducted in accordance with a quality assurance program meeting the requirements of 10 CFR 50, Appendix B, verifies the adequacy of applied coatings. Recording the condition of reapplied coating in the preservice record does not substantiate the containment structural integrity. However, PG&E acknowledges that the quality and integrity of coatings applied is relevant to the containment's functional integrity. This assurance is best accomplished by visually inspecting the coating, which is accomplished through the DCPP Qualified Coatings Program. Should deterioration of the coating in the reapplied area occur, the area would require additional evaluation regardless of the preservice record. Recording the condition of new paint or coating in the preservice records does not increase the level of quality and safety of the containment.

In NRC SECY 96-080, dated April 17, 1996, the Commission responded to Comment 3.2, which involves IWE-2200(g), by stating, "In the NRC's opinion, this does not mean that a visual examination must be performed with every application of paint or coating. A visual examination of the topcoat to determine the soundness and the condition of the topcoat should be sufficient."

The visual examination is currently accomplished through the DCPP Qualified Coatings Program.

3.4.2 Proposed Alternative

The reapplied paint and coatings on the containment vessel will be examined in accordance with the DCPP Qualified Coatings Program. If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. Although repairs to paint or coatings are not subject to the repair/replacement rules of ASME Section XI (ref. Code Interpretation XI-1-98-14), repairs to the primary containment boundary, if required, would be conducted in accordance with ASME Section XI Code rules.

3.4.3 Evaluation

The licensee has proposed to perform paint and coating examinations in accordance with existing plant requirements rather than documenting the condition of the new paint or coating on the preservice examination report as required by IWE-2200(g).

The licensee states that its coating program, which is applied and inspected in accordance with a quality assurance program that meets the requirements of 10 CFR Part 50, Appendix B, verifies the adequacy of applied coatings. Further, degraded coatings in the reapplied area would require additional evaluation regardless of the preservice record and its subsequent documentation in the preservice record does not increase the level of quality and safety of the containment.

The licensee's nuclear coatings program, which meets the requirements of 10 CFR Part 50, Appendix B, provides a conservative approach to the inspection and documentation of new coatings. The staff finds the proposed alternative adequate for protecting the inside steel

surfaces of the containment. Therefore, the licensee's proposed alternative in relief request #CNT-E4 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that it provides an acceptable level of quality and safety.

3.5 Relief Request #CNT-E5

The licensee requests relief from the requirements of IWE-2500(b) for all painted or coated containment components prior to removal of paint or coatings. IWE-2500(b) requires that when paint or coatings are to be removed, the paint or coatings shall be visually examined in accordance with Table IWE-2500-1 prior to removal.

3.5.1 Licensee's Basis for Requesting Relief (as stated):

> Paint and coatings are not part of the containment pressure boundary under current Code rules because they are not associated with the pressure-retaining function of the component. The interiors of containment are painted to prevent corrosion and to aid in contamination removal efforts. Paint and coatings on the containment pressure boundary were not subject to Code rules when they were originally applied and are not subject to ASME Section XI rules for repair or replacement in accordance with IWA-4111(b)(5). Deterioration of the paint or coating materials, e.g., flaking, scaling, etc., on containment would be an indicator of potential degradation of the containment pressure boundary. Additional measures, such as VT-3 or VT-1 visual examination, ultrasonic measurement of remaining wall thickness, or evaluation by the responsible engineers, would be employed to determine the nature and extent of any degradation, if present. The application of ASME Section XI rules for removal of paint or coatings when unrelated to an ASME Section XI repair or replacement activity, does not provide a compensating increase in the level of quality and safety.

3.5.2 Proposed Alternative

The paint and coatings on the containment vessel will be examined in accordance with the DCPP Qualified Coatings Program. If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. Although repairs to paint or coatings are not subject to the repair/replacement rules of ASME Section XI based on the Code's response to Inquiry 97-22, repairs to the primary containment boundary, if required, would be conducted in accordance with ASME Section XI Code rules.

3.5.3 Evaluation

The licensee proposes to examine existing painted or coated components prior to removal under its Qualified Coatings Program. In addition, the licensee indicated that paint and coatings were not part of the Code rules when they were originally applied and are not subject to ASME Section XI rules for repair or replacement in accordance with IWA-4111(b)(5). However, if degradation of the coating is identified, the licensee has committed to implementing additional measures, such as VT-3 or VT-1 visual examination, ultrasonic measurement of

remaining wall thickness, or evaluation by the responsible engineers, to determine if the degradation will have an effect on the containment pressure boundary.

Based on the licensee's Qualified Coatings Program and the implementation of additional measures to determine if degraded paint or coatings will affect the containment pressure boundary, the staff considers the proposed alternative, as stated by the licensee, adequate for protecting the containment pressure boundary, and will provide an acceptable level of quality and safety. Therefore, the licensee's proposed alternative in relief request #CNT-E5 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that it provides an acceptable level of quality and safety.

3.6 Relief Request #CNT-L1

The licensee requests relief from the requirements of IWL-2310, "Visual Examination and Personnel Qualification," and IWA-2210, "Visual Examination," for the exterior concrete portion of the containment buildings. IWL-2310 and IWA-2210 of the 1992 Edition, 1992 Addenda of Section XI of the ASME Code require specific minimum illumination and maximum direct examination distance for all concrete surfaces and maximum procedure demonstration lower case character height requirements. The concrete portion of the containment buildings at DCPP Units 1 and 2 are subject to the rules and requirements for inservice inspection of Class CC components, Examination Category L-A, Concrete, Item L1.11, as applicable to IWL-2310 and IWA 2210.

