U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos: 50-275/88-26 and 50-323/88-24

Docket Nos: 50-275 and 50-323

License Nos: DPR-80 and DPR-82

Licensee: Pacific Gas and Electric Company
77 Beale Street, Room 1451
San Francisco, California 94106

Facility Name: Diablo Canyon Units 1 and 2

Inspection at: Diablo Canyon Site, San Luis Obispo County, California

Inspection Conducted: September 4 through October 22, 1988

Inspected by: W. Wagner (signature) 11/22/88
W. Wagner, Regional Inspector — Date Signed

M. M. Mendonca for 11/22/88
K. E. Johnston, Resident Inspector — Date Signed

M. M. Mendonca for 11/22/88
P. P. Narbut, Senior Resident Inspector — Date Signed

Approved by: M. M. Mendonca 11/22/88
M. M. Mendonca, Chief, Reactor Projects Section 1 — Date Signed

Summary:

Inspection from September 4 through October 22, 1988 (Report Nos. 50-275/88-26 and 50-323/88-24)

Areas Inspected: The inspection included routine inspections of plant operations, maintenance and surveillance activities, follow-up of onsite events, open items, and licensee event reports (LERs), as well as selected independent inspection activities. Inspection Procedures 30703, 61726, 62703, 71707, 71710, 73753, 92701, 92702, 93702, and 99021 were applied during this inspection.

Results of Inspection: No violations or deviations were identified.

Areas of Strength Noted

- The licensee's actions discussed in paragraph 4.j., regarding foreign material exclusion problems involving a dropped dosimeter, were quick,

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specific and positive. The more general actions of tailboards, and reminders/cautions were not solely relied on; rather specific actions were applied such as taping hot particle garments and logging dosimetry in and out at foreign material exclusion boundaries.

° The licensee demonstrated comprehensive and well controlled event investigation methodology in response to the discovery of broken check valve studs in Unit 2 and in the examination of a potential control rod drive mechanism leak.

° The licensee's Quality Assurance organization demonstrated initiative in following up problems discovered in the previous refueling outage with the auxiliary saltwater pumps. Specifically, in auditing the heat treatment of pump impellers by a sub tier vendor, the QA organization identified potentially important problems with heat treatment resulting in a Part 21 report to the NRC.

° Electrical maintenance personnel demonstrated an overriding sense of safety responsibility and knowledge in establishing that electrical components on the main steam isolation valves did not appear to be environmentally qualified. In pursuing and properly elevating this problem to managements' attention, the fact that the valve components were not qualified was firmly determined and appropriate action resulted.

Areas of Weakness

° Two events in this report demonstrate that management has not yet instilled the proper instincts in all operating plant personnel. The two events are discussed in Section 4 of the report and deal with overfilling of a steam generator and mistakenly injecting reactor coolant system (RCS) water into a dry nitrogen system (paragraphs 4.k. and 4.m., respectively). Other events in this report support the conclusion and are discussed in paragraphs 4.c, 4.f., 4.j., and 4.q. These events demonstrate that some plant personnel do not have a firm understanding of the fundamental precepts of accepting only good work procedures, working to those procedures, and stopping work in the face of uncertainty rather than the freelance creation of a solution.

° A number of valve lineup errors discussed in this report point strongly to inadequate valve lineup controls for operations, I&C or the interface between the two:

- the discovery of an inoperable reactor cavity sump level indicator due to a closed air supply valve discussed in paragraph 4.e.

- the errors made in valve lineups that contributed to overfilling a steam generator discussed in paragraph 4.k.

- the errors made in valve lineups that contributed to the injection of RCS water into the containment nitrogen system discussed in paragraph 4.n.

- the lack of adequate valve seals discussed in paragraph 7.a.1.

- the errors made in lining up the reactor vessel refueling level system (RVRLS) on September 20 & 21 discussed in paragraph 4.f.

o The report discusses several incidents which demonstrate limited effectiveness in dealing with problems:

- Unit 2 pressurizer was cooled down in excess of the allowable rate. The same event had occurred in the beginning of the year in Unit 1.

- a leaking boron injection tank drain was noted in September 1987 but not properly characterized until September 1988 as a significant threat to the tank's pressure boundary.

- the licensee's analysis of the cause of a main feed pump trip/reactor trip was in error requiring a shutdown to 50% and additional repairs.

- Operations personnel reaction to an acoustic alarm on a pressurizer safety valve was limited and was not reported to management for consideration.

