

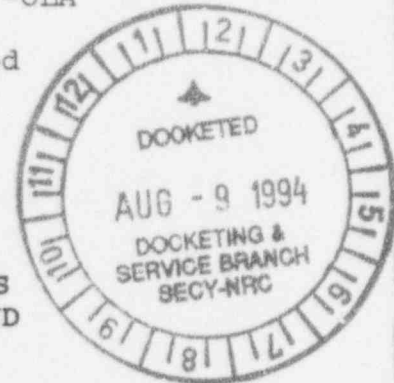
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of)	Docket Nos. 50-275-OLA	-2
Pacific Gas and Electric Company)	50-323-OLA	
Diablo Canyon Nuclear Power Plant)	Construction Period	
Units 1 and 2)	Recovery	
)	August 8, 1994	

SAN LUIS OBISPO MOTHERS FOR PEACE'S
RENEWED MOTION TO REOPEN THE RECORD
REGARDING PACIFIC GAS AND ELECTRIC COMPANY'S
APPLICATION FOR A LICENSE AMENDMENT TO EXTEND
THE TERM OF THE OPERATING LICENSE FOR THE
DIABLO CANYON NUCLEAR POWER PLANT



I. INTRODUCTION

Pursuant to 10 C.F.R. § 2.734, San Luis Obispo Mothers for Peace ("SLOMFP") hereby renews and reasserts its February 25, 1994, motion to reopen the record in this construction period recapture proceeding for Pacific Gas & Electric Company's ("PG&E's") Diablo Canyon nuclear power plant ("DCNPP"). In the February 25 motion, SLOMFP sought reopening of the record in order to introduce Inspection Report 93-36 (January 12, 1994), which identified numerous and significant problems related to the maintenance and surveillance of DCNPP's Auxiliary Saltwater ("ASW") cooling system: in effect, because PG&E's surveillance program for the ASW system was inadequate, PG&E did not discover that one of DCNPP's CCW heat exchangers had significant fouling, to the extent that it was beyond the design basis for cooling capacity. Inspection Report 93-36, Details at 7; see also

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Inspection Report 94-08, Details at 2 (March 16, 1994).¹ Thus, PG&E did not perform maintenance when it was necessary.

In LBP-94-9 (March 23, 1994), the Licensing Board dismissed SLOMFP's motion without prejudice, on the ground that the issues raised in Inspection Report 93-36 were as yet "unresolved," and thus currently did not provide an adequate basis for the motion. Slip op. at 4-5.

With the recent issuance of a Notice of Violation on July 14, 1994, (hereinafter "NOV"), the NRC appears to have concluded its enforcement review of the issues that initially were raised in Inspection Report 93-36.² The NOV confirms the existence of problems with PG&E's program for the surveillance of the ASW system, which the NRC considers "significant," and which clearly are relevant to the resolution of SLOMFP's Contention I regarding the adequacy of PG&E's maintenance and surveillance program. In addition, several other issues raised in Inspection Report 93-36 remain unaddressed or inadequately resolved. Accordingly, SLOMFP renews its motion to reopen the record, and seeks to introduce the various NRC documents which relate to the issues raised in Inspection Report 93-36. These documents are listed in Attachment B to this motion.

As described more fully below, SLOMFP satisfies the applicable criteria for reopening the record to introduce this

¹ Inspection Report 94-08 was served on the Board and parties via Board Notification 94-06 (March 17, 1994).

² The NOV was served on the Licensing Board and parties on July 22, 1994 by Ann P. Hodgdon, counsel to the NRC Staff.

new evidence. First, this motion is timely filed since it concerns recently issued NRC inspection reports, and thus could not have been raised before the record closed. Second, the new evidence raises significant safety and environmental issues because it concerns the adequacy of PG&E's ASW cooling system, which performs the essential safety function of cooling the reactor during certain design basis accidents, and because the deficiencies and misrepresentations of PG&E with respect to this system raise concerns about PG&E's overall maintenance and surveillance program. Finally, this new evidence is likely to affect the outcome of the case because it contradicts testimony at the hearing by PG&E and the NRC staff and because it corroborates many aspects of SLOMFP's position that PG&E's maintenance and surveillance program is inadequate. Moreover, the fact that PG&E appears to have misrepresented the operability of the ASW system and the status of its maintenance program implicates the integrity of PG&E's entire maintenance and surveillance program and the reliability of PG&E's testimony in this case.

II. BACKGROUND

A. The License Extension Proceeding

On July 9, 1992, PG&E applied for an operating license amendment to extend the term of its operating license for Unit 1 and Unit 2 so that the plant would have a full 40-year operating license term, starting from the dates that the operating licenses were issued for Units 1 and 2. SLOMFP timely petitioned to intervene and a hearing was held in August of 1993 on the issues

raised by SLOMFP's two admitted contentions, including the adequacy of PG&E's maintenance and surveillance program. SLOMFP introduced extensive evidence, in the form of PG&E correspondence, NRC inspection reports, and other documents, demonstrating a repetitive pattern of inadequacies in PG&E's maintenance program. The parties submitted Proposed Findings of Fact and Conclusions of Law, which are now under consideration by the Licensing Board.

B. Safety Significance of and Regulatory Requirements for The Auxiliary Salt Water System

One of the essential safety systems at DCNPP which must be monitored and maintained to ensure its adequate performance is the ASW system, also known as the service water system. The ASW system performs an important safety function because it serves as the "ultimate heat sink" for removal of heat from safety components in the event of a design basis accident. See Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment" (July 18, 1989), citing 10 C.F.R. Part 50, General Design Criterion ("GDC") 44.

Adequate surveillance and maintenance of the ASW system are specifically required by NRC regulations. Thus, the service water system must be designed "to permit appropriate periodic inspection of important components, such as heat exchangers and piping, to assure the integrity and capability of the system." Id., citing GDC 45. It must also be designed "to permit appropriate periodic pressure and functional testing." GDC 46.

NRC regulations at 10 CFR Part 50, Appendix B, Section XI, also require that "a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents."

