UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

September 12, 2011

Mr. Anthony Vitale
Vice-President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES NUCLEAR PLANT COMPONENT DESIGN BASES INSPECTION AND TEMPORARY INSTRUCTION 2515/177, "MANAGING GAS ACCUMULATION IN EMERGENCY CORE COOLING, DECAY HEAT REMOVAL, AND CONTAINMENT SPRAY SYSTEMS REPORT" 05000255/2011009

Dear Mr. Vitale:

On August 25, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed a Component Design Bases Inspection (CDBI) and Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," inspection at your Palisades Nuclear Plant. The enclosed report documents the results of this inspection, which were discussed on July 15, 2011, with the Mr. A. Blind, and on August 25, 2011, with Mr. O. Gustafson and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, four NRC-identified findings of very low safety significance were identified. Three of the findings involved a violation of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy

If you contest the subject or severity of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Palisades Nuclear Plant. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at the Palisades Nuclear Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Ann Marie Stone, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-255
License No. DPR-20

Enclosure: Inspection Report 05000255/2011009;
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-255
License No:	DPR-20
Report No:	05000255/2011009
Licensee:	Entergy Nuclear Operations, Inc.
Facility:	Palisades Nuclear Plant
Location:	Covert, MI
Dates:	June 13 through August 25, 2011
Inspectors:	A. Dunlop, Senior Engineering Inspector, Lead B. Jose, Senior Engineering Inspector, Assistant Lead N. J. Féliz Adorno, Engineering Inspector, TI 2515/177 J. Gilliam, Engineering Inspector, Electrical M. Jones, Engineering Inspector, Mechanical C. Brown, Engineering Inspector, Operations N. Della Greca, Electrical Contractor S. Spiegelman, Mechanical Contractor
Observer:	R. Baker, Operations Examiner N. Hansing, Summer Intern
Approved by:	Ann Marie Stone, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000255/2011009, 06/13/2011 – 08/25/2011; Palisades Nuclear Plant, Component Design Bases Inspection (CDBI), Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

The inspection was a 3-week onsite baseline inspection that focused on the design of components. The inspection was conducted by regional engineering inspectors and two consultants. Four (Green) finding were identified by the inspectors. Three of the findings were considered Non-Cited Violations (NCVs) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be (Green) or assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

- Green. The inspectors identified a finding of very low safety significance involving the licensee's failure to adequately evaluate the enclosure installed over the 1F/1G Buses to be in compliance with all applicable requirements. Specifically, the licensee did not ensure that the new enclosure would not affect start-up transformer 1-2 during a design basis wind event. There were no violations of NRC regulations identified. This finding was entered into the licensee's corrective action program, which resulted in replacing inadequate eye-bolts.

  The performance deficiency was determined to be more than minor because it was associated with the Initiating Events Cornerstone attribute of transient initiator (loss of offsite power) and affected the cornerstone objective to limit the likelihood of those events that upset plant stability. Specifically, there was reasonable doubt as to whether the enclosure could have withstood a design wind event, which would have increased the probability that severe weather could have affected the ability of startup transformer 1-2 to provide offsite power. The finding screened as very low safety significance (Green) because the transient initiator would not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. This finding has a cross-cutting aspect in human performance because the licensee did not ensure reviews of safety significant decisions to verify the validity of the underlying assumptions or identify possible unintended consequences. Specifically, the licensee's design reviews for the 1F/1G Bus enclosure modification did not address the potential impact on start-up transformer 1-2 if the enclosure failed during a design basis wind event. [H.1(b)]. (Section 1R21.5.b.(1)).

- Green. The inspectors identified a finding of very low safety significance and associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to establish appropriate procedures for managing gas accumulation issues. Specifically, three examples were identified as follows: (1) Procedure ESSO-10 did not ensure that identified voids would be successfully removed by flushing; (2) Procedure SOP-3 did not specify a maximum flowrate which analyzed net positive suction head and potential air entrainment due to

vortexing during reduced inventory operations when in shutdown cooling; and (3) Procedure SOP-3 did not contain instructions to vent the steam that could form at the low pressure safety injection discharge piping following a shutdown loss of cooling accident prior to system initiation. This finding was entered into the licensee's corrective action program.

