

Diablo Canyon 1

4Q/2011 Plant Inspection Findings

Initiating Events

Mitigating Systems

Significance:  Jun 26, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Fire Hazard Evaluations

The inspectors identified a noncited violation of Diablo Canyon Facility Operating License Condition 2.C (5), "Fire Protection," after Pacific Gas and Electric failed to implement the required compensatory actions described in Equipment Control Guideline 18.7, "Fire Rated Assemblies." On December 28, 2010, the licensee blocked open Fire Doors 175 and 182-2, entrances to the Unit 1 and 2 safety injection pump room to address auxiliary building ventilation flow balance problems. The supporting engineering evaluation failed to identify that the doors were rated fire barriers as described in the fire hazard analysis. If a fire had occurred, these blocked open doors would have allowed smoke and hot gases to pass from fire area AB-1 to impact equipment in adjacent fire areas 3-B-2 (Unit 1) and 3-D-2 (Unit 2). Equipment Control Guideline 18.7 required the licensee to either establish a continuous fire watch on at least one side of the inoperable fire doors or verify that the fire detection or automatic suppression system on at least one side of the fire doors was operable and establish an hourly fire watch. The licensee took corrective actions to establish the required fire watches and enter the finding into the corrective action program as Notification 50409975.

The inspectors concluded that the failure of Pacific Gas and Electric to maintain the fire doors in the rated configuration as described in the Final Safety Analysis Report Update "Fire Hazard Analysis," was a performance deficiency. This finding was more than minor because the degraded fire barriers affected the Mitigating Systems Cornerstone external factors attribute objective to prevent undesirable consequences due to fire. The inspectors concluded that the finding was of very low safety significance (Green) because the finding only affected the ability to reach and maintain cold shutdown conditions. This finding had a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee did not thoroughly evaluate problems associated with modification of the safety injection pump room fire doors such that the resolutions addressed causes and extent of conditions, as necessary [P.1(c)].

Inspection Report# : [2011003](#) (*pdf*)

Significance:  Jun 26, 2011

Identified By: Self-Revealing

Item Type: FIN Finding

Unplanned Loss of Preferred Offsite Power Due to Less than Adequate Work Planning

The inspectors identified a self-revealing finding following the unplanned loss of 230 kV preferred offsite power to Unit 1 due to inadequate work planning. On May 17, 2011, Unit 1 lost preferred offsite power after a technician began cutting a hole in a startup bus control panel using a reciprocating saw. The reciprocating saw induced vibration on the control panel and caused the phase differential protection relay to actuate which separated the startup bus from preferred offsite power. All three Unit 1 emergency diesel generators automatically started after offsite power was lost to the plant vital loads. Procedure AD7.DC8, "Work Control," stated that when performing nonroutine work, including modifications on electrical or instrument equipment, the equipment shall be isolated to prevent any unintended equipment actuations. The licensee had authorized the cutting work while the Unit 1 startup bus was in service. The licensee took corrective action to restore offsite power and entered the finding into the corrective action program as Notification 50402706.

The inspectors determined that the failure to adequately evaluate the effect of the cutting activity on the energized plant equipment was a performance deficiency. This performance deficiency was more than minor because the finding was associated with the Mitigating Systems Cornerstone human performance attribute and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The senior reactor analyst utilized Table 3.7 from the plant specific risk-informed notebook and determined that the risk based on Phase 2 estimation was Green. Additionally, the analyst performed a bounding analysis that corroborated the Phase 2 result based on three complete losses of preferred power during the refueling outage with a total exposure time of 2.9 hours. Using the standardized plant analysis risk model for Diablo Canyon Units 1 and 2, the analyst quantified the conditional core damage probability for any initiator resulting in a consequential loss of offsite power as 1.2×10^{-4} . Given these conditions, the analyst noted that the change in core damage frequency could be approximated as the product of these two values (3.9×10^{-8}). This indicated that the subject finding was of very low risk significance (Green). This finding has a crosscutting aspect in the area of human performance associated with the work control component, in that Pacific Gas and Electric failed to appropriately plan work activities by incorporating risk insights, job site conditions, and plant structures, systems, and components [H.3 (a)].