DETAILS

1. Persons Contacted

*J. D. Townsend, Plant Manager
*D. B. Miklush, Assistant Plant Manager, Maintenance Services
L. F. Womack, Assistant Plant Manager, Operations Services
*B. W. Giffin, Assistant Plant Manager, Technical Services
J. M. Gisclon, Acting Assistant Plant Manager for Support Services
C. L. Eldridge, Quality Control Manager
*K. C. Doss, On-site Safety Review Group
T. Bennett, Acting Maintenance Manager
D. A. Taggert, Director Quality Support
W. G. Crockett, Instrumentation and Control Maintenance Manager
J. V. Boots, Chemistry and Radiation Protection Manager
T. L. Grebel, Regulatory Compliance Supervisor
*S. R. Fridley, Operations Manager
O. K. Franks, ISI,NDE Supervisor
D. A. Gonzales, NDE Specialist
M. E. Leger, NDE Specialist
D. E. Morris, NDE Specialist
M. E. Kersey, NDE Specialist

The inspectors interviewed several other licensee employees including shift foremen (SFM), reactor and auxiliary operators, maintenance personnel, plant technicians and engineers, quality assurance personnel and general construction/startup personnel.

*Denotes those attending the exit interview on November 9, 1988.

2. Operational Status of Diablo Canyon Units 1 and 2

Unit 1 returned to power just prior to the reporting period and remained at power for the reporting period except for planned power reductions for testing. On September 26, power was reduced to 50% to allow work on main feed pump 1-2 which was experiencing speed instability. This pump previously caused a reactor trip on August 30, 1988 (reported in Inspection Report 50-275/88-21).

Unit 2 began the reporting period at power having just recovered from a reactor trip on September 1, 1988. The unit remained at power until September 17, 1988, when the unit was shutdown to commence its second refueling outage. During the reporting period the reactor fuel was off-loaded and work performed on steam generators, reactor coolant pumps, emergency core cooling systems (ECCS) and diesel generators. At the end of the reporting period, the reactor had been refueled, the head installed and tensioned, and was in Mode 5.

During the report period the Diablo Canyon SALP report was issued and a management meeting (on the SALP report) was held in the NRC offices in Walnut Creek just after the end of the report period.

Significant issues reported in detail in this report included the licensee's deferral of the planned Unit 2 integrated leak rate test of containment until the third refueling outage, resolution of possible seal weld leaks on Unit 2 Control Rod Drive Mechanisms (CRDMs), evaluation of the licensee's justifications for continued operation for Auxiliary Saltwater Pumps (which the licensee concluded had received improper heat treatment) and for ECCS check valves which the licensee determined had internal parts subject to integranular stress corrosion cracking.

3. Operational Safety Verification (71707)

a. General

During the inspection period, the inspectors observed and examined activities to verify the operational safety of the licensee's facility. The observations and examinations of those activities were conducted on a daily, weekly or monthly basis.

On a daily basis, the inspectors observed control room activities to verify compliance with selected Limiting Conditions for Operations (LCOs) as prescribed in the facility Technical Specifications (TS). Logs, instrumentation, recorder traces, and other operational records were examined to obtain information on plant conditions, and trends were reviewed for compliance with regulatory requirements. Shift turnovers were observed on a sample basis to verify that all pertinent information of plant status was relayed. During each week, the inspectors toured the accessible areas of the facility to observe the following:

(a) General plant and equipment conditions.

(b) Fire hazards and fire fighting equipment.

(c) Radiation protection controls.

(d) Conduct of selected activities for compliance with the licensee's administrative controls and approved procedures.

(e) Interiors of electrical and control panels.

(f) Implementation of selected portions of the licensee's physical security plan.

(g) Plant housekeeping and cleanliness.

(h) Engineered safety feature equipment alignment and conditions.

(i) Storage of pressurized gas bottles.

The inspectors talked with operators in the control room, and other plant personnel. The discussions centered on pertinent topics of general plant conditions, procedures, security, training, and other aspects of the involved work activities.

b. Test Procedure for Reducing Carbon Monoxide in Unit 2 Containment

On September 12, 1988, the licensee commenced the venting of Unit 2 containment using service air to reduce the concentration of carbon monoxide (CO) prior to the outage. CO has steadily built up since the large containment purge valves were declared inoperable (LER 2-87-25). To use service air as the supply required the opening of manual containment isolation valve AIR-2-200. TS Table 3.6-1 allows that the valve "May be opened on an intermittent basis under administrative control." The inspector determined that appropriate control had been established in accordance with OP 0-12 "Operation of Manual Containment Isolation Valves." Specifically, the inspector observed that an individual had been stationed at the valve with a radio in hand and in the proximity of a telephone. In addition, the inspector reviewed the evaluation performed in accordance with 10 CFR 50.59 and found it acceptable.

No violations or deviations were identified.