The performance deficiency was associated with the Initiating Events and Mitigating System Cornerstones, and determined to be more than minor because, if left uncorrected, it would have the potential to lead to a more significant safety concern. The finding screened as of very low safety significance (Green) because: (1) Procedure ESSO-10 was a deficiency confirmed not to result in loss of operability in that a review of recent periodic gas monitoring results determined that the affected locations were full of water; (2) Procedure SOP-3 associated with reduced inventory operations did not meet any of the criteria that required a Phase II or III analysis in that it did not rise to the level that there was an increase in the likelihood of a loss of shutdown cooling; and (3) Procedure SOP-3 associated with the steam void formation did not require a quantitative assessment because it met each item for the core heat removal, inventory control, power availability, containment control, and reactivity guidelines. This finding had a cross-cutting aspect in the area of problem identification and resolution because the licensee did not thoroughly evaluate relevant external operating experience. Specifically, the licensee's evaluation of gas related issues in response to Generic Letter 2008-01 was deficient in that, the licensee did not identify two potential gas sources, vortexing during reduced inventory and flashing following a shutdown loss of coolant accident, and did not address the minimum flowrate required to remove gas in piping when flushing. [P.2(a)]. (Section 4OA5.1c.(2))

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding of very low safety significance and associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to adequately review the design of emergency core cooling and containment spray systems with respect to the potential to accumulate voids. Specifically, the design reviews did not consider system interactions, evaluate the acceptability of locations believed to be inaccessible for periodic monitoring, and ensure the validity of the assumption that some high point vents were periodically used to ensure that some locations were full of water when excluding them from periodic monitoring. This finding was entered into the licensee's corrective action program.

  The performance deficiency was associated with Mitigating System Cornerstone and determined to be more than minor because, if left uncorrected, it would have the potential to lead to a more significant safety concern. The finding screened as of very low safety significance (Green) because the finding involved a design or qualification deficiency that did not result in a loss of operability. Specifically, based on a historical review of recent maintenance activities, current process parameters, and, in some locations, ultrasonic examinations, the licensee's operability evaluation concluded there were no adverse voids at these locations. This finding had a cross-cutting aspect in the area of human performance because the licensee did not ensure supervisory oversight of work activities associated with the Generic Letter 2008-01 design reviews such that nuclear safety is supported. Specifically, oversight did not ensure that the contractor's design reviews considered plant specific information such as system interactions and at-power operations. [H.4(c)]. (Section 4OA5.1c.(1))

- Green. The inspectors identified a finding of very low safety significance and associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to develop conservative void size acceptance criteria. Specifically, the void size acceptance criteria was based on an incorrect safety injection and refueling water base tank elevation and a 10 percent degradation of the design rated flowrates of the pumps. When the correct base tank elevation and lower allowable pump flowrates were considered, the void acceptance criteria were non-conservative. This finding was entered into the licensee's corrective action program.

  The performance deficiency was determined to be more than minor because it was associated with the Mitigating System Cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as of very low safety significance (Green) because the finding was a design or qualification deficiency confirmed not to result in loss of operability. Specifically, a review of recent periodic gas monitoring results determined that no voids were present at the suction side of the affected pumps. This finding had a cross-cutting aspect in the area of human performance because the licensee did not ensure supervisory oversight of work activities associated with actions related to Generic Letter 2008-01 such that nuclear safety is supported. Specifically, oversight did not ensure that the contractor's development of void acceptance criteria relied on limiting design values. [H.4(c)]. (Section 4OA5.1c.(3))

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (71111.21)

.1 Introduction

The objective of the component design bases inspection is to verify that design bases have been correctly implemented for the selected risk significant components and that operating procedures and operator actions are consistent with design and licensing bases. As plants age, their design bases may be difficult to determine and an important design feature may be altered or disabled during a modification. The Probabilistic Risk-Assessment (PRA) model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectable area verifies aspects of the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for which there are no indicators to measure performance.