C. Generic Letter 89-13

On July 18, 1989, the NRC issued Generic Letter 89-13, which described recurring industry problems related to "biofouling" of service water systems with large organisms such as clams and mussels ("macrofouling"), and small organisms such as algae ("microfouling"); as well as fouling by other agents such as mud, silt, and corrosion products. The generic letter requested that licensees and applicants follow five specific recommendations, or take "equally effective actions," to ensure that their service water systems comply and remain in compliance with GDC 44, 45, and 46, and 10 C.F.R. Part 50, Appendix B, Section XI. Id. at 4. These recommendations were:

I. "For open-cycle service water systems, implement and maintain an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling." . . .

II. "Conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by service water." . . .

III. "Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the

performance of the safety-related systems supplied by service water." . . .

IV. "Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant."

V. "Confirm that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety-related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively."

Id. at 4-6. All licensees, including PG&E, were required to advise the NRC whether they had established programs to implement the recommendations or pursued "an equally effective alternative course of action." Id. at 7.

PG&E responded with a a detailed discussion of how it would either implement the recommendations of Generic Letter 89-13 or establish equivalent alternatives. In response to Generic Letter 89-13's first recommendation for "an ongoing program of surveillance and control techniques to reduce the incidence of flow blockage problems as a result of biofouling," PG&E committed to "visually inspect the ASW intake structure during refueling outages," "install a continuous chlorination system," and "continue [PG&E's] existing program for monthly system flow testing." DCL-90-027, Enclosure at 1-3; Inspection Report 93-36, Details at 3. In DCL-91-286, PG&E stated that these commitments had been fulfilled. Letter No. DCL-90-027 (January 26, 1990).³ Inspection

³ Previous to the issuance of Generic Letter 89-13, the NRC had also expressed "concern" regarding the adequacy of PG&E's ASW system in Inspection Report 88-11 (June 17, 1988).

Report 93-36, cover letter at 1. Inspection Report 88-11 criticized PG&E for "inadequate knowledge of the plant system design bases" with respect to the ASW system. Inspection Report 88-11, cover letter at 1-2. The NRC found that in numerous instances, the design basis assumptions for the ASW system had not been fully implemented into plant procedures and alarm set points, thus "requiring a review" of the ASW's past operability. Id., Details at 17. Moreover, plant configuration and procedures did not consistently conform to design basis assumptions. Id. at 18-10. In response to this inspection report, PG&E assured the NRC that the ASW system had "adequate margin." Inspection Report 93-36, cover letter at 1.

D. NRC Inspections

On January 12, 1994, the NRC issued Inspection Report 93-36, which discussed the results of a routine, announced inspection conducted from December 13 through December 17, 1993, regarding "PG&E's activities performed in response to Generic Letter 89-13." Id., cover letter at 1. Inspection Report 93-36 identified numerous apparent deficiencies in PG&E's response to Generic Letter 89-13, and in its program for monitoring and maintaining the ASW system. They included the following:

First, the NRC found that PG&E had "failed to provide complete and accurate information" to the NRC regarding the capability of heat exchanger CCW 1-2 to remove the design basis heat load: although a 1991 test of the heat exchanger showed that it could not remove the design basis heatload, PG&E represented that

it could. Id., Details at 5. In addition, PG&E failed to take any corrective action to address the inadequacy in the heat exchanger's heat removal capacity, despite several opportunities to do so. Id., Details at 7.

Second, the inspector found that when heat exchanger CCW 1-2 was taken out of service and inspected at a differential pressure of only 125 inches, it had significantly more fouling than expected, thus raising a question as to whether the operational differential pressure limit of 140 inches set by PG&E was excessive. Inspection Report 93-36, Details at 6-7.

Third, PG&E did not follow its criteria for maintenance of the ASW structure. The NRC inspector noted that for several months in 1992, "the licensee temporarily allowed the heat exchangers to exceed their operational differential pressure limit of 140 inches, be declared inoperable and left in service until a limit of 200 inches was reached." Id.

Fourth, the NRC found that PG&E had not established a permanent testing program, as it had promised. Although PG&E had committed to undertake an "ongoing" program for surveillance of the ASW system in 1990, almost four years later, the NRC's inspection revealed that PG&E was still using "temporary" test instruments for monthly flow tests of the ASW system. Id.

Inspection Report 93-36 was followed up by further investigation, including another inspection on February 28, March 1 and 8, 1994, which was reported on in Inspection Report 94-08. Inspection Report 94-08 cited three "apparent violations" which

were being considered for "escalated enforcement action" in accordance with NRC's enforcement policy. These apparent violations involved:

(1) the failure to implement adequate design control measures to assure that the specifications and procedures associated with the Component Cooling Water Heat Exchangers maintained the system design basis for maximum system temperature, (2) the failure to provide complete and accurate information to the NRC regarding the results of the testing of these heat exchangers, and (3) the failure to identify the cause and take timely corrective action for the failure of CCW Heat Exchanger 1-2 to meet the test acceptance criteria for heat exchanger capacity on February 2, 1991.

Id. Inspection Report 94-08 also noted that PG&E had determined that the ASW system had not been within the plant's design basis for unspecified "past operating periods." Id., Details at 2.

Following further investigation, including an enforcement conference on March 23, 1994, the NRC issued a Notice of Violation. The NOV found that PG&E had not met its commitment, in response to Generic Letter 89-13, that the ASW system "had ample design margin, and that maintenance practices would prevent significant fouling or blockage." NOV, cover letter at 2. As summarized in the NOV,

Despite PG&E assurances of ASW system design margin, the NRC determined that CCW heat exchanger 1-2 failed to demonstrate ability to remove the design basis heat load during a heat exchanger test performed in February 1991. The NRC also determined that PG&E had failed to properly identify the cause or to take timely corrective action following the February 1991 CCW heat exchanger test failure. Further, a May 1993 PG&E Quality Assurance (QA) surveillance report and July 1993 QA audit report had addressed the heat exchanger test failure, but PG&E engineering personnel again failed to promptly respond to identified problems, this time by failing to properly evaluate or resolve the QA find-

ings, and QA did not force the issue. PG&E's inadequate followup on the QA findings represents an additional, significant missed opportunity to have identified and corrected the violation which is now being cited by the NRC.