Inspection Report# : [2011003](#) (pdf)

Significance: G Jun 26, 2011

Identified By: Self-Revealing

Item Type: FIN Finding

Unplanned Loss of Preferred Offsite Power Due to the Failure to Follow Work Instructions

The inspectors identified a self-revealing finding following two unplanned losses of 230 kV preferred offsite power to Unit 1 due to personnel errors. On May 26, 2011, Unit 1 lost preferred offsite power after a technician incorrectly installed test equipment on the Unit 2 startup bus control circuit during a post-modification test. The Unit 1 phase differential protection relay actuated and separated the startup bus from preferred offsite power after the technician energized the test circuit. On May 27, 2011, Unit 1 again lost preferred offsite power after a technician incorrectly installed test equipment on a Unit 1 wiring termination when the post-modification test specified that the test equipment was to be installed on Unit 2. The Unit 1 phase differential protection relay actuated and separated the startup bus from preferred offsite power. In each event, all three emergency diesel generators automatically started after offsite power was lost to the plant vital loads. The licensee took corrective action to reestablish offsite power and entered the finding into the corrective action program as Notifications 50405004 and 50405010.

The inspectors concluded that the failure to follow post-modification testing work instructions was a performance deficiency. This performance deficiency was more than minor because the finding was associated with the Mitigating Systems Cornerstone human performance attribute and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The senior reactor analyst utilized Table 3.7 from the plant specific risk-informed notebook and determined that the risk based on Phase 2 estimation was Green. Additionally, the analyst performed a bounding analysis that corroborated the Phase 2 result based on three complete losses of preferred power during the refueling outage with a total exposure time of 2.9 hours. Using the standardized plant analysis risk model for Diablo Canyon Units 1 and 2, the analyst quantified the conditional core damage probability for any initiator resulting in a consequential loss of offsite power as 1.2×10^{-4} . Given these conditions, the analyst noted that the change in core damage frequency could be approximated as the product of these two values (3.9×10^{-8}). This indicated that the subject finding was of very low risk significance (Green). This finding had a crosscutting aspect in the area of human performance associated with the work practices component because the licensee failed to effectively communicate human error prevention techniques; and consequently, these techniques were not used commensurate with the risk of the assigned task [H.4(a)].

Inspection Report# : [2011003](#) (pdf)

Significance: G Jun 26, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Less Than Adequate Evaluation of New Security Modifications

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," after Pacific Gas and Electric failed to adequately evaluate the impact of protected area boundary modifications. These modifications affected the ability of plant operators to transfer water from the raw water storage

reservoirs to the auxiliary feedwater system using temporary hoses. Plant engineers authorized a series of security modifications which included the installation of physical intrusion barriers, including delay fences and razor wire between the raw water reservoirs and the auxiliary feedwater system. The licensing basis evaluation did not address raw water makeup to the auxiliary feedwater system using temporary hoses as described in Final Safety Analysis Report Update Section 6.5, "Auxiliary Feedwater System," and Section 3.7.6, "Seismic Evaluation to Demonstrate Compliance with the Hosgri Earthquake Requirements Utilizing a Dedicated Shutdown Flowpath." The licensee took immediate corrective actions to establish a route for the temporary hoses, including preplanned security compensatory measures, and entered this finding into the corrective action program as Notification 50410997.

The failure to adequately evaluate the impact of the security modifications on the plant licensing and design bases was a performance deficiency. This performance deficiency was more than minor because the finding affected the Mitigating Systems Cornerstone design control attribute and objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors concluded that the finding was of very low safety significance (Green) because the finding was confirmed not to result in the loss of operability or functionality. This finding had a crosscutting aspect in the area of Problem Identification and Resolution, associated with the Corrective Action Program component, because the licensee failed to thoroughly evaluate the security modifications such that the resolutions addressed causes and extent of conditions, as necessary [P.1(c)].

Inspection Report# : [2011003](#) (*pdf*)

Significance:  Mar 27, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Design Control for the Preferred Offsite Power System