Specific documents reviewed during the inspection are listed in the Attachment to the report.

.2 Inspection Sample Selection Process

The inspectors used information contained in the licensee's PRA and the Palisades' Standardized Plant Analysis Risk Model to identify two scenarios to use as the basis for component selection. The scenarios selected were a station blackout event and a small break loss-of-cooling-accident. Based on these scenarios, a number of risk significant components were selected for the inspection.

The inspectors also used additional component information such as a margin assessment in the selection process. This design margin assessment considered original design reductions caused by design modification, power uprates, or reductions due to degraded material condition. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as performance test results, significant corrective actions, repeated maintenance activities, Maintenance Rule (a)(1) status, components requiring an operability evaluation, NRC resident inspector input of problem areas/equipment, and system health reports. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in depth margins. A summary of the reviews performed and the specific inspection findings identified are included in the following sections of the report.

The inspectors also identified procedures and modifications for review that were associated with the selected components. In addition, the inspectors selected operating experience issues associated with the selected components.

This inspection constituted 21 samples as defined in Inspection Procedure 71111.21-05.

.3 Component Design

a. Inspection Scope

The inspectors reviewed the Final Safety Analysis Report (FSAR), Technical Specifications (TS), design basis documents, drawings, calculations and other available design basis information, to determine the performance requirements of the selected components. The inspectors used applicable industry standards, such as the American Society of Mechanical Engineers (ASME) Code, Institute of Electrical and Electronics Engineers (IEEE) Standards and the National Electric Code, to evaluate acceptability of the systems' design. The NRC also evaluated licensee actions, if any, taken in response to NRC issued operating experience, such as Bulletins, Generic Letters (GLs), Regulatory Issue Summaries (RISs), and Information Notices (INs). The review was to verify that the selected components would function as designed when required and support proper operation of the associated systems. The attributes that were needed for a component to perform its required function included process medium, energy sources, control systems, operator actions, and heat removal. The attributes to verify that the component condition and tested capability was consistent with the design bases and was appropriate may include installed configuration, system operation, detailed design, system testing, equipment and environmental qualification, equipment protection, component inputs and outputs, operating experience, and component degradation.

For each of the components selected, the inspectors reviewed the maintenance history, preventive maintenance activities, system health reports, operating experience-related information, vendor manuals, electrical and mechanical drawings, and licensee corrective action program (CAP) documents. Field walkdowns were conducted for all accessible components to assess material condition and to verify that the as-built condition was consistent with the design. Other attributes reviewed are included as part of the scope for each individual component.

The following 17 components were reviewed:

- Emergency Diesel Generator (EDG) 1-1: The inspectors reviewed the equipment specifications, vendor manual, and the vendor nameplate rating to determine the EDG rated output capability. The inspectors also reviewed the EDG loading calculation to assure that the worst case loading was considered and that process controlled loads and load increases due to overvoltage/over-frequency conditions had also been considered. The review included an evaluation of selected motor loads to confirm that the horsepower ratings used in the calculation were based on conservative design and operating conditions. The inspectors reviewed the EDG loading sequence, as well as the dynamic analysis to confirm that the EDG was capable of starting, accelerating, and carrying loads during loss of offsite power (LOOP) with and without a loss-of-coolant-accident (LOCA). The inspectors reviewed the load breaker ampacity and short circuit rating to confirm that the EDG breaker was capable of carrying maximum calculated loads and interrupting anticipated faults. Additionally, the inspectors reviewed adequacy of generator protection, including protective relay settings and breaker-fuse coordination to assure that the breakers did not trip under maximum loading and that faults were interrupted by the breaker/fuse closest to

the fault. The breaker and the EDG start-stop logic and control wiring diagrams, including available control power, were reviewed to confirm compliance with the system description and operation requirements. Additionally, the inspectors reviewed normal and abnormal operating procedures to confirm that they incorporated appropriate load ratings and EDG loading limitations. The inspectors reviewed the results of recent surveillance tests to confirm that test conditions were consistent with the design basis loading and the TS requirements.