4. Onsite Event Follow-up (93702)

a. Unit 1 Plant Vent Gross Radiation Monitor Out-of-Service

On September 6, 1988, the licensee determined that radiation monitor RM-29, the plant vent gross radiation monitor, would be out of service greater than seven days due to ineffective work coordination and delay. The situation requires the licensee to submit a special report to the NRC explaining the occurrence and corrective action. The inspectors verified that the licensee was acceptably addressing the issue.

b. Unit 2 Integrated Leak Rate Test (ILRT) Postponed to Third Refueling Outage

On September 6, 1988, the licensee determined that the ILRT for the Unit 2 containment would be performed in the third refueling outage versus the upcoming second refueling outage. The decision was discussed with the resident inspector, who informed Region V and NRR management of the decision. The licensee decision was determined to meet regulatory requirements.

c. Unit 2 Work Performed on Wrong Auxiliary Building Ventilation System Damper

On September 14, 1988, general construction I&C technicians lifted electrical leads on the wrong Auxiliary Building Ventilation System (ABVS) damper (2A versus 22A) which initiated a ventilation mode change through the charcoal filters. Licensee maintenance management suspended further general construction I&C work until work packages could be reviewed for adequacy. The problem appeared to be caused by an erroneous work package. The licensee initiated a nonconformance report to document and resolve the situation.

d. Apparent Unit 2 Pressurizer Cooldown

On September 18, 1988, Unit 2 exceeded the allowable pressurizer cooldown rate when attempting to go solid in the pressurizer. This had previously occurred on Unit 1 during its second refueling outage.

The licensee's initial actions were to perform analysis to verify that no detrimental effects on the pressurizer had been incurred. The licensee's actions to prevent recurrence had not been defined and will be followed up through the review of the nonconformance report on the subject (DC2-88-TN-N106-00).

e. Unit 2 Inoperable Reactor Cavity Sump Level Indicator

On September 20, 1988, the licensee discovered that the Unit 2 reactor cavity sump level indicator was inoperable and may have been since the last refueling outage due to the fact that an air supply to the level indicator had been isolated. The sump level is one of three technical specification systems required to give timely warning of leakage in containment. Further licensee investigation revealed that the recorder for sump level was also miswired and would not have functioned.

The licensee had prepared an NCR on the finding and will issue an LER. This item will be followed up through the LER process.

f. Misaligned Reactor Vessel Refueling Level System (RVRLS)

On September 20, 1988, with Unit 2 in Mode 5, cold shutdown, and depressurized, operations drained to 25% pressurizer cold calibration level. While performing the walkdown to place the wide range (WR) RVRLS and tygon level hose in service, operators mistook an unlabeled valve for another valve they were to verify was opened.

The correct valve, 8053A, the reference leg isolation valve, was left closed. As a result, both the tygon hose and WR RVRLS did not agree with pressurizer cold calibration level which triggered the licensee's investigations.

On September 21, 1988, a similar problem occurred in the alignment of narrow range (NR) RVRLS, in that, one of the reference leg valves was mis-positioned because of a checklist reading error and the same reading error was repeated during verification.

As a result of two similar problems on other systems in the same time frame, the operations manager wrote an "Operations Incident Summary" discussing the importance of independent verification to be read by all operations personnel. In addition, QC initiated a Quality Evaluation.

The inspector will assess the adequacy of the corrective action in the course of future inspections.

g. Unit 2 BIT Telltale Drain Leakage

On September 23, 1988, the licensee re-identified a problem which had been previously identified on September 10, 1987, but had been mischaracterized at that time and not acted upon until the refueling outage. The problem was the appearance of boron crystal and leakage from a drain on the Boron Injection Tank (BIT). The drain, however, was a telltale drain which indicates a failure of the stainless steel liner or cladding in the carbon steel BIT. Since boric acid will attack carbon steel, leakage from the telltale could represent unacceptable corrosion of the BIT pressure vessel wall which the stainless steel lining is designed to protect.

The licensee had originally characterized the leakage from the telltale as an indicator of leakage past the BIT manway gasket. Subsequent examination by nondestructive examination showed indications in the liner as the probable cause of leakage. The indications were in turn determined to have been caused by improper layup conditions during construction. The licensee repaired the liner. The licensee also performed tests to determine remaining wall thickness measurements of the pressure vessel wall and concluded the wastage rate was acceptable for continued operation until the next refueling cycle. The licensee plans to examine the problem at the next outage. The licensee determined the condition was not reportable based on the conclusion that the safety barrier was not seriously degraded.