Id., cover letter at 2. Accordingly, the NRC found that PG&E had committed

a significant violation involving the failure of your engineering staff to fully recognize or correct operational deficiencies in the Auxiliary Saltwater (ASW) System, despite several opportunities to recognize the existence of these deficiencies.

Id., cover letter at 1. The NRC also confirmed Inspection Report 94-08's findings that PG&E had failed to implement adequate design control measures to assure that the specifications and procedures associated with the Component Cooling Water Heat Exchangers maintained the system design basis for maximum system temperature, and had failed to provide complete and accurate information to the NRC regarding the results of the testing of these heat exchangers. However, it decided that separate citations for these problems were unwarranted because "each of these failures was a direct consequence of the poor engineering work that resulted in [PG&E's] failure to take appropriate corrective action." Id.

III. NRC INSPECTIONS REVEAL NEW EVIDENCE OF SIGNIFICANT MAINTENANCE DEFICIENCIES AND SAFETY PROBLEMS.

Inspection Report 93-36, Inspection Report 94-08, and the NOV, reveal significant safety deficiencies which bear on the adequacy of PG&E's program for maintenance and surveillance at DCNPP. In addition, several other maintenance problems raised by

Inspection Report 93-36 remain either unresolved or inadequately addressed by Inspection Report 94-08 or the NOV.

A. Heat Exchanger Testing and Maintenance Inadequate

The CCW heat exchangers function to transfer heat from the primary coolant for plant safety systems to the service water or ASW cooling system. If they are blocked and unable to transfer heat from the safety systems at a sufficient rate, then the safety systems may fail. Thus, the operability of the CCW heat exchangers is extremely important to plant safety.

Accordingly, Generic Letter 89-13 "requested that licensees conduct a test program to verify the heat transfer capability of all safety-related heat exchangers." Inspection Report 93-36, Details at 4. The generic letter also "allowed for an alternative program such as frequent regular maintenance of the heat exchanger." Id. PG&E responded that it "would perform a one-time heat exchanger performance test to confirm the baseline heat transfer capability of the heat exchangers," and that it would "implement an alternative program to verify the system would remain capable of maintaining design basis capability." DCL-90-027, Enclosure at 4; Inspection Report 93-36, Details at 4. DCL-90-027 also stated that the licensee would "implement a monitoring program which combined flow testing, trending, inspection, and frequent preventative maintenance." Id. PG&E committed to completing these actions by the end of the 1991 fourth refueling outage of each unit. Id., Details at 5.

In DCL-91-286, PG&E reported that it "had performed the heat exchanger capacity test" and stated that ". . . the computer model predicted that the heat exchanger would remove the design basis heat load at design conditions." Id., Enclosure at 2. PG&E also stated that the licensee "had implemented the alternative monitoring program." Id.

However, the NRC has found that (1) heat exchanger CCW 1-2 failed to carry the design basis heat load during the February 1991 test, and was significantly fouled during that period, (2) PG&E did not completely and accurately report the test results, (3) PG&E failed to take timely corrective action, and (4) PG&E's analysis of the ASW system operability showed that the system had not been operating within its design basis in the past.

1. Heat Exchanger CCW 1-2 Failed Heat Removal Test and Was Significantly Fouled

On February 2, 1991, PG&E performed a heat removal test on all four of its heat exchangers. While three of the heat exchangers passed the test, heat exchanger CCW 1-2, the field test report showed the heat removal capacity for heat exchanger CCW 1-2 to be only 98.7 percent of the design, i.e., lower than the design basis capacity. Inspection Report 93-36, Details at 5. The NRC cited PG&E for this test failure in the NOV: cover letter at 2, NOV at 1.

In the December 1993 inspection, the NRC also examined CCW Heat Exchanger 2-1, which PG&E had taken out of service at a differential pressure of 125 inches, i.e., before it reached the

"alarm setpoint" of 140 inches. Inspection Report 93-36, Details at 6. Because of other fouling problems in this heat exchanger due to calcification, CCW 2-1 was expected to show less macro-fouling than other heat exchangers at the same differential pressure. Id.

However, this expectation was not borne out by the NRC's inspection. At 125 inches, CCW 2-1 had significant fouling, including 15 tubes plugged with mussels and barnacles; and three crabs in the head, representing another three plugged tubes. Id. All together, including ten tubes that were permanently plugged due to tube wear problems, the inspector estimated that 28 tubes were plugged. This exceeded the manufacturer's plugging limit for safe operation of 2 percent of the total tubes or 24 plug-gable tubes. Id.

Based on this inspection, the NRC found that "the differential pressure limit of 140 inches was excessive and that the heat exchangers may have been inoperable during conditions of warmer ocean temperature." This was considered a "significant item due to the high safety significance of the system." Id. at 7.

PG&E subsequently performed an analysis of the adequacy of the 140 inch setpoint. Inspection Report 94-08, Details at 5-6. However, the NRC found that the data collected by PG&E during biomass cleanings "did not correlate well." Id., Details at 5. The inspector concluded that PG&E's calculations had demonstrated that the 140 inch setpoint was adequate "if the amount of macrofouling assumed and the heat exchanger capacity assumed were

correct." Id., Details at 6, emphasis added. However, he "noted that the calculations did not demonstrate that any significant margin existed in the 140 inch limit." Id. According to the Inspection Report, PG&E plans to "reassess" the 140 inch limit in the 1994 refueling outages. Id. Thus, it appears that even if the 140 inch limit is adequate, it is only barely adequate, providing no margin of safety to accomodate the potential uncertainties in macrofouling and heat exchanger capacity. Clearly, this would be incompatible with PG&E's commitment, in response to Generic Letter 89-13, to protect the operability of the ASW system with adequate design margins.