The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," after Pacific Gas and Electric failed to ensure that the preferred offsite power system design basis was correctly translated into electrical dynamic loading Calculations 357A-DC, "Units 1 and 2 Load Flow, Short Circuit and Motor Starting Analysis," Revision 12 and 359-DC, "Offsite Power Dynamic Analysis," Revision 8. The licensee did not include the limiting load flow cases representing the largest total onsite demand for both units as required by the plant design basis. On July 7, 2010, the NRC clarified that the Diablo Canyon current licensing basis required the preferred offsite power system to have adequate capacity and capability to supply the most limiting loading requirements, including a dual unit trip. The licensee subsequently entered the condition into the corrective action program as Notification 50289590 and revised the station dynamic loading analysis to reflect the increased onsite power demand. The inspectors concluded that the failure to ensure that the dynamic loading analysis included all design basis requirements was a performance deficiency. This performance deficiency is more than minor because the finding was associated with the Mitigating Systems Cornerstone initial design control attribute and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because the inspectors were unable to conclude that the preferred offsite power system had not been inoperable for greater than the allowed Technical Specification outage time, a senior reactor analyst performed a bounding Phase 3 analysis. The Phase 3 analysis demonstrated that the subject finding was of very low safety significance (Green), because of the small increase of probability of a loss of offsite power that the finding represented. This finding had a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee did not thoroughly evaluate the current licensing basis requirements to ensure that resolutions addressed causes and extent of conditions, as necessary. [P.1(c)]

Inspection Report# : [2011002](#) (*pdf*)

Barrier Integrity

Significance:  Sep 25, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Maintain the Control Room Habitability System in the Design Configuration

The inspectors identified a Green noncited violation of Technical Specification 5.5.19, "Control Room Envelope Habitability Program," after the licensee failed to maintain the Unit 1 control room ventilation train in the design configuration. The inspectors identified that Unit 1 control room ventilation system was in a degraded/non-conforming condition on August 31, 2011. The inspectors observed airflow bypassing the control room inlet header through disconnected ductwork. Technical Specification 5.5.19 required the licensee to maintain the habitability system in the most limited configuration used during the tracer gas in-leakage test. The disconnected ductwork was a more limiting condition than the tested configuration. The licensee took corrective action to declare the control room envelope inoperable and entered the finding into the corrective action program as Notification 50425114.

The inspectors determined that the failure of the licensee to maintain the control room habitability system in the design configuration was a performance deficiency. This finding was more than minor because it was associated with the configuration control attribute of the Barrier Integrity Cornerstone and affected the cornerstone objective to provide reasonable assurance for the control room physical design to protect from radionuclide releases caused by accidents or events. The inspectors concluded that the finding was of very low safety significance (Green) because the finding only represented a degradation of the radiological barrier function provided for the control room. This finding had a crosscutting aspect in the area of human performance associated with work control in that the licensee failed to appropriately plan work activities consistent with nuclear safety.

Inspection Report# : [2011004](#) (*pdf*)

Significance:  Sep 25, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow a Procedural Requirement for Reactivity Manipulation

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Procedures," after operations personnel conducted a reactivity manipulation during shift turnover. Procedure OP1.ID3, "Reactivity Management Program," required plant operators to suspend reactivity manipulations during shift turnover. On March 27, 2011, plant operators conducted a continuous dilution during shift turnover. The licensee entered this condition into the corrective action program as Notification 50407054.

The inspectors concluded that the failure of operations personnel to follow Procedure OP1.ID3 was a performance deficiency. The finding was more than minor because the performance deficiency was associated with the procedure adherence area of the human performance attribute of the barrier integrity cornerstone and affected the objective to provide reasonable assurance that design barriers will protect the public from radionuclide releases. The inspectors concluded that the finding was of very low safety significance (Green) because only the fuel barrier was affected by the performance deficiency. The finding has a crosscutting aspect in the area of human performance, associated with work practices component, because the licensee failed to define and effectively communicate expectations regarding procedural compliance.

Inspection Report# : [2011004](#) (*pdf*)

Significance:  Jun 26, 2011

Identified By: NRC

Item Type: FIN Finding

Inadequate Review of Severe Accident Management Guidelines

The inspectors identified a finding after Pacific Gas and Electric failed to periodically review and update the severe accident management guidelines. Procedure OM10.ID5, "Severe Accident Management," required the licensee to review and update the severe accident management guidelines biennially to ensure that any changes in plant design or procedures, experience in severe accident management requalification training, and any changes in industry understanding of severe accidents were incorporated into the severe accident management guidelines. As a result of the licensee's failure to implement the periodic review, the severe accident management guidelines did not incorporate the latest owners' group guidance or recent plant design and hardware changes. The licensee took corrective actions to implement the biennial reviews and entered this finding into the corrective action program as Notification 50399554.