The inspector will follow-up licensee final determinations and actions through the nonconformance report on the subject.

h. Main Feedwater Pump Speed Probe

On September 27, 1988, the licensee reduced power on Unit 1 from 100% to 50%, to allow work on main feedwater pump 1-2. The feedwater pump had indications of speed spiking. The pump had previously tripped an overspeed on August 30 and caused a reactor trip. The root cause analysis done at that time identified the problem as a failed speed probe which was repaired and the unit put back in service. Subsequently, information from the controls manufacturer indicated that the licensee's original analysis was incorrect and the problem was due to a pneumatic controller (the "Hi-Select") located locally to the pump which had a leaky valve (the "badger valve") allowing air from the local manual controller to override the automatic inputs from the Hagen rack.

The erroneous original root cause, the speed probe, was identified by the licensee to have resulted due to two apparent factors: First, the licensee interfaced with the vendor at a low level and received what they perceived to be concurrence with their analysis and theories. Subsequent contact with vendor experts cast doubt on the validity of the licensee's analysis and actions. Secondly, the licensee stopped investigative actions at the first indication of a solution and did not pursue other possible causes.

As discussed in the residents' previous report 50-275/88-21, the licensee had demonstrated this limited mode of problem resolution

previously; specifically, in PG&E's erroneous integral analysis of the Unit 2 reactor trip of August 30, which ultimately proved to be caused by a closed valve.

The resident's perceptions regarding this matter were discussed with licensee management during the exit interview.

i. Dosimeter Dropped and Retrieved from Unit 2 Upper Internals

On September 27, 1988, a contractor dropped a dosimeter on the upper internals of the reactor. The contractor did not observe the incident since the dosimeter was taped to his anti-contamination clothing under hot particle clothing and its absence was not noted until he was undressing. Subsequent follow-up by rad protection individuals led to the discovery of the dosimeter and its retrieval. Subsequent actions by the licensee were proper and included taping of the hot particle outer garments to preclude unobserved loss of items and the inclusion of specific dosimetry counts at the foreign material exclusion logging point.

j. Actuation of Unit 1 Acoustic Alarm

On October 2, 1988, operators in Unit 1 noted an acoustic alarm received on pressurizer relief valve 8010B. The item was noted in the log and operators confirmed, by tailpipe temperature indications, that the alarm was not due to the opening of the relief valve. On the following day, the inspector followed up with licensee management to determine if the cause of the alarm was being pursued. Licensee management was not aware of the alarm and an action request had not been written by the operators.

Subsequent to the inspector notifying management, the licensee's first approach was to examine the acoustic alarm circuitry for malfunctions.

The inspector's concern was that the alarm was an indication that something had let go near the top of the pressurizer where the acoustic monitor is located.

Licensee personnel subsequently made containment entry, inspected the area, and determined nothing visually observable had let go.

The inspector discussed the incident at the exit meeting and discussed the need for management to assure that personnel pursue anomalies through the action request system and "believe the instrumentation"; in this case, believe that something happened to cause an acoustic alarm until all possibilities are explored.

k. Overfilling of Steam Generator 2-3

On October 3, 1988, the inspector became aware of an incident that occurred on October 1, 1988, which involved overfilling a Unit 2 Steam Generator (SG 2-3). The event was investigated by the shift supervisor but was not reported to management over the weekend. The

event did not involve great safety significance but did represent a number of avoidable errors. Additionally, three mutually exclusive errors were committed any one of which could have been the single cause. Also, the existing plant procedure for filling steam generators was formally changed, with the approval of the Plant Staff Review Committee (PSRC), to allow filling the generator with only one means of level indication versus the previously required two means. Although this was not a deciding factor in the event, the licensee subsequently determined that this was an inappropriate decision since normal level instrumentation could have been made available in a matter of hours. Instead a temporary tygon tube was hooked up and used for level indication. The PSRC required that the tube be physically watched during fill. Problems identified by the licensee evaluation included:

- The work order issued to accomplish the task did not require the tygon tube to be hooked up to the location specified by the operations procedure.

- The I&C technician, a contractor for the outage, did not hook up to the location specified by the work order or the operations procedure. He did not inform supervision of his departure from written instructions. He hooked up to the left side of the level transmitter (which he believed was always the variable side) and hooked up to the vent connection whereas his work order required hooking to the drain side.

- The operations personnel recognized that both their procedure and the I&C procedure were not specific for valve lineup. They did not stop and rectify this but instead gave verbal instructions based on assumptions to an auxiliary operator who opened the wrong valve.

- The operations personnel commenced filling the steam generator on one shift and the next day after several starts and stops discovered they had overfilled the steam generator and caused water to spill out the open condensers to the turbine building floor.

Licensee management reacted properly and issued a nonconformance report identifying several specific and reasonable actions to be taken.