2. PG&E Misrepresented Results of Heat Exchanger Test

Inspection Report 93-36 found that PG&E had not reported accurately when it stated in DCL-91-286 that its computer model "predicted that the heat exchangers would remove the design basis heat load at design conditions." Id., Details at 5. PG&E later responded that the test failure was due to a combination of (a) an abnormal degree of fouling in the heat exchanger, and (b) the nature of the computer code used for the test. Inspection Report 94-08, Details at 4. According to PG&E, if PG&E had used a different, more commonly used, computer code, the test results would have been 101 percent of the design basis requirements. Id. Inspection Report 94-08 and the NOV do not specifically address the adequacy of PG&E's analysis of the computer code.???? However, Inspection Report 94-08 found that there was an "apparent violation" in that PG&E had failed to provide "complete and

accurate information" when it reported the test results. Id., Details at 4. This assessment was confirmed in the NOV, although the NRC did not cite the problem as a violation. NOV, cover letter at 1. Id.

3. PG&E Failed to Take Any Corrective Action In Response to ASW Problems.

The NOV finds a "significant violation" in PG&E's failure to "recognize or correct operational deficiencies" in the ASW system, "despite several opportunities to recognize the existence of these deficiencies." NOV, cover letter at 1. PG&E's repeated failure to take these opportunities is of even greater concern to the NRC than the faulty engineering practices which led to the test failure in the first place. Id. As documented in Inspection Report 93-36, for years PG&E has been receiving many reminders about the significance and potential vulnerability of the ASW system:

System operability concerns due to differential pressure had been raised in Inspection Report 50-275/88-11 and the licensee responded to those concerns with assurances that the differential pressures were acceptable. Generic Letter 89-13 again focused attention on the issue of heat exchanger performance and maintenance practices. The failed heat exchanger capacity test in 1991 should have triggered investigative actions but did not. Finally, a QA surveillance in May 1993 (discussed in Section 3 of this report) raised the specific issue of the adequacy of the differential pressure setpoint, but did not elicit a studied response from the engineering organization. These multiple missed opportunities indicate that engineering was ineffective.

Id., Details at 7. In fact, Inspection Report 93-36 indicates that that the test failure was not documented until November 22,

1991, almost ten months later. PG&E did nothing in response; in fact, it falsely reported to the NRC on November 26, 1991, that the computer model used in the test had predicted that the heat exchangers would carry the design basis heat load.

PG&E's QA Department also conducted an audit from March 5 to May 7, 1993 and issued a formal Action Request on May 10, 1993. Inspection Report 93-36, Details at 10. The audit report, issued July 28, 1993, identified the test failure of CCW Heat Exchanger 1-2, as well as a "concern with the 140 inch differential pressure setpoint." Id. However, almost two years after the test failure, during the NRC inspection in the middle of December 1993, the effect of the test failure on ASW system reliability was still unresolved.

4. PG&E's Analysis of ASW Operability Faulty

In response to Inspection Report 93-36, PG&E performed "extensive calculations" to assess the operability of the ASW system "during the periods of high microfouling and high macrofouling" of the CCW system. Inspection Report 94-08, Details at 2. According to the NRC, PG&E concluded that the ASW system "had been operable but not within its design basis for past operating periods." Id. This analysis is grossly deficient.

In the first place, it is a contradiction in terms to state that a safety system that does not comply with its design basis is "operable." As defined in DCNPP's technical specifications, a system, subsystem, train, component or device is considered to be "operable" or have "operability" when "it is capable of perform-

ing its specified functions(s) and when all necessary attendant instrumentation, controls, electric power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its functions(s) are also capable of performing their related support functions."⁴ NUREG-1132, Technical specifications for Diablo NUREG-1132, Technical Specifications for Diablo Canyon Nuclear Power Plant, Unit 2, Docket No. 50-323, Appendix "A" to License No. DPR-81, § 1.21 (NRC: April 1985) (Attachment C to this Motion); NUREG-1102, Technical Specifications for Diablo Canyon Nuclear Power Plant, Unit 1, Docket No. 50-275, Appendix "A" to License No. DPR-80, § 1.20 (NRC: November 1984) (Attachment D to this Motion) (emphasis added). Thus, the ASW could not lawfully be considered to be "operable" if it did not comply with its "specified functions," i.e., the plant's design basis.

Second, as discussed in Inspection Reports 94-08 and 93-36, there were numerous deficiencies and nonconservatisms in PG&E's analysis. For instance, in Inspection Report 94-08 the NRC noted that PG&E's calculations depended on the 1991 heat exchanger capacity tests, which were "not well controlled." Id., Details at 2. Moreover, in the tests "the microfouling and macrofouling conditions were not known and had to be later inferred by the licensee." Id. These inadequate test conditions were also dis-

⁴ DCNPP's technical specifications are based on NRC standard technical specifications for Westinghouse-designed nuclear power plants, see NUREG-1431, Vol. 1, § 1.1 (NRC: September 1992).

cussed in Inspection Report 93-36: First, there was no assessment of the amount of microfouling and macrofouling already present in the heat exchangers, resulting in an approach that was "not conservative." Id., Details at 5. Second, PG&E had not recorded the amount of differential pressure present in the heat exchanger, thus precluding the use of the test data to assess the adequacy of the operator's differential pressure limits. Id. Finally, PG&E did not measure the outlet water box level, which affects the measurement of differential pressure across the heat exchanger because it varies with the tide. Id.

In Inspection Report 94-08, the NRC also found that PG&E appeared to "essentially remove the margin in the calculations." Id., Details at 2. In particular, PG&E "took advantage of a two percent tube plugging allowance provided by the manufacturer to increase the baseline heat removal capacity by two percent;" it used actual ocean temperatures rather than higher design temperatures in the calculation; and used actual versus design values for containment initial temperature, reactor power, water temperature in the Refueling Water Storage Tank, and "other parameters." Id. Although the inspector found that PG&E's approach "appeared credible" for purposes of "assessing past conditions," it "left little of the conservative margin usually preserved for calculational uncertainties in predictions of performance." Id., Details at 3. Nor did it conform to PG&E's previous assurance that the integrity of the ASW system was assured in part by "ample design margins." See NOV, cover letter at 2.

