ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-275/95-04
50-323/95-04

Licenses: DPR-80
DPR-82

Licensee: Pacific Gas and Electric Company
77 Beale Street, Room 1451
P.O. Box 770000
San Francisco, California

Facility Name: Diablo Canyon Nuclear Power Plant, Units 1 and 2

Inspection At: Diablo Canyon Nuclear Power Plant, Units 1 and 2

Inspection Conducted: May 22-25, 1995

Inspectors: Joseph I. Tapia, Examiner/Inspector, Operations Branch, Division of Reactor Safety

Stephen L. McCrory, Examiner/Inspector, Operations Branch, Division of Reactor Safety

Approved: John L. Pellet 6/20/95
John L. Pellet, Chief, Operations Branch Date
Division of Reactor Safety

Inspection Summary

Areas Inspected (Units 1 and 2): Routine, announced inspection of the qualifications of applicants for operating licenses, the licensed operator requalification program, and ability to detect and respond to steam generator tube leaks and tube ruptures.

Results (Units 1 and 2):

Operations

- Both applicants for initial licenses passed the examinations (Section 1).
- The reference material provided by the training department for examination development was good and adequately supported examination development (Section 1.1).

- The examiners observed generally good communication practices by applicants during the conduct of the examination (Section 1.2).

- Operator performance during the requalification examination was satisfactory with some weaknesses in communications and command and control. Examples of nondirected communications, informal wording, multiple conversations and failures to repeat back were noted (Section 2.2).

- The practice of allowing licensed reactor operators to fill the position of senior control operator was not consistent with the commitment made by the licensee in the FSAR and resulted in a Deviation (Section 2.2).

- The licensee's handling of generic communications related to steam generator tube integrity was considered appropriate, however, one example of untimely implementation of generic communications was noted (Section 3.1).

- The licensee exhibited good capability and used diverse methods for detection of primary-to-secondary leakage. Appropriate alarm setpoints were utilized to provide rapid notification of increasing leakage (Section 3.2 and 3.3).

- The procedures and supporting training that were used by operators in response to primary-to-secondary leakage were good (Section 3.4).

Summary of Inspection Findings:

- One deviation was identified during this inspection (275;323/9504-01).

Attachments:

- Attachment 1 - Persons Contacted and Exit Meeting
- Attachment 2 - Simulation Facility Report

DETAILS

1 LICENSED OPERATOR APPLICANT INITIAL QUALIFICATION EVALUATION (NUREG-1021)

During the inspection, the examiners evaluated the qualifications of one license applicant for senior reactor operator and one applicant for reactor operator. The inspection assessed the eligibility and administrative and technical competency of the applicants to be issued licenses to operate and direct the operation of the reactivity controls of a commercial nuclear power facility in accordance with 10 CFR Part 55 and NUREG-1021, "Operator License Examiner Standards," Revision 7, Supplement 1, Sections 200 (series), 300 (series), and 400 (series). Further, the inspection included evaluations of facility materials, procedures, and simulation capability used to support development and administration of the examinations. These areas were evaluated using the guidance provided in the areas of NUREG-1021 cited above.

Both applicants were being reexamined. Accordingly, the written examination was waived based on prior successful completion in accordance with 10 CFR 55.35 and 10 CFR 55.47. Similarly, the administrative topics and control room systems/facility walk-through part of the examination was waived for both applicants.

After completion of the evaluations, the examiners recommended that both applicants satisfied the requirements of 10 CFR 55.33(a)(2), and both have been issued the appropriate licenses.

1.1 Facility Materials Submitted for Examination Development

Most of the materials had been submitted for development of the initial reactor operator examinations administered by the NRC in October 1994. In addition, the licensee updated the materials prior to the re-examination. The materials were adequate in scope, depth, and variety for examination development.

1.2 Operating Examinations

The examiners developed comprehensive operating tests in accordance with the guidelines of NUREG-1021, Revision 7, Supplement 1, Section 301. The operating examinations consisted of an evaluation of integrated plant operations. The examiners previewed and validated the operating examination on May 22, 1995, with the assistance of facility training personnel under security agreement. The examination was administered on May 22, 1995.

The examiners evaluated the two applicants on two scenarios using the Diablo Canyon plant-specific simulation facility. The licensee provided a training instructor to act as a surrogate for staffing of a three person operating crew for purposes of the examination. The examiners compared applicants' actual performance during the scenarios with expected performance in accordance with the requirements of NUREG-1021, Revision 7, Supplement 1, Section 303, to evaluate applicants' competency on the operating examination.