The inspectors also reviewed the EDG air start system to verify conformance with its design basis requirements and to verify the capability of the design to perform its intended function. The inspectors verified the capacity of the air start tanks to ensure volume and pressure were being maintained in accordance with system design requirements. The inspectors reviewed EDG surveillances to verify past performance of the EDG and the air start system.

- Non-Safety-Related (NSR) Diesel Generator: The inspectors reviewed maintenance history and surveillance test results to verify the NSR diesel generator would start if needed as another source of power during a station blackout (SBO). The inspectors also reviewed the fuel supply calculation to determine if there was enough fuel available to support its function.

- 2.4 kV Switchgear Bus (1C): The inspectors reviewed load flow calculations, short circuit calculations, and incoming breakers protective relay trip setpoints to evaluate the adequacy of the switchgear bus and breakers to carry anticipated loads under limiting condition and to withstand and interrupt maximum available faults. The review included electrical protection settings versus equipment ratings, prevention of spurious tripping, upstream-downstream coordination, and capability of protective devices to guard against low magnitude faults. The inspectors reviewed the voltage profile of the offsite system, voltage drop calculations, and the degraded voltage relays setting to confirm that adequate voltage was available at the terminals of the safety-related loads under worst operating and accident conditions. The inspectors also reviewed breaker logic and control wiring diagrams to ensure that the breakers operation conformed to the system description and the system operation requirements. The review also verified that adequate voltage was available to the control circuits for the proper closing and tripping of breakers. In addition, the inspectors verified that the automatic fast transfer of loads from the preferred to the alternate offsite source could be accomplished under postulated conditions and that actuation of the degraded and loss of voltage relays initiated EDG starting sequence. The control of bus tie-breakers was also reviewed to assure that paralleling of redundant sources was not allowed. The inspectors reviewed maintenance and testing procedures to confirm that maintenance and testing of breakers and bus were in accordance with industry standards and manufacturer recommendations.

- DC Batteries (D-01): The inspectors reviewed various electrical calculation associated with the safety-related DC battery to verify the battery was designed to serve its function and pick up the required loads during a LOCA and SBO. These calculations included battery sizing, voltage drop, minimum voltage, and

short circuit. The calculation review verified methodology, design inputs, assumptions, and results. The inspectors also reviewed TS surveillance requirements and completed surveillances to confirm that sufficient capacity existed for the battery to perform its safety function. The battery's performance history including cell voltage, charging, specific gravity, electrolyte level, and temperature correction were also reviewed to ensure acceptance criteria were met and performance degradation would be identified.

- DC Bus D10: The inspectors reviewed various electrical calculation including voltage drop, short circuit, and minimum voltage calculation to verify methodology, design inputs, assumptions, and results. The inspectors reviewed the breaker/fuse coordination for the bus to ensure adequate coordination in case of a fault.

- High Pressure Safety Injection (HPSI) Pump (P-66B): The design basis parameters (temperature, flow, and pressure), as described in the FSAR and design basis document, were reviewed to assure consistency with selected calculations and test records. This review included operating conditions, emergency conditions, and minimum bypass flow. The inspectors compared maintenance and testing requirements with plant maintenance and test performance records to assure timeliness of maintenance and those actions were completed for the identified issues. Trends of test results were reviewed to assure consistent performance of the pump or determine if actions were initiated for declining performance. Records of pump vibration and oil test results were also reviewed as an indicator of acceptable pump performance. The inspectors reviewed motor sizing calculation and motor/pump performance curves to confirm that the electrical load was correctly included in the EDG and bus loading calculations. The inspectors also reviewed motor feeder ampacity and short circuit capability. Additionally, the inspectors reviewed the protective relay setpoint calculations and relay settings to assess the adequacy of the circuit protection under normal and faulted conditions and ensure that trip setpoints would not permit the feeder breaker to trip during pump motor highest loading conditions. Available motor voltage was also reviewed to confirm the availability and capability of the pump to perform its safety function under most limiting conditions. The inspectors reviewed motor control logic and wiring diagrams to ascertain compliance with system operation requirements and confirmed adequacy of environmental qualification of motor under accident conditions. The electrical separation was also reviewed to ensure that the redundancy of safety divisions was not compromised. The inspectors reviewed motor testing and inspection procedures for on-line and off-line conditions to assure that the testing parameters were adequate and in accordance with industry standards. The review also included recent electrical maintenance and test activities to confirm the readiness of the component to perform its required functions during system demands.