The NRC also found that PG&E "took credit for operator actions which they [sic] considered credible at the time, but which were not in all cases part of the Emergency Operating Procedures."

Id. Finally, although this problem was later corrected, the NRC found that "the study was performed using the licensing basis model for mass and energy release which did not predict as severe conditions as the newer mass and energy release models." Id.

In summary, the NRC found that if DCNPP had been operating at its limit of 140 inches differential pressure, there would have been no safety margin under PG&E's analysis. Id., Details at 3. As discussed above, to operate without any safety margin violates PG&E's original commitment with respect to maintaining the ASW system, as well as the fundamental principles that a sufficient safety margin is necessary to provide adequate protection to public health and safety.

B. Several Issues Raised In Inspection Report 93-36 Remain Unresolved.

1. Lack of Trending for Calcification in CCW Heat Exchanger Tubes

According to Inspection Report 93-36, PG&E had observed calcification on the inner diameter of the CCW heat exchanger tubes, at the outlet end in the tube sheet area. Id. at 11. According to a system engineer, the calcification was caused by deposits from seawater caused by the impressed voltage system for cathodic protection of the ASW piping. Id. The engineer stated that "the calcification was of a short length and would not affect the available heat transfer area or tube fouling factor." Id. How-

ever, the NRC inspector "expressed the concern that since the buildup was not being trended for rate of buildup, and since the inlet of the tubes had a reduced diameter, the calcification could cause the tubes to plug at the outlet end which would not be detected by the periodic cleaning and inspection of the inlet end." Id.

In Inspection Report 94-08, the NRC reported that scaling in CCW heat exchanger 1-2 had proceeded to "such an extent" that "7 out of 20 tubes examined by a video camera, had become completely blocked at the outlet end, and 3 additional tubes were partially blocked." Id., Details at 8. The heat exchanger had not received "normal outage maintenance" of tube scraping during the previous refueling outage "due to an outage management decision," and therefore it had become blocked. Id.

It appears that PG&E has now stated that it will inspect the tubes each outage, and that it will perform trending of differential pressure. Id., Details at 9. However, as noted by the inspector, differential pressure trending "would not provide data on the rate and degree of scale buildup." Id. Moreover, PG&E appears to have "assumed, rather than demonstrated, that scraping once an outage would prevent tube blockage." Id. While PG&E appears to have agreed to additional conditions set by the NRC, its initial failure to recognize the measures needed to resolve its previous inability to detect scaling is a matter of serious concern. Moreover, it remains unclear as to how or why the policy of scraping the tubes during outages was overridden in

this case, and whether such overrides have adversely affected other maintenance practices at DCNPP.

2. PG&E Wrongly Allowed DCNPP To Operate in Excess of Differential Pressure Limit

In Inspection Report 93-36, the NRC inspector noted that for several months in 1992, "the licensee temporarily allowed the heat exchangers to exceed their operational differential pressure limit of 140 inches, be declared inoperable and left in service until a limit of 200 inches was reached." Id., Details at 3. PG&E's decision to continue operating with this inoperable equipment violates basic safety principles and is completely inconsistent with safe maintenance of the plant.

In response to SLOMFP's original motion to reopen the record, the NRC Staff submitted the affidavit of Paul P. Narbut, which states that the NRC has accepted PG&E's practice of entering a "72 hour technical specification" and allowing the ASW system to run "for a few hours longer" without taking credit for its operability. Affidavit of Paul P. Narbut at 3 (March 14, 1994). However, the heat exchanger which was declared inoperable was one of two redundant heat exchangers in each unit. It would violate the plant's design basis and the Single Failure Criterion to continue to operate a unit with only one operable heat exchanger, for any period of time. Moreover, it is not clear whether the unit was operating with an inoperable heat exchanger for just a few short hours, or for a longer period of perhaps three days.

3. PG&E Falsely Told NRC It Had Established a Routine Inspection Program for ASW System

As discussed above, one of Generic Letter 89-13's recommendations was for the establishment of "a routine inspection and maintenance program for the service water system piping and components" so that "corrosion, erosion, coating failure, silting and biofouling would not degrade the performance of the system." Id. at 7. In DCL-90-027, PG&E committed to establishing such a program by the fourth refueling outages for Units 1 and 2, and in DCL-91-286, it stated that the program had been established. See Inspection Report 93-36 at 8; DCL-90-027, Enclosure at 5; DCL-91-286, Enclosure at 2.

However, the 1993 inspection revealed that contrary to its previous assurances, PG&E had not established a routine inspection program or procedures for the ASW piping. Inspection Report 93-36, Details at 8. During the 1991 refueling outages, PG&E inspected only about half the ASW piping, using a "temporary procedure." Id. No ASW piping inspections were conducted during the fifth refueling outage, and none were planned for the sixth outage in 1994. Id.

Inspection Report 94-08 claims to have resolved the NRC's previous concern that PG&E may have supplied false information to the NRC when it stated in 1991 that it had established a routine program for inspection and maintenance of ASW piping. The NRC now says that it finds the existence of the temporary procedure acceptable, because in 1991 there was an electronic response to

an open Action Request, which specified the frequency of the piping inspections. Id., Details at 6. However, the procedure apparently remained "temporary," and the action request was never formally closed. The NRC does not address such significant questions of (a) whether the level of instruction and training for this temporary procedure was equivalent to what it would have been for a permanent procedure, (b) whether the electronic response was sufficient record to adequately instruct maintenance personnel of their responsibilities, or (c) how an open action request went unclosed for over two years.

IV. SLOMPF HAS SATISFIED THE STANDARD FOR REOPENING THE RECORD.

As discussed below, SLOMPF satisfies the three criteria of 10 C.F.R. § 2.734(a) to reopen the record in this case.⁵

A. The Motion is Timely.

This motion is timely, because it could not have been filed before the record closed in August of 1993. The NRC's investigation of the above-discussed ASW problems did not begin until December of 1993, and the final NOV was not issued until July 14, 1994. SLOMPF has proceeded diligently, within a reasonably short period of time of receiving the NOV, which was served on the parties on July 22, 1994, to renew its motion to reopen the record.