The applicants demonstrated good command and communication discipline during the simulator scenarios. The applicants exhibited familiarity with facility procedures and were quick to evaluate which procedure was required and then locate and reference that procedure. Crew feedback was solicited and appropriately incorporated into responses to events. The prioritization of event responses was appropriate.

1.3 Simulator Fidelity

During the preparation and conduct of the operating examination, the examiners observed one minor discrepancy in simulator fidelity, as described in Attachment 2. The discrepancy did not affect the validity of the operating examination.

2 LICENSED OPERATOR REQUALIFICATION PROGRAM EVALUATION (IP 71001)

During the inspection, ongoing annual requalification examinations were observed and programmatic requirements were reviewed to assess whether the licensee's requalification program was evaluating operators' mastery of training objectives in accordance with 10 CFR Part 55. This included review of the examination material and an assessment of the examination evaluators' effectiveness in conducting examinations.

2.1 Operating Examination

The inspectors evaluated the dynamic scenarios being used in the operating examination with respect to the guidelines of NUREG-1021, section 604. The licensee examined operating crews utilizing two different scenarios for each crew during the week of the inspection. The format and content of the scenarios were consistent with the guidelines of NUREG-1021 and adequate to discriminate safe operator performance. The initial conditions of the scenarios were realistic and the scenarios consisted of related events. The scenarios had been previously validated by the training staff and allowed the evaluators to measure the examinees' competencies commensurate with the scenario objectives.

2.2 Operator Performance

An inspector observed one shift crew and one crew composed of on-shift and staff personnel on two scenarios each in the dynamic simulator examinations. The crew composition included a shift supervisor, a shift foreman, a senior control operator, two control operators, and a shift technical advisor. For the shift crew, the inspector noted satisfactory performance of the crew and individual operators, with adequate communications, command and control. Some examples of nondirected communications, informal wording, multiple conversations, and failures to repeat back were noted. The mixed crew also exhibited satisfactory performance, however, the inspector observed conditions which challenged the command, control and communication function during response to an emergency condition.

Diablo Canyon Administrative Procedure OP1.DC11, Rev. 1, "Conduct of Control Operations-Abnormal Plant Conditions," establishes the structure of the control room staff during abnormal plant operations. In accordance with this procedure, the shift foreman provides overall direction and supervision of the control room activities while the senior control operator assumes the duty of procedure reader. The senior control operator is expected to interact with the shift foreman whenever there are procedure transitions, entry points, or questions as to the effectiveness of the procedure. During observations of the mixed crew, the inspector noted that the shift foreman spent a considerable amount of time in activities that did not lend themselves to maintaining overall direction of control room activities. These included protracted conversations with both the shift supervisor and the shift technical advisor, and telephonic communications with plant personnel. At the same time, the senior control operator adopted a role beyond that of procedure reader and included directing and providing responses to questions from control board operators. The consequence of the assumption of those roles by the shift foreman and the senior control operator was that command and control of control room activities and communications among operators suffered. Overall coordination in response to the scenario events became focused on the senior control operator and the involvement of the shift foreman was fragmented.

As a result of the performance exhibited by the mixed crew, the inspector reviewed the licensee's programmatic requirements which delineate the general authorities and responsibilities of operating shift personnel. During this review, the inspector noted that the position of senior control operator was allowed to be filled by either a licensed reactor operator or licensed senior reactor operator. Further review disclosed that seven of the nineteen designated senior control operators are licensed reactor operators while the remaining twelve have senior reactor operator licenses. The senior control operator in the mixed requalification examination crew was a licensed reactor operator. In addition, the inspector verified that, on May 23 and 24, 1995, the on-shift Unit 2 senior control operator was a licensed reactor operator and not a licensed senior reactor operator. The inspector expressed concern that a licensed reactor operator was being placed in a position of directing the licensed activities of other licensed reactor operators. 10 CFR Part 50.54(l) specifically authorizes only those licensed as senior reactor operators to direct the licensed activities of licensed operators. The licensee agreed that the observations made by the inspector of the constituted crew were of concern, but did not agree that the senior control operator was directing the activities of other licensed reactor operators for actual operating crews.