- Containment Sump Recirculation Valve (CV-3030): The inspectors reviewed the design basis documentation for the containment sump recirculation valve to identify functional requirements and to assure that the requirements were fully

considered in the valve design. The maintenance activities were compared with maintenance program requirements for timeliness. Calculations were reviewed to evaluate any changes that have been made for the valve and determine the limiting thrust and torque from the valve operator. Trending of valve stroke time was reviewed to evaluate the longer term performance indicating the overall status of the valve.

- Turbine-Driven Auxiliary Feedwater (AFW) Pump (P-8B): The inspectors reviewed the turbine-driven AFW pump to assure that the pump and turbine meets the design and performance requirements identified in the AFW system design basis and the FSAR description. The inspectors compared the identified minimum flow requirements with the design calculations and inservice testing (IST) results to assure that adequate flow would be available at operating pressure. The inspectors also reviewed the flow distribution between steam generators during a SBO event and limiting design conditions to determine if sufficient flow was available. The inspectors reviewed the water supply from the condensate storage tank (CST) and the associated vortex suppression modification. The inspectors also reviewed the availability of backup water sources in the event of the loss of the CST. Included in the review of the water sources was a review of the ability to take manual action to open and align supporting equipment within identified time periods. Manual action to identify the associated steam generator impacted by a steam line break and respond to the event within a specified time was also reviewed by the inspectors. Finally, the inspectors reviewed the over-speed protection system and the mechanical controls related to the system.

- AFW Turbine Steam Admission Valve (CV-0522B): The inspectors reviewed the steam admission valve for the AFW steam turbine to assure that valve would open and close on demand. Test results were reviewed to evaluate opening and closing times and valve function. The results from valve and turbine testing were inspected to assure that an adequate volume of steam (at design temperature) was consistent with design requirements. The basis of maintenance intervals were compared with manufacturer's recommendations to assure that timely inspections and tests were performed. The inspectors evaluated a 10 CFR Part 21 notice from the manufacturer for the disc stack and action that was taken by engineering to evaluate the notification. The inspectors reviewed electrical schematic diagrams and control logic diagrams to ensure separation from other trains. Inspectors also reviewed solenoid vendor specification data and 125VDC minimum voltage/voltage drop calculations to confirm the valve's solenoid would perform their safety function.

- AFW Flow Control Valve (CV-0727): The inspectors reviewed the AFW flow control valve for normal and emergency shutdown functions to assure that it was capable of operating on demand within specified time requirements. The inspectors reviewed the diagnostic test records, including trend data for flow, set-up margin, and thrust/torque requirements to ensure they were within design allowable. The inspectors reviewed the air supply logic and nitrogen back-up supplies, as well as the fail-open actuator designs to assure that the normal and

failed conditions were addressed in the design. The inspectors reviewed electrical schematic diagrams and control logic diagrams to ensure separation from other trains. Inspectors also reviewed solenoid vendor specification data and 125VDC minimum voltage/voltage drop calculations to confirm the valve's solenoid would perform their safety function.