⁵ In compliance with § 2.734(b), the motion is supported by the declaration of undersigned counsel, Diane Curran, who prepared this motion in reliance on the expertise of the NRC inspectors who prepared the NOV and Inspection Reports 94-08 and 93-36, as well as the authority of Generic Letter 89-13. See Attachment A.

B. The Motion Addresses a Significant Safety and Environmental Issue.

There can be no question that the NRC's inspection reports concerning the ASW system raise issues of enormous safety and environmental significance. First, the NRC has classified PGE's violation as Severity Level III, which by its own terms is "significant." See 10 C.F.R. Part 2, Appendix C. The safety importance of the ASW system is beyond dispute: if DCNPP's cooling system were inadequate to remove heat from safety systems during an accident, those safety systems could be rendered inoperable as a result, with disastrous consequences. The fact that this system was out of compliance with DCNPP's design basis, for an unspecified length of time in the past, is a matter of major safety concern.

Moreover, the nature of PG&E's response to Generic Letter 89-13 and to identified problems with the ASW system also raises significant safety issues. As the NRC observed, it is "significant" that PG&E had "a number of opportunities" to address the ASW problem, but did not. Inspection Report 93-36, NOV cover letter at 1-2. Such laxness demonstrates a lackadaisical attitude toward maintenance of key safety systems.

PG&E's response to Generic Letter 89-13 also misrepresented the facts on two important issues: the results of the single heat exchanger test that played an important role in PG&E's program for assuring the adequate operability of the heat exchangers; and the existence of an inspection program for the

ASW piping. Whether they result from incompetence or intentional deception, such misrepresentations raise questions about the adequacy and integrity of PG&E's entire maintenance program.

C. The admission of this newly proffered evidence is likely to affect the outcome of this case.

The evidence described above is likely to affect the outcome of this case, because it contradicts the testimony and proposed findings of PG&E and the NRC Staff in several important respects, because it provides significant corroboration for the proposed findings of SLOMFP, and because it raises significant questions with respect to the PG&E's competence and integrity in responding to maintenance problems. For instance:

1. PG&E and NRC Testimony and Proposed Findings on the Adequacy of PG&E's Maintenance and Surveillance Program Are Contradicted by the Inspection Reports and NOV.

PG&E's and the NRC Staff's testimony in this case are directly contradicted by the findings in Inspection Report 93-36, Inspection Report 94-08, and the NOV. For instance, the NRC Staff testified that the "performance of maintenance and surveillance at Diablo is considered to be superior and clearly supportive of safe facility operation." NRC Staff Testimony of Paul P. Narbut, Mary H. Miller and Sheri R. Peterson Regarding Contention 1: The Surveillance and Maintenance Program at Diablo Canyon at 5 (July 30, 1993). The NRC also testified that "generally the Licensee has dealt with problems in the maintenance and surveillance areas effectively," and has "corrected a great majority of the problems promptly." Id. at 6. The Staff's Proposed Findings

and Conclusions of Law also assert that "in-service inspections are being carried out in an appropriate manner." NRC Staff's Findings of Fact and Conclusions of Law at 50 (December 22, 1993). Similarly, PG&E testified that PG&E has "a comprehensive maintenance and surveillance program," which it has implemented in "an effective, and often outstanding, manner." Testimony of Pacific Gas & Electric Company Addressing Contention I: Maintenance and Surveillance at 3, 4 (August 2, 1993). See also PG&E's Proposed Findings of Fact and Conclusions of Law at 57-63.

These broad and sanguine generalizations contrast starkly with the reality presented by the inspection reports and the NOV, in which PG&E allowed an essential safety system to become inoperable because it failed to conduct adequate surveillance, tested equipment improperly, failed to follow up on a significant test failure, failed to establish adequate criteria for taking heat exchangers out of service to conduct maintenance, allowed important safety margins to erode, and ignored even the weak criteria that it had by allowing the plant to operate when set-points were exceeded. Moreover, it ignored these problems for a period of years, rather than addressing them in a timely fashion.

2. The Inspection Reports Corroborate SLOMFP's Proposed Finding That Deficiencies in PG&E's Maintenance and Surveillance Program at Diablo Canyon Have Resulted in the Failure or Unreliability of Important Safety Systems.

In its Proposed Findings, SLOMFP accurately observed that most of PG&E's maintenance problems in the last several years have disabled or threatened essential safety systems, thus undermining the redundancy of the systems and reducing the margin of safety on which the plant relies for safe operation. See SLOMFP Proposed Findings, pars. 25, 26. As established by the inspection reports and the NOV, the ASW system is another vitally important safety system whose operability has been compromised by inadequate surveillance and maintenance. Not only did the CCW heat exchanger fail the initial test of its capacity, but inspection revealed that tube plugging due to biofouling and other causes exceeded PG&E's own acceptance criteria. Moreover, not only does PG&E's setpoint for determining when maintenance should be conducted appear to be too high, but PG&E sometimes allows the plant to continue operating in exceedance of the setpoint. Thus, the operability and reliability of the ASW system are in doubt.

The inspection reports and NOV also corroborate other concerns raised by SLOMFP on this record, regarding the adequacy of PG&E's program for the maintenance and surveillance of heat exchangers. See SLOMFP's Proposed Findings at pars. 200-213, regarding inadequacy of eddy current testing frequency, questionable ability of maintenance and surveillance activities to assure the efficiency of the CCW heat exchangers, potential

violations by PG&E maintenance program of design criteria for CCW heat exchangers.

3. The Inspection Reports Corroborate SLOMFP's Proposed Finding That PG&E Has Shown a Pattern of Untimely or Ineffective Response to Maintenance Problems.