Pacific Gas and Electric's failure to follow procedural requirements for periodic review of the severe accident management guidelines was a performance deficiency. The finding was more than minor because if left uncorrected, the failure to review and update the severe accident management guidelines has the potential to lead to a more

significant safety concern. This finding affected the barrier integrity cornerstone because the severe accident management guidelines are procedures that would be used to maintain the functionality of the containment should a severe accident occur. The inspectors concluded that the finding was of very low safety significance because it did not represent a degradation of the radiological, smoke, or toxic atmosphere barrier function; or represent an actual open pathway in the physical integrity of the reactor containment; or involve the function of the containment hydrogen igniters. The finding did not have any crosscutting aspects because the performance deficiency occurred more than three years ago and is not indicative of current licensee performance in that the licensee has improved the design review process since the performance deficiency occurred.

Inspection Report# : [2011003](#) (*pdf*)

Significance:  Mar 27, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Document Design Basis of Containment Fan Cooler Unit Cooling Coil Casings

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to December 15, 2010, the licensee failed to assure that the design basis function of the containment fan cooler unit casings was translated into specifications, drawings, procedures, and instructions. The licensee has entered this violation into the corrective action program as Notification 50384801.

The inspectors determined that the failure to establish measures to assure that the design basis function of the containment fan cooler unit cooling coil casings was translated into specifications, drawings, procedures, and instructions was a performance deficiency. The finding was more than minor because it adversely affected the barrier integrity cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Using Inspection Manual Chapter 0609, Attachment 4, "Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because it did not represent a degradation of the barrier function of the control room against a smoke or toxic barrier, an open pathway in the physical integrity of reactor containment, or an actual reduction in function of hydrogen igniters in the reactor containment. The inspectors determined that this finding has a crosscutting aspect in the area of human performance because the licensee failed to ensure that personnel, equipment, procedures and other resources were available to assure nuclear safety by maintaining complete, accurate and up-to-date design documentation. [H.2(c)]

Inspection Report# : [2011002](#) (*pdf*)

Significance:  Mar 27, 2011

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate Design Control for the Auxiliary Building Ventilation System Control Panel Modification

The inspectors reviewed a self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," after Pacific Gas and Electric failed to ensure that the design basis requirements for single failure criteria were correctly translated into auxiliary building ventilation system controls modifications. On January 10, 2011, a single failure of a Unit 2 auxiliary building ventilation Train "A" damper resulted in the loss of system safety function for both trains. The loss of safety function occurred because of a logic error in the programmable logic controllers. The licensee programmed and installed the logic controllers in November 2010 for Unit 1 and in November 2009 for Unit 2. The inspectors identified that the engineering department performed a less than adequate review to identify the single point vulnerability during the modification review process. Pacific Gas and Electric entered this issue into the corrective action program as Notification 50370698, replaced the failed damper, and implemented compensatory actions to mitigate the design deficiency. The licensee plans to implement corrective actions to program the logic controller program consistent with the design basis requirements.

The inspectors concluded that the failure to ensure that the modification met design basis requirements was a performance deficiency. This performance deficiency is more than minor because it was associated with the design control attribute of the Barrier Integrity Cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers and radiological barriers, including the Auxiliary Building, protect the public

from radionuclide releases caused by accidents or events. The inspectors determined that the finding had very low safety significance because the finding only represents degradation to the radiological barrier function provided for the auxiliary building. This finding had a crosscutting aspect in the area of human performance associated with work practices because the licensee did not ensure human error prevention techniques, such as self and peer checking, were effectively used in the preparation of the modification. [H.4(a)]

Inspection Report# : [2011002](#) (pdf)

Emergency Preparedness

Significance:  Sep 25, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Ensure Emergency Response Organization Qualifications

A noncited violation of 10 CFR 50.47(b)(10) was identified for the licensee's failure to ensure a range of protective actions is available for emergency workers during emergencies. Specifically, an operator filled an on-shift emergency response organization watch position with expired self-contained breathing apparatus respiratory protection qualifications. The licensee has entered this issue into the corrective action program as Notification 50420127.

The failure to ensure that an emergency response organization on-shift watch stander was respiratory protection qualified is a performance deficiency. This finding is greater than minor because it affects the emergency response organization readiness attribute of the emergency preparedness cornerstone to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. The finding is of very low safety significance because it was not a loss of a planning standard function. The finding had a human performance crosscutting aspect of conservative assumptions under the decision making component because the licensee did not ensure that personnel filling the minimum shift staffing emergency response organization positions were qualified to take the watch.

Inspection Report# : [2011004](#) (pdf)

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

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