The event was discussed by senior NRC regional management and licensee corporate management on October 26, 1988, in conjunction with the SALP meeting (Inspection Report 50-275/88-30). The point was made at that meeting that this event was an example of Diablo personnel not yet having the proper instincts in reaction to a situation, that fundamental concepts such as having good procedures, following those procedures, and stopping in the face of uncertainty were not yet ingrained into Diablo's conduct of work.

Licensee management committed to take meaningful actions to successfully communicate this philosophy to the Diablo staff.

The inspectors will follow-up licensee actions on this event through the nonconformance process.

l. Actuation of Fuel Handling Building Radiation Monitor

On October 3, 1988, the licensee made a four hour non-emergency report due to an alarm received on the Fuel Handling Building Radiation Monitor RM-58 which was set to alarm at a reading of 7.5 mr/hr, a conservative setting under the technical specification limit of 15 mr/hr. The alarm was not caused by an incident but rather by a higher than normal radiation level due to the Unit 2 core having been offloaded and stored in the spent fuel pool.

The licensee subsequently reset the alarm to a higher setpoint after calculating less conservative margins to the technical specification limits. The licensee has submitted an LER on the event and licensee actions will be followed through the LER process.

m. Potential Leak Discovered on Unit CRDM Canopy Seal Weld

On October 3, 1988, the licensee informed the resident of a possible leak discovered in the Unit 2 spare Control Rod Drive Mechanism (CRDM) canopy seal weld similar to that discovered and repaired on Unit 1 during its refueling outage.

Through subsequent investigation, the licensee determined that the discoloration was not indicative of a leak. Licensee representative stated that they will examine the area again during pressurization to confirm their position.

n. RSC Water Discovered in Unit 2 Containment Nitrogen System

On October 5, 1988, the licensee discovered contaminated RCS water in several nitrogen accumulators in the Unit 2 containment. The accumulators were supposed to be dry and contain pressurized nitrogen to act as backup for several important air operated components such as pressure operated relief valves (PORV's).

The licensee declared the situation a nonconformance and launched an investigation as to the cause of the water and possible effects. The result of the investigation showed water intrusion and contamination was limited to the nitrogen system and that the instrument air system was not affected.

The licensee concluded that the water intrusion occurred on September 30, 1988, when operations personnel were preparing to go to mid loop operation and were performing an operation to drain RCS water form the steam generator tubes by injecting nitrogen into the steam generators. The nitrogen injection system was a temporary system which attached to the permanent containment nitrogen system and used it as a source of nitrogen.

The primary direct cause of the water intrusion occurred when operations personnel were dissatisfied with the rate of nitrogen

injection and verbally ordered the I&C personnel to remove the temporary flow regulators from the system. No work orders were issued and the I&C technician removed the flow regulators but also removed the protective check valves. The nitrogen blow proceeded successfully but at the end of the operation, operators did not close the temporary manual isolation valve but closed, remotely from the control room, the nitrogen supply valve to the containment. The nitrogen system bled down in pressure and reactor coolant water, due to static head, was injected into the nitrogen system.

There was no safety significance to this event since all fuel was off loaded and the reactor coolant system was vented to atmosphere.

The event demonstrated inherent improper operating philosophy and instincts on the part of the personnel involved.

Failure to Provide Descriptive, Specific Procedure: The particular procedures used should have been excellent since they were specifically reviewed and approved by many levels of licensee management and personnel. The procedures were those revised after the April 10, 1987, loss of residual heat removal (RHR) event which received the highest management attention. The I&C operations procedures did not describe adequately the temporary nitrogen system other than by one general step to install a system. The components location and valve lineup were not adequately described in the procedure. Likewise, the procedure was inadequate to instruct the operators how to secure the system after use, in that no specific valves were required to be shut. The same lack of specifics was noted in 1987 on the RVRLS system which the licensee subsequently made very specific.

Failure to Follow Procedure: As non-descriptive and non-specific as the procedure was, the procedure was not followed in that the nitrogen regulators were verbally ordered removed contrary to the one line description of the system. Likewise, administratively, work was verbally ordered to be done and was done without a work order required by administrative procedures.

Failure to Stop in the Face of Uncertainty: Basic fundamentals of properly controlled work were violated as described above. Adherence to basic fundamentals (of having good procedures, following the procedures, stopping when a problem is recognized and properly revising procedures) has been previously discussed in violations and inspection report cover letters to management. This issue is a further example that management has not yet effectively communicated their expectations to the working level regarding development of the proper instincts in carrying out operational activities.