As discussed in section III.A.3 above, despite repeated opportunities or reminders to take action, for years PG&E ignored both the inadequacy of its setpoint for maintenance on the CCW heat exchangers, and the 1991 heat exchanger test failure. Moreover, it still had not resolved these problems when the NRC conducted its inspection in late 1993. In fact, PG&E misrepresented the results of the heat exchanger test rather than taking steps to address the failure. PG&E's dismal performance in this regard corroborates SLOMFP's proposed finding, based on numerous other similar examples, that PG&E has shown a pattern of responding to many maintenance problems in a lax and untimely manner.⁶ See

⁶ Maintenance, as defined by INPO 90-008, an industry guidance document followed by PG&E, is

considered to be the aggregate of those actions that prevent the degradation or failure of, and that promptly restore the intended functions of, structures, systems, and components. As such, maintenance includes not only the activities traditionally associated with identifying and correcting actual or potential degraded conditions (that is repair, surveillance, and other preventive measures), but also extends to supporting functions for the conduct of these activities. Examples of these functions include engineering support of maintenance; operator identification of materiel deficiencies; and some aspects of chemical control, radiological protection, and training.

Id. at 1. Here, although the NRC essentially attributes PG&E's ASW problems to failings by PG&E's engineering staff, it is important to note that (1) the engineering practices that failed were part of PG&E's program for the maintenance and surveillance of the ASW system; (2) PG&E failed to live up to its commitment in response to Generic Letter 89-13 that its maintenance program,

SLOMFP's Proposed Findings of Fact and Conclusions of Law, par. 33 (November 19, 1993). It also makes a mockery of the NRC Staff's testimony and proposed finding that DCNPP's maintenance and surveillance programs "had elements of 'openness' and 'aggressive self-identification' which indicated that the programs were extremely healthy and effective." NRC Staff's Findings of Fact and Conclusions of Law In the Form of an Initial Decision, par. I-47 (December 22, 1993).

4. The Inspection Reports Corroborate SLOMFP's Proposed Finding That Routine Surveillances, Tests and Inspections at DCNPP are Inadequate to Ensure the Continued Safe Operation of the Plant.

In its Proposed Findings, SLOMFP noted the extensive and repetitive pattern of missed surveillances, improperly performed tests, and a lack of monitoring activities for essential equipment at DCNPP. *Id.*, pars. 49-52. As documented in Inspection Report 93-36, and discussed above, a single inspection of only one safety system at PG&E has revealed an extraordinary number of omissions and deficiencies with respect to routine surveillance and testing of the ASW system. This evidence thus provides significant support for SLOMFP's proposed finding regarding the general inadequacy of PG&E's routine surveillance and testing programs.

(continued)

combined with adequate design margins, would prevent excessive blockage of the ASW system; and (3) adequate maintenance and surveillance necessarily involves the capability of the PG&E organization, as a whole, to recognize and promptly restore to inoperable safety systems -- and PG&E failed to recognize or respond to the ASW problem for a period of years.

5. The Inspection Report Corroborates SLOMPF's Proposed Finding That a Lack of Communication and/or Coordination Leads to Inadequate Maintenance at Diablo Canyon.

As discussed in SLOMPF's Proposed Findings at page 22, the record of this case demonstrates a pattern of poor communication and coordination between various PG&E departments with maintenance-related responsibilities. Inspection Report 93-36 provides further significant support for this conclusion, noting the role of "management and communication" issues in the breakdown of ASW maintenance. Id., cover letter at 1. The investigation of the ASW system deficiencies portrays a total breakdown in communication between departments responsible for design, engineering, surveillance, and maintenance. As a result, the ASW system was not properly monitored or maintained, threatening the operability of the system and the health and safety of the public.

For instance, PG&E did not document the February 1991 failure of a CCW heat exchanger until November of that year. See discussion in Section C above. An Action Request was not submitted to the Engineering Department until May of 1993, and a QA report was not issued until July of 1993. There is no explanation for these great time gaps in communication. Moreover, the Inspection Report does not even state whether the Maintenance Department was made aware of the test failure.

It also appears that maintenance personnel, who would have had practical experience with the appropriateness of setpoints

triggering maintenance of heat exchangers, were not consulted regarding problems with the acceptability of these setpoints. Moreover, if Maintenance had any concerns about the setpoints, they apparently were not communicated to the Engineering Department. Instead, the engineers preparing the DCM vaguely relied on heat exchanger maintenance "per standard practice" without having any understanding that (a) the ASW system was not being properly maintained or (b) the 140 inch setpoint was too high. Inspection Report 93-36, Details at 9.

6. The Inspection Reports Raise Significant Questions With Respect to PG&E's Competence and Integrity in Responding to Maintenance Problems.


As discussed above, PG&E misrepresented the status of its maintenance and inspection program to the NRC in two significant respects. First, PG&E reported to the NRC that a heat exchanger test was successful, when in fact it failed. This test was significant because pursuant to PG&E's program for maintenance and surveillance of the ASW system, it formed part of PG&E's basis for assuring the operability of the ASW system. Second, PG&E told the NRC it had established a program for surveillance of ASW piping, when in fact it had not. These apparent misrepresentations raise grave questions about both the competence and the integrity of PG&E. Whether the misrepresentations resulted from ineptitude or intentional deceit, either cause would have serious implications regarding the adequacy of PG&E's maintenance and surveillance program, and the truthfulness and reliability of other representations it has made regarding that program, both in

this proceeding and in responding to the NRC in the course of its oversight and enforcement activities.

CONCLUSION

For the foregoing reasons, the record of this proceeding should be reopened for the purpose of considering the documents in Attachment B and any other relevant evidence regarding PG&E's inadequate surveillance and maintenance of the ASW system.

Respectfully submitted,



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August 8, 1994

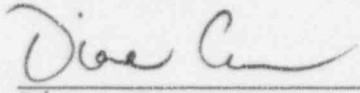
ATTACHMENT A

DECLARATION OF DIANE CURRAN

1. I am the attorney representing San Luis Obispo Mothers for Peace in this proceeding.

2. I have reviewed the Notice of Violation (July 7, 1994), Inspection Report 94-08 (March 16, 1994), Inspection Report 93-36 (January 12, 1994), Inspection Report 88-11 (June 17, 1988), Generic Letter 89-13 (July 18, 1989), PG&E Letter DCL-94-037 (February 15, 1994), DCL-90-027 (January 26, 1990) and DCL-91-286 (November 25, 1991).