- Service Water (SW) Pump (P-7B): The inspectors reviewed SW pump calculations, maintenance history, operations history, and design requirements to verify that the pump was maintained such that it remains capable of operating within design basis requirements. The inspectors reviewed IST results and SW system performance testing to ensure that design basis requirements were correctly translated into test acceptance criteria and that the tests demonstrated the pumps capability to perform its design basis functions. The inspectors reviewed motor sizing calculation and motor/pump performance curves to confirm that the electrical load was correctly included in the EDG and bus loading calculations. The inspectors also reviewed motor feeder ampacity and short circuit capability. Additionally, the inspectors reviewed the protective relay setpoint calculations and relay settings to assess the adequacy of the circuit protection under normal and faulted conditions and ensure that trip setpoints would not permit the feeder breaker to trip during pump motor highest loading conditions. Available motor voltage was also reviewed to confirm the availability and capability of the pump to perform its safety function under most limiting conditions. The inspectors reviewed motor control logic and wiring diagrams to ascertain compliance with system operation requirements and confirmed that the electrical separation was sufficient to ensure that the redundancy of safety divisions was not compromised. The inspectors reviewed motor testing and inspection procedures for on-line and off-line conditions to assure that the testing parameters were adequate and in accordance with industry standards. The review also included recent electrical maintenance and test activities to confirm the readiness of the component to perform its required functions during system demands.

- Service Water to EDG (CV-0885): The inspectors verified that valve CV-0885 remained capable of performing as intended during design basis conditions. The inspectors reviewed calculations and diagnostic test results to ensure that the licensee has correctly translated the design basis into work control procedures and test procedures used to verify valve performance. The inspectors reviewed the licensee's air-operated valve (AOV) program to ensure that the valve was being maintained in accordance with program requirements. The inspectors reviewed electrical schematic diagrams and control logic diagrams to ensure separation from other trains. Inspectors also reviewed solenoid vendor specification data and 125VDC minimum voltage/voltage drop calculations to confirm the valve's solenoid would perform its safety function.

- Service Water Strainer for P-7B (BS1319): The inspectors also reviewed procedures, surveillances results, trend data, and differential pressure and debris loading calculations to ensure the strainers have remained capable of performing their intended functions while subject to limiting design conditions. The

inspectors reviewed strainer design requirements to ensure debris loading assumptions were consistent with industry guidance. The inspectors also reviewed the monitoring program, along with maintenance and operations procedures to verify that historical differential pressure remained below the licensee established acceptance criteria for service water system operability.

- Power-Operated Relief Valve (PORV) (PRV-1043B): The inspectors reviewed the design requirements of the replacement PORV to assure that it met the valve specifications for flow and pressure. As part of the review, the inspectors reviewed the manufacturer's test of the valve including the environmental qualification tests/evaluations to assure that it was capable of meeting the design specifications. Stroke time for the PORV was reviewed to ensure that test requirements have been met. The inspectors reviewed past maintenance history to evaluate the basis for replacement. In addition, the inspectors compared maintenance intervals and activities specified by the manufacturer with the maintenance program to determine if maintenance activities were consistent. The inspectors reviewed minimum voltage/voltage drop calculations to determine the effects of degraded voltage conditions on minimum power and voltage requirements. The inspectors also verified separation from other trains and divisions by reviewing electrical drawings.

- PORV Block Valve (MO-1043A): The inspectors reviewed the valve control diagram, the system functional description, FSAR requirements, and selected calculations to ascertain compliance system operation requirements. Included in the review were the comparison motor torque and valve minimum torque to open and close and the maximum torque in relation to the weak link analysis. A review was performed of diagnostic tests including the trending of opening and closing time of the valve to evaluate past operating performance. The inspectors also reviewed breaker sizing and circuit protection, including coordination with upstream breaker, to confirm that the circuit was adequately protected under faulted conditions and ensure its availability under limiting loading conditions. The inspector reviewed the voltage available at the motor terminals under degraded voltage conditions to ensure that it was sufficient for the proper operation of the valve during system demands. The control voltage drop calculations and control fuse sizing were also reviewed to confirm the availability of the circuit on demand. The inspectors reviewed the environmental qualification of the valve operator to confirm its capability to perform its safety function under postulated accident conditions. The inspectors also evaluated maintenance requirements and test procedures, as well as recent maintenance and test activities to confirm availability of the component during system requirements.