This event was discussed with senior regional NRC management and PG&E corporate management on October 26, 1988, at the SALP meeting

in the Region V offices. Licensee management committed to further efforts in developing the proper instincts in their personnel. The licensee's corrective actions for this event will be followed up through normal review of the nonconformance written for this event (DC-2-88-OP-N118).

o. Improper Auxiliary Saltwater System Pump Impeller Heat Treatment

On October 7, 1988, the resident was informed of potential operability questions regarding the Unit 1 and Unit 2 Auxiliary Saltwater Pumps due to improper heat treatment of the impellers, discovered through a PG&E QA audit of the sub tier vendor who performed the heat treatment.

In summary, the licensee has determined that the impellers installed are satisfactory for operation until the next refueling cycle based on 10 years of satisfactory service demonstrated on a removed impeller from Unit 1. That impeller was made of a more sensitive material (ASTM A 296 CF-8M) which had not been heat treated. The new replacement impellers in Units 1 and 2 were made of ASTM A 743 CF-8M and were heat treated but with poor oven temperature controls and for insufficient time for the thicknesses involved. The licensee had tested the Unit 1 impellers for sensitization by using ASTM A 262 practice A which showed the impellers were not sensitized.

The licensee documented the problem in nonconformance report DC1-88MM-N042 and prepared a justification for continued operation (JCO 88-07-R1). The inspectors found the licensee's submitted JCO acceptable in that it provided assurance based on operating history and engineering evaluation that the impellers would perform their function.

This item will be followed up through review of the licensee's nonconformance report process.

p. Broken Internal Check Valve Studs

On October 8, 1988, during preplanned check valve inspection, broken internal studs were found on RHR hot leg recirculation check valve 8470A in Unit 2.

The problem was quickly recognized as a potenitally significant one and the resident inspector informed senior NRC management in Region V and in NRR. The licensee formed an Event Investigation Team in response.

The broken studs hold the internals of the check valve in the valve body and therefore could affect the functionality of the valve. The studs are made of Type 410 stainless steel and were subsequently determined to be broken due to integranular stress corrosion cracking, a phenomenon to which Type 410 stainless steel is susceptible. A total of 10 valves, in each unit, were made by the

same manufacturer with the same material. The 10 valves are important safety function valves.

Contact with the vendor by the licensee indicated the problem had previously been noted at D.C. Cook in September 1988, but no other reports had been identified.

The licensee examined the nine remaining valves in Unit 2, found no additional broken studs but replaced all studs with a different material not susceptible to integranular stress corrosion cracking.

The licensee prepared a Justification for Continued Operation (JCO) of Unit 1 which was at power. The JCO concluded plant operation could continue until the next outage of sufficient duration based on: 1) successful testing of the valves performed in April 1988, 2) radiographs of the two most susceptible valves which showed the internals in place and no clearly broken studs (although an indication was noted on one), and 3) a safety analysis and a Probabilistic Risk Assessment (PRA). Additionally, the licensee considered the problem more likely to occur on Unit 2 which had a chemistry control problem during extended layup prior to operation.

NRR and the inspectors examined the licensee's actions and the JCO. Further, the NRC prepared and issued an information notice and is considering additional generic communication as a result of the findings at Diablo and D.C. Cook.

The resident inspectors will follow-up the licensee's actions through LER 88-14 to be submitted by November 9, 1988.

q. <u>Inadvertant Start of Diesel Generator 1-3</u>

On October 10, 1988, the licensee made a four hour non emergency report to NRC based on an automatic diesel generator start caused by an electrician testing a transformer relay improperly. Specifically, the test required temporary power which is ordinarily provided by a test cart. The electrician attempted to rig a temporary power supply from an adjacent relay and caused the trip of startup transformer relay 2-2 which opened a startup feeder breaker for Unit 2 and caused the automatic start of Unit 1 diesel 1-3, the shared diesel.

This event will be followed up through review of the licensee's LER 88-12 on the subject.

r. <u>Environmental Qualification of MSIV Actuation Components</u>

On October 14, 1988, the main steam isolation valves in Unit 1 were determined by the licensee to be inoperable due to the discovery of electrical actuation components (a surge suppressor and a terminal connection) which were not environmentally qualified for a severe environment as would occur in a steam line break outside of containment.

The NRC resident attended plant management's deliberations on the subject. The two affected MSIVs were declared inoperable at 8:15 p.m. on October 14, 1988. At 9:14 p.m. operators commenced a ramp down in power in accordance with technical specification 3.0.3 and declared the resultant Notification of Unusual Event.

Repairs to the MSIVs were completed at 11:47 p.m. and the MSIVs were declared operable. The licensee continued to ramp down power however to perform turbine valve testing (required weekly). At 3:30 a.m. on October 15, 1988, the operators commenced a ramp back to 100% power.