3. The arguments set forth above regarding SLOMFP's satisfaction of the NRC's criteria for reopening the record of this case are based on the factual contents of the documents identified in paragraph 2 above, on the NRC's conclusions regarding the legal and safety significance of these facts, and on my own conclusions regarding the legal and safety significance of these facts.


Diane Curran

August 8, 1994

ATTACHMENT B

LIST OF DOCUMENTS WHICH SLOMPF
SEEKS TO HAVE ADMITTED TO THE RECORD

- ASW 1: Notice of Violation (July 14, 1994) (served on Licensing Board and parties by the NRC Staff via letter from Ann P. Hodgdon to Administrative Judges (July 22, 1994));
- ASW 2: Inspection 94-08 (March 16, 1994) (served on Licensing Board and parties by the NRC Staff via Board Notification 94-06 (March 17, 1994));
- ASW 3: Inspection 93-36 (January 12, 1994) (Attachment 1 to SLOMPF's February 25, 1994, Motion to Reopen the Record; also served on the Licensing Board and parties via Board Notification 94-06 (March 17, 1994));
- ASW 4: PG&E Letter No. DCL-91-286 (November 26, 1991) (Attachment 5 to SLOMPF's February 25, 1994, Motion to Reopen the Record);
- ASW 5: PG&E Letter No. DCL-90-027 (January 26, 1990) (Attachment 4 to SLOMPF's February 25, 1994, Motion to Reopen the Record);
- ASW 6: Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment" (July 18, 1989) (Attachment 2 to SLOMPF's February 25, 1994, Motion to Reopen the Record);
- ASW 7: Inspection Report 88-11 (June 17, 1988) (excerpts re ASW system) (Attachment 3 to SLOMPF's Motion to Reopen the Record);
- ASW 8: NUREG-1132, Technical Specifications for Diablo Canyon Nuclear Power Plant, Unit 2, Docket No. 50-323, Appendix "A" to License No. DPR-81, Section 1.21 (NRC: April 1985) (attached to this Motion);
- ASW 9: NUREG-1102, Technical Specifications for Diablo Canyon Nuclear Power Plant, Unit 1, Docket No. 50-275, Appendix "A" to License No. DPR-80, Section 1.20 (NRC: November 1984) (attached to this Motion).

Technical Specifications

Diablo Canyon Nuclear Power Plant, Unit No. 2

Docket No. 50-323

Appendix "A" to
License No. DPR-81

Issued by the
U.S. Nuclear Regulatory
Commission

Office of Nuclear Reactor Regulation

April 1985



DEFINITIONS

IDENTIFIED LEAKAGE

1.17 IDENTIFIED LEAKAGE shall be:

- a. Leakage, except CONTROLLED LEAKAGE, into closed systems, such as pump seal or valve packing leaks that are captured and conducted to a sump or collecting tank, or
- b. Leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of Leakage Detection Systems or not to be PRESSURE BOUNDARY LEAKAGE, or
- c. Reactor Coolant System leakage through a steam generator to the Secondary Coolant System.

MASTER RELAY TEST

1.18 A MASTER RELAY TEST shall be the energization of each master relay and verification of OPERABILITY of each relay. The MASTER RELAY TEST shall include a continuity check of each associated slave relay.

MEMBER(S) OF THE PUBLIC

1.19 MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the licensee, its contractors, or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

OFFSITE DOSE CALCULATION PROCEDURE

1.20 The OFFSITE DOSE CALCULATION PROCEDURE (ODCP) shall contain the methodology and parameters used in the calculation of offsite doses due to radioactive gaseous and liquid effluents and in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints.

OPERABLE - OPERABILITY

1.21 A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s) and when all necessary attendant instrumentation, controls, electric power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s).

DEFINITIONS

GASEOUS RADWASTE SYSTEM

- 1.16 A GASEOUS RADWASTE SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

IDENTIFIED LEAKAGE

- 1.17 IDENTIFIED LEAKAGE shall be:

- a. Leakage, except CONTROLLED LEAKAGE, into closed system, such as pump seal or valve packing leaks that are captured and conducted to a sump or collecting tank, or
- b. leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be PRESSURE BOUNDARY LEAKAGE, or
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Technical Specifications

Diablo Canyon Nuclear Power Plant, Unit No. 1

Docket No. 50-275

Appendix "A" to
License No. DPR-80

Issued by the
U.S. Nuclear Regulatory
Commission

Office of Nuclear Reactor Regulation

November 1984



CERTIFICATE OF SERVICE

I certify that on August 8, 1994, copies of SAN LUIS OBISPO MOTHERS FOR PEACE'S RENEWED MOTION TO REOPEN THE RECORD REGARDING PACIFIC GAS AND ELECTRIC COMPANY'S APPLICATION FOR A LICENSE AMENDMENT TO EXTEND THE TERM OF THE OPERATING LICENSE FOR THE DIABLO CANYON NUCLEAR POWER PLANT were served on the following parties by FAX and/or by first-class mail as indicated below:

*Charles Bechhoefer
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

*Dr. Jerry R. Kline
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washintgon, D.C. 20555

*Frederick J. Shon
Administrative Judge
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*David Repka, Esq.
Winston & Strawn
1400 L Street N.W.
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*Ann P. Hodgdon, Esq.
Office of General Counsel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Adjudicatory File
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

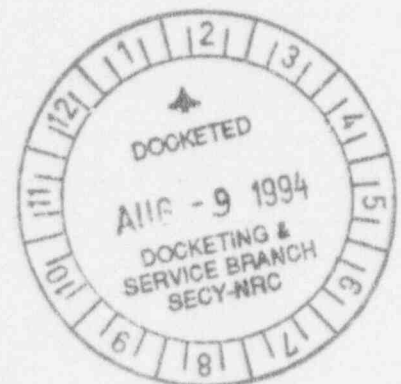
*Secretary of the Commission
ATTN: Docketing and Service
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Washington, D.C. 20555

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

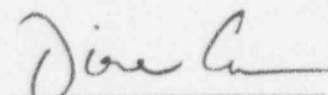
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Diane Curran