- Main Steam Isolation Valve (CV-0501): The inspectors reviewed the main steam isolation valve to ensure the valve remain capable of performing its intended safety function to close upon receiving an isolation signal. The inspectors reviewed IST stroke time data and AOV program requirements to ensure valve performance was being appropriately monitored. The inspectors reviewed electrical schematic diagrams and control logic diagrams to ensure separation

from other trains. Inspectors also reviewed solenoid vendor specification data and 125VDC minimum voltage/voltage drop calculations to confirm the valve's solenoid would perform its safety function.

- Atmospheric Dump Valves (ADVs) (CV-0780): The inspectors reviewed CV-0780 performance to verify conformance with design basis requirements. The inspectors reviewed AOV calculations to verify the licensee maintains sufficient valve margin under design basis accident conditions. The inspectors reviewed valve calibration data to verify that the valve setup requirements were ensured when maintenance was performed. The inspectors reviewed the licensee's AOV program to verify that valve maintenance was in accordance with program requirement. The inspectors also reviewed the back-up nitrogen supply system to ensure the valves closing capability was ensured and maintained during an SBO. The inspectors reviewed electrical schematic diagrams to ensure separation from other trains. Inspectors also reviewed solenoid vendor specification data and 125VDC minimum voltage/voltage drop calculations to confirm the valve's solenoid would perform its safety function.

b. Findings

No findings of significance were identified.

.4 Operating Experience

a. Inspection Scope

The inspectors reviewed 4 operating experience issues to ensure that NRC generic concerns had been adequately evaluated and addressed by the licensee. The operating experience issues listed below were reviewed as part of this inspection:

- IN 2010-25, "Inadequate Electrical Connections";
- IN 2010-20, "Turbine Driven Auxiliary Feedwater Pump, Pump Repetitive Failures";
- IN 2010-23, "Malfunctions Of Emergency Diesel Generator Speed Switch Circuits"; and
- IN 2010-26, "Submerged Electrical Cables."

b. Findings

No findings of significance were identified.

.5 Modifications

a. Inspection Scope

The inspectors reviewed seven permanent plant modifications related to selected risk significant components to verify that the design bases, licensing bases, and performance

capability of the components had not been degraded through modifications. The modifications listed below were reviewed as part of this inspection effort:

- EC242, Evaluation of Manufacturer Specified Material/Change for EDG Air Start Motor;
- EC7237, Prepare Design Package to Provide Missile Barrier for CST;
- EC10382, Condensate Storage Tank Vortex Suppression Device;
- EC26866, Enclosure to Cover 4160V Buses 1F and 1G;
- EC-5000122470, Improvement of Fast Transfer Capability of Station Offsite Power Supply System;
- FC-944, ADV's Back-up Nitrogen Supply; and
- WO 51637262, Replace Station Battery ED-01.

b. Findings

(1) Failure to Adequately Evaluate the Enclosure Over Busses 1F/1G

Introduction: The inspectors identified a finding of very low safety significance (Green) involving the licensee's failure to adequately evaluate the enclosure installed over the 1F/1G Buses to be in compliance with all applicable requirements. Specifically the licensee did not ensure that the enclosure would not affect startup transformer 1-2 during a design basis wind event. No violations of NRC regulations were identified.

Description: While conducting a plant walkdown, the inspectors noted that an enclosure had been installed over non-safety-related busses 1F/1G, in close proximity to startup transformer 1-2. The inspectors noted that the enclosure was constructed of steel tubing with aluminum sheathing (conductive material) that was held down by four nylon straps to large concrete blocks (Jersey Barriers) over the original common enclosure for busses 1F/1G and that the enclosure was partially disassembled for maintenance activities. The inspectors were concerned with the potential interaction of the enclosure with the transformer providing offsite power if the straps did not hold during a design basis wind event. When questioned about any preventive maintenance (PM) activities on the enclosure, the licensee stated there were no PMs to periodically inspect and/or replace the nylon straps to ensure that the straps were not degrading.