The licensee's Updated Final Safety Analysis Report Section 13.1.2.3, "Shift Crew Composition," provides a description of the minimum shift organization that the licensee provided to satisfy 10 CFR Part 50.34(b)(6)(i). The Final Safety Analysis Report was originally submitted as part of the application for the operating license and has been periodically updated in accordance with 10 CFR Part 50.71. The most recent update, Revision 10, was issued on April 27, 1995. Figure 13.1-3 is referenced by Section 13.1.2.3 and describes the

senior control operator as requiring an NRC senior reactor operator license. The licensee's current practice of allowing licensed reactor operators to fill the position is not consistent with the Updated Final Safety Analysis Report and represents a deviation from a commitment (275;323/9504-01).

2.3 Evaluations

The inspector observed the post scenario evaluations. The observations and analyses made by the training department evaluators were detailed and well focused. The facility evaluators identified crew strengths and weaknesses as well as individual strengths and weaknesses. The evaluators rated the examinees' competencies by comparing actual performance during the scenarios against expected performance in accordance with the guidance of NUREG-1021. The evaluators did not record that the senior control operator, a licensed reactor operator, was directing the activities of other licensed reactor operators. As a result, no performance feedback was provided to the operator.

3 PRIMARY-TO-SECONDARY LEAKAGE MONITORING AND RESPONSE

An inspection was performed to determine the effectiveness of the licensee programs and actions concerned with monitoring of and response to steam generator primary-to-secondary leakage. The areas reviewed included handling of generic communications related to steam generator tube integrity, the adequacy of procedures and equipment to provide real time information on leak rate and rate of change of leak rate, the adequacy of alarm set points on radiation monitors used for detection of leakage and for alerting operators to any increasing primary-to-secondary leak rate, and operator training.

3.1 Licensee Response to Generic Communications

The inspectors reviewed the licensee's handling of specific generic communications related to steam generator tube integrity.

The inspectors reviewed the licensee evaluations of Information Notices 88-99, "Detection and Monitoring of Sudden and/or Rapidly Increasing Primary-to-Secondary Leakage"; 91-43, "Recent Incidents Involving Rapid Increases in Primary-to-Secondary Leak Rate"; and 93-56, "Weakness in Emergency Operating Procedures Found as a Result of Steam Generator Tube Rupture." The licensee's actions in response to these generic communications were found to be appropriate and included implementation of applicable mitigation strategies.

The inspector reviewed the licensee's actions in response to the industry's Significant Operating Experience Report (SOER) 93-1, "Diagnosis and Mitigation of Reactor Coolant System Leakage Including Steam Generator Tube Ruptures." This document was evaluated by the licensee's Independent Safety Engineering Group (ISEG) and resulted in eight recommendations, dated June 7, 1994. The Plant Staff Review Committee (PSRC) concurred with six of the eight recommendations in June, 1994. The necessary "Action Requests" to implement the resulting recommendations were not generated by the ISEG until March, 1995. This untimely action resulted because of informal processes which

allowed the generation of the Action Requests to be overlooked. The delay in implementing the recommendations, which resulted from the ISEG evaluation of an industry report, indicates a potential vulnerability which, in this case, did not significantly impact the safety of the plant.

3.2 Procedures and Equipment Adequacy for Leak Rate Information

Chemical Analysis Procedures AP-1, Revision 2, "Prompt Steam Generator Leak Identification Procedure," and D-15, Revision 6, "Steam Generator Leak Rate Determination," were reviewed by the inspector. These procedures were found to provide good bases for promptly identifying which steam generator is leaking or ruptured and for quantifying the primary-to-secondary leak rate. The referenced radiation monitoring equipment was capable of measuring the concentrations of contaminants in the secondary system and comparing those to the concentrations in the primary system, identifying and quantifying the leak rate and thereby minimizing the potential for large-scale secondary contamination and effluent releases by isolating the affected steam generator.

3.3 Alarm Setpoints on Radiation Monitors

The inspector reviewed the alarm set points on radiation monitors used in each unit for detection of leakage and alerting operators to an increasing leak rate. The inspector determined that the radiation monitors in both units, that were used for detection of leakage, were set suitably low to ensure rapid notification of any increasing primary-to-secondary leak rate. Confirmation of any primary-to-secondary leak rate indications were to be made through independent chemistry measurements.