The licensee's actions in response to the EQ implications of this event will be followed up in review of LER 88-28.

s. Plastic Spray Nozzles Lost in the Refueling Cavity

On October 17, 1988, the licensee determined that small plastic spray nozzles were missing and presumed to be in the reactor coolant system. The nozzles had been used in a temporary system to spray down the reactor vessel opening during midloop operation to reduce airborne contamination in the containment. The nozzles were discovered missing upon removal of the system.

The licensee performed chemical analysis of the material, determined that the nozzles would break down at temperature, did not contain harmful chemicals, and obtained Westinghouse concurrence to their acceptance of the condition.

5. Maintenance (62703)

The inspectors observed portions of, and reviewed records on, selected maintenance activities to assure compliance with approved procedures, Technical Specifications, and appropriate industry codes and standards. Furthermore, the inspectors verified maintenance activities were performed by qualified personnel, in accordance with fire protection and housekeeping controls, and replacement parts were appropriately certified.

During this report period, the inspector examined the maintenance related aspects of events discussed in Section 4 of this report. Specifically the inspector examined maintenance aspects of:

- the delayed work on RM-29 on September 6, 1988.
- the lifting of improper leads on September 14, 1988.
- the corrective action associated with MFP 1-2 on September 27, 1988.
- the foreign material exclusion controls aspects of the September 27 dosimeter incident.

- the lack of work control associated with temporary system installations in the October 1 SG overfill incident and the October 5 injection of water in the nitrogen system incident.

- the maintenance activities associated with internal stud replacement pursuant to the October 8 discovery of broken studs.

- the lack of work control associated with the October 10 diesel generator start caused by an electrician.

- the repair activities associated with the inoperable MSIVs on October 14, 1988.

Unit 2 Phase C Motor Operated Disconnect (MOD) Refurbishing

The inspector observed portions of maintenance and design change implementation performed on phase C of the Unit 2 MOD. The work implemented corrective actions resulting from the November 7, 1987 MOD phase C failure.

The inspector observed that the work was performed in accordance with the work order. In addition, the inspector discussed the change with the maintenance engineer. All activities reviewed were found acceptable.

No violations or deviations were identified.

6. Surveillance (61726)

By direct observation and record review of selected surveillance testing, the inspectors assured compliance with TS requirements and plant procedures. The inspectors verified that test equipment was calibrated, and acceptance criteria were met or appropriately dispositioned.

In response to the events and incidents described in paragraph 4, the inspectors examined surveillance testing aspects of the events including:

- the acceptability of rescheduling the Unit 2 ILRT of containment.

- the nondestructive examination work performed on the BIT and in radiographing RHR hot leg recirculation check valves described in paragraphs 4.h. and 4.g..

In addition the inspectors examined:

a. Unit 2 Safety Valve Testing

Prior to the Unit 2 refueling outage, the licensee tested all main steam safety valves (a total of 20). The inspector observed the testing of two valves. The inspector observed that the testing was performed acceptably using Maintenance Procedure (MP) M-4.18 "Verification of Lift Point Using Furmanite's Trevitest Equipment for the Main Steam Safety Valves."

The testing was performed by a contractor under observation by the licensee. The advantage of the test method is that it can be done at power with no observable plant perturbations. Of the 20 valves, nine were found to lift outside -1% of the design setpoint, six high and three low. Of the nine only two lifted greater than 2% outside the criteria, 3.35% high and 2.16% high for valves RV-14 and RV-58 respectively. The licensee intends to have the safety significance of the out of tolerance lifts reviewed by Westinghouse.

Currently, the licensee is reviewing the results of this set of data in conjunction with previous Unit 1 and Unit 2 data to establish appropriate corrective actions. Under consideration is a Technical Specification change of the acceptance criteria to greater than the current 1% of the setpoint. Also under consideration is a design change to use pilot operated relief valves. The inspectors will continue to follow the licensee's actions.

b. Auxiliary Saltwater (ASW) Pump Inservice Testing

The inspector reviewed the results of two repeat ASW pump tests. In both cases the initial test pump differential pressures were found to be in the alert range, one reading high and the other low. For the pump with a low differential pressure a second test was performed using a temporary gage and the results were found to be acceptable. An action request was generated on the out of calibration gage.

For the second pump, with the high differential pressure reading, it was determined that the reference legs had not been adequately drained. A second crew drained the line and a second test was performed finding pump differential pressure within its acceptance criteria.

ASME Section XI, inservice testing of pumps and valves allows the retesting of equipment if the first test is determined to be invalid based on instrument calibration. Therefore, the retesting of both ASW pumps without repair, replacement, or analysis was found to be acceptable.

No violations or deviations were identified.