3.6.1 Licensee's Basis for Requesting Relief (as stated):

> The VT-3 requirements specified in IWA-2210 and Table IWA-2210-1 were developed for the examination of components such as Class 1 pump and valve bodies, the Class 1 reactor pressure vessel interior, Class 3 welded attachments, and Class 1, 2, and 3 supports. VT-3 examinations are conducted to determine the general mechanical and structural condition of components and their supports by verifying parameters such as clearances, settings, and physical displacements. Additionally, VT-3 examinations are conducted to detect discontinuities and imperfections, such as loss of integrity at bolted or welded connections, loose or missing parts, debris, corrosion, wear, or erosion. For these Class 1, 2, and 3 components, small amounts of corrosion/erosion or small crack-like surface flaws may be detrimental to the structural integrity of the component.
>
> The existing 1989 Code rules which do not incorporate this level of detail have proven fully adequate to detect such relevant conditions in Class 1, 2 and 3 components and continue to be universally implemented for these examinations. However, it was recognized by the industry and the NRC during the development of the implementing rules in 10 CFR 50.55a that IWA-2210 and Table IWA-2210-1 requirements were excessively stringent for the IWE-required examination of the metal portion of the containment. Therefore, the NRC changed the requirements to allow that "When performing remotely the visual examinations required by Subsection IWE, the maximum direct distance specified in Table IWA-2210-1 may be extended and the minimum illumination requirements

specified in Table IWA-2210-1 may be decreased provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination."

PG&E has concluded that the use of the VT-3 requirements found in IWA-2210 and Table IWA-2210-1 when performing VT-3C examinations of the concrete surfaces is excessively stringent and should not be applied. This is based on the recognition that due to the nature of concrete, a concrete containment will have numerous, small "shrinkage-type" surface cracks or other imperfections that are not detrimental to the structural integrity of the containment. The application of IWA-2210 and Table IWA-2210-1 "minimum illumination requirements," "maximum direct visual examination distance requirements," and "maximum procedure demonstration lower case character height requirements," to attempt to identify these small "shrinkage-type cracks" or other imperfections is considered to be unnecessary and could result in a large number of manhours erecting scaffolding, using lifts, evaluating insignificant indications, etc.

Per the requirements of IWL-2320, the Registered Professional Engineer (RPE) is experienced in evaluating the inservice condition of structural concrete and is knowledgeable of the design and Construction Codes and other criteria used in design and construction of concrete containments. The RPE will use experience and training to determine the necessary examination distance and illumination to detect the conditions or indications for which the visual examination is performed. It is anticipated that most examinations will be conducted outside in daylight with or without optical aids such as binoculars. The procedures and equipment used will be demonstrated to the standards specified by the RPE using American Concrete Institute (ACI) 349.3R-96 as a guideline, to the satisfaction of the Authorized Nuclear Inservice Inspector for the examination of concrete surfaces.

The ASME standard 1/32 inch black line on an 18 percent neutral gray card will be used to assure ability to detect those conditions specified by the RPE under field conditions. The visual examinations will be performed in sufficient detail to identify areas of concrete deterioration and distress, such as defined in American Concrete Institute ACI 201.1R-92.

3.6.2 Licensee's Proposed Alternative (as stated):

VT-3C examinations will be performed as required by IWL-2310 except that instead of using the minimum illumination, maximum direct examination distance, and maximum procedure demonstration lower case character height requirements specified in IWA-2210 and Table IWA-2210-1 for VT-3 examinations, the recommendations of the RPE for illumination and distance, as described above, will be implemented. The examination system, either direct or remote, shall demonstrate ability to resolve a 1/32 inch black line on an 18 percent neutral gray test card on the examination surface or under similar conditions of illumination and distance as the test surface.

3.6.3 Evaluation

The licensee proposed an alternative to the requirements of IWL-2310, which invokes IWA-2210, Table IWA-2210-1, which specifies minimum illumination and maximum direct distances for visual examinations. The licensee indicated that the RPE would recommend the minimum illumination and maximum distances to complete the required containment visual examination. The licensee stated that the indications of interest would be detectable at the chosen distances and illumination as specified by the RPE. Furthermore, the licensee stated “The examination, either direct or remote, shall demonstrate ability to resolve a 1/32 inch black line on an 18 percent neutral gray test card on the examination surface or under similar conditions of illumination and distance as the test surface." Further, the procedures and equipment used would be demonstrated to the authorized nuclear inservice inspector (ANII) for the concrete examination, and the RPE will use the appropriate ACI standards ACI 349.3R-96 and ACI 201.1R-92 as guidance for defining and determining the acceptance criteria.

The staff finds that by having the licensee demonstrate the visual examination procedures to the satisfaction of the ANII will ensure that the illumination and distances the licensee has chosen are adequate to detect indications of interest. Furthermore, the fact that the licensee’s RPE will develop acceptance criteria for concrete degradation using the ACI standards ACI 201.1R-92 and ACI 349.3R-96 will ensure that the unacceptable flaws and degradation of concrete surfaces of the containment structures will be identified. Therefore, the staff authorizes the licensee’s proposed alternative in relief request #CNT-L1 pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that it provides an acceptable level of quality and safety.

4.0 CONCLUSION

The staff has evaluated the licensee’s submittal for DCPP, Units 1 and 2. The authorizing of alternatives or granting of relief is based upon fulfillment of any commitments made by the licensee in its basis for each relief request and the alternatives proposed. The implementation of the ISI program and relief requests is subject to inspection by the NRC.

The alternatives proposed in relief requests #CNT-E3, #CNT-E4, #CNT-E5, and #CNT-L1 are authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that they provide an acceptable level of quality and safety. The alternatives proposed in relief requests #CNT-E1 and #CNT-E2 are authorized pursuant to 10 CFR 50.55a(a)(3)(ii) 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 or safety.

Principal Contributor: S. Bloom

Date: September 28, 2000