The first indication of primary-to-secondary system leakage was provided by redundant condenser air ejector monitors which were Victoreen beta scintillators that monitor noble gases. These monitors provided alerts at settings equivalent to 20 gallons per day and high alarms at 50 gallons per day. The chemistry department provided operators daily values for equating gallons per day to counts per minute. This allowed operators to linearly scale the air ejector readings and monitor changing leakage rates. Any increase of 50 gallons per day in four hours was then considered a good indicator for a potential tube rupture and appropriate action was to be taken. Main steam lines were monitored with upgraded gamma detectors which alarm an alert at the equivalent of six gallons per minute and high alarm at 46 gallons per minute. These detectors provided indications of significant leakage. More accurate results were provided by counting samples taken from each steam generator within 30 to 45 minutes. A common steam generator blow-down monitor served as a backup to the other two methods and alarmed at an equivalent 250 gallons per day. Sample lines from each steam generator also passed over radiation detectors, serving as an additional backup.

3.4 Adequacy of Emergency Operating Procedures and Operator Training

The inspectors reviewed the adequacy of the licensee's emergency operating procedure (EOP) E-3, Revision 12, "Steam Generator Tube Rupture," and abnormal operating procedures (AOPs) AP-3A, Revision 6, "Steam Generator Tube Leak," and AP-3B, Revision 8, "Steam Generator Tube Failure."

The inspectors determined that the AOPs and EOP required the operators to evaluate the magnitude and trend for various parameters such as pressurizer level, RCS pressure, activity levels, and primary-to-secondary leak rate. A minor inconsistency was noted between procedures in the level of detail given for securing the turbine-driven auxiliary feedwater pump and isolating it from the affected steam generator. The licensee issued an On-The-Spot Change which added valve numbers for performing this activity to procedure AP-3B and resolved the inconsistency.

The inspectors evaluated the capability of an operating crew to identify and trend primary-to-secondary leakage by conducting a dynamic scenario in the facility simulator. The scenario also served to verify the adequacy of detection and alarm indications in real time. The scenario started with an imposed leakage of 0.01 gallons per minute which ramped to 0.03 gallons per minute in 10 minutes. A 0.03 gallon per minute leak equates to about 50 gallons per day. The operating crew successfully detected the leakage within the first minute. A subsequent step change to 0.1 gallon per minute, or 150 gallons per day, was also detected. Subsequent step changes to 1 gallon per minute and 75 gallons per minute were also detected. Crew actions in response to the changing leakage were appropriate.

The reviewed procedures adequately provided control room operators the guidance necessary for continued monitoring, assessment, and response to identified primary-to-secondary leakage. The symptoms and entry conditions were sufficiently diverse, such that the operators could correctly diagnose a steam generator tube rupture and enter the steam generator tube rupture procedure. The performance of an operating crew in response to simulated leakage conditions was good.

ATTACHMENT 1

PERSONS CONTACT AND EXIT MEETING

1 PERSONS CONTACTED

1.1 Licensee Personnel

D. Bahner, Operations Engineer
*J. Becker, Operations Director
*K. Bych, ISEG Supervisor
*G. Deardorff, Senior Control Operator
*B. Exner, TS Supervisor
*S. Fridley, Outage Services Director
W. Fujimoto, Vice-President
*J. Fuhriman, Engineer
J. Gardner, Senior Engineer
*B. Glynn III, QA
*T. Grebel, Regulatory Services Director
*J. Griffin, Learning Services Director
*C. Harbor, NRC Interface
C. Hartz, QA Engineer
*R. Jett, Learning Services Supervisor
*D. Miklush, Operations Manager
D. Oatley, Acting Maintenance Manager
K. O'Neil, I&C Engineer
*D. Taggart, Nuclear Safety Engineering Director
*D. Vosburg, Engineering Services Director
*J. Welsch, Learning Services Supervisor
J. Young, NQS Acting Manager

1.2 NRC Personnel

*M. Tschiltz, Senior Resident Inspector

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection period.

*Denotes personnel that attended the exit meeting.

2 EXIT MEETING

An exit meeting was conducted on May 25, 1995. During this meeting, the inspector reviewed the scope and generic findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the examiners.

ATTACHMENT 2

SIMULATION FACILITY REPORT

Facility Licensee: Pacific Gas & Electric

Facility Docket Nos: 50-275/323

Operating Test Administered on: May 23, 1995

This observation does not constitute an audit or inspection finding and is not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). This observation does not affect NRC certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required in response to this observation.

While conducting the validation of scenarios for the operating examination, the seismic ground acceleration level required to trip the reactor was 0.4 g. The in-plant seismic trip setpoint value is 0.3 g.