7. Engineering Safety Feature Verification (71710)

Residual Heat Removal System

The inspector performed a walkdown of both Unit 1 and Unit 2 Residual Heat Removal (RHR) systems prior to the Unit 2 refueling outage. The inspector verified breakers and valves were in their appropriate positions, appropriate valves were sealed, hanger supports and instrumentation were properly installed, and assessed overall system condition. The inspector made the following observations:

1) Valves CCW-1-460, component cooling water to RHR pump 1-1 seal cooler, and CCR-1-170, component cooling water return from containment fan cooler Unit 1, were not adequately sealed.

2) RHR pump high point vents on both units (valves 928 and 929) had tygon hose routed from the vent to either a poly bottle or floor drain. The vent valves were both in the closed position.

3) Unit 1 Safety Injection valve, 8802A, had substantial boron buildup and the bonnet bolts appeared corroded.

The inspector notified the shift foreman of item 1). Both valves were found to be in their correct position and resealed. The inspector discussed it further with the operations manager. Specifically, the issue of valves not adequately sealed had been previously identified. The operations manager noted that there had been corrective actions taken, as a result of what he felt was a relaxed attitude towards sealed valves, in the form of a new sealed valve procedure (AP C-9S1) just issued. The procedure more specifically addresses what is an acceptable seal ("All component seals are to be installed so that the seal must be broken before the component to which it is attached can be re-positioned") and states that discarded seals are to be disposed of. The corrective actions address the inspector's concerns, however the sealed valve program will continue to receive attention to assure the actions taken are effective.

The inspector discussed the temporary tygon connections with the operations manager. The operations manager's investigation revealed that the tygon had been installed as part of preparation for mid-loop operations and had not been removed. The hoses were subsequently removed.

The inspector discussed item 3) with the maintenance manager. The maintenance manager's investigation showed that the leak had been identified on August 10, 1988 (shortly following Unit 2 restart). The maintenance manager initiated an engineering review of the valve. It was determined that the carbon steel bolts required replacing with stainless within 30 days. In addition, the packing would be replaced. When this issue was revisited over a month later, the work had not been performed or scheduled. To resolve the issue of review of system leakage, the maintenance department is developing a program of initiating an engineering review of every leak to determine actions. In addition, the program will include a periodic revisit of the leak to determine whether it is trending up or down. The inspectors will continue to monitor the development of this issue.

No violations or deviations were identified.

8. <u>Radiological Protection (71707)</u>

The inspectors periodically observed radiological protection practices to determine whether the licensee's program was being implemented in conformance with facility policies and procedures and in compliance with regulatory requirements. The inspectors verified that health physics supervisors and professionals conducted frequent plant tours to observe activities in progress and were generally aware of significant plant activities, particularly those related to radiological conditions and/or

challenges. ALARA consideration was found to be an integral part of each RWP (Radiation Work Permit).

No violations or deviations were identified.

9. Physical Security (71707)

Security activities were observed for conformance with regulatory requirements, implementation of the site security plan, and administrative procedures including vehicle and personnel access screening, personnel badging, site security force manning, compensatory measures, and protected and vital area integrity. Exterior lighting was checked during backshift inspections.

No violations or deviations were identified.

10. Inservice Inspection - (ISI) Observations of Work Activities (73753)

The inspector observed magnetic particle (MT) and visual examinations (VT-3) being performed on the integrally welded support attachment to the pressure boundary of centrifugal charging pump PP2-1. The VT-3 visual examination was performed on the base of the charging pump to identify any abnormal conditions such as corrosion, missing parts, cracks or loss of integrity at the welded connections. The MT examinations were consistent with the limits or ranges addressed in ISI procedure N-MT-1 entitled "Magnetic Particle Examination Procedure Using Yoke and Prods." MT test attributes observed included type and color of ferromagnetic particles, surface preparation and temperature examination technique, and yoke lifting power.

The inspector also observed liquid penetrant (PT) and ultrasonic (UT) examinations being performed on boron injection tank inlet butt weld number WIC-1034. Surface preparation for PT, application of penetrant and developer including recommended dwell times, penetrant removal, and visual inspection for surface indications were observed and found to be in compliance with ISI procedure N-PT-1. The performance of the UT examination observed was in compliance with ISI procedure N-UT-1 and the following ASME Section XI requirements: type of apparatus used, extent of coverage (beam angles, scanning surface, scanning rate and directions), calibration requirements, size and frequency of the search units, limits of evaluation and recording of indications, and determination of acceptance limits.

The qualification and certification records of the ISI personnel performing these examinations were reviewed by the inspector. All personnel were qualified in accordance with ASME Section XI requirements.

No violations or deviations were identified.

11. Exit (30703)

On November 9, 1988, an exit meeting was conducted with the licensee's representatives identified in paragraph 1. The inspectors summarized the scope and findings of the inspection as described in this report.