The inspectors reviewed the enclosure design characteristics stated in modification EC26866, "Enclosure to Cover 4160V Buses 1F and 1G," and determined that the licensee had not considered the specifications for the original Bus 1F/1G enclosure when designing the new enclosure, instead relying on manufacturer's statements without independently verifying the design requirements and whether the new enclosure met those requirements. Further, although the original enclosure was mounted on a six-foot thick concrete pad and built to withstand 30 pounds force per square foot, the inspectors were concerned that the new enclosure could be affected by high winds. The inspectors

were concerned that the enclosure had not been evaluated against 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 17, “Electric Power Systems,” as to whether the enclosure could affect startup transformer 1-2 and its ability to provide offsite power. In response, the licensee initiated CR-PLP-2011-03221 to evaluate the design requirements for the 1F/1G enclosure as it pertains to weather and high wind loading. The condition report (CR) concluded that both the original and new enclosure were non-safety-related, such that the enclosure did not have to be evaluated against the GDC requirements or protected from tornado missiles.

The inspectors reviewed design basis document DBD-3.01, “External Power Supply Transformers,” and FSAR Section 5.1.3.8, “Criterion 17 – Electrical Power Systems,” which stated the licensee’s commitment to GDC 17. The GDC 17 states, in part, “Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.” The inspectors requested the licensee to address whether the Bus 1F/1G enclosure would increase the probability of loss of an offsite electrical power source (i.e., startup transformer 1-2).

The licensee stated the installation of the new enclosure over the existing 1F/1G Bus enclosure had the potential to increase the probability of loss of one of the offsite power sources. During this review, the licensee also discovered that the eye-bolts, that connected the nylon straps to the new enclosure, were not sufficient for the design wind-loading on a Class 3 structure. As a result, during a design wind event, the anchorage could potentially fail and the structure could potentially damage the 1F/1G Bus. The licensee initiated CR-PLP-2011-03282 and replaced the deficient eye-bolts under EC30524. The enclosure returned to service on July 7, 2011. The inspectors also reviewed the CR operability evaluation and determined that it had focused solely on the 1F/1G enclosure and did not assess the potential affect of the enclosure during a design wind event on the loss of offsite power via startup transformer 1-2. In response, on July 13, 2011, the licensee concluded the original operability evaluation did not address the potential impact to startup transformer 1-2 and operability for the CR should have been classified as degraded or non-conforming, which would have been appropriate based on insufficient documentation to demonstrate compliance with GDC-17.

In addition, the inspectors identified that startup transformer 1-2 was described in the TS Bases B3.8.1 as part of the Class 1E power system (safety-related). The licensee initiated CR-PLP-2011-03085, which concluded that the TS Bases incorrectly listed offsite power sources as Class 1E and the TS Basis statement needed to be corrected.

Analysis: The inspectors determined that the failure to evaluate the 1F/1G Bus enclosure to be in compliance with all applicable requirements was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Initiating Events Cornerstone attribute of transient initiator (loss of offsite power) and affected the cornerstone objective to limit the likelihood of those events that upset plant stability. Specifically, there was reasonable doubt as to whether the enclosure could have withstood a design wind event, which would have increased the probability that severe weather could have affected the ability of startup transformer 1-2 to provide offsite power, contrary to the requirements of GDC-17.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Screening and Characterization of Findings," Table 4a for the Initiating Events cornerstone as a transient initiator contributor. The finding screened as very low safety significance (Green) because the transient initiator would not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available.

The inspectors determined that this finding had a cross-cutting aspect in the area of human performance because the licensee did not ensure reviews of safety significant decisions to verify the validity of the underlying assumptions or identify possible unintended consequences. Specifically, the licensee's design reviews for the 1F/1G Bus enclosure modification did not address the potential impact on start-up transformer 1-2 if the enclosure failed during a design basis wind event. [H.1(b)]

Enforcement: Since the equipment involved with the performance deficiency were not safety-related, there were no violations of NRC regulations associated with this finding (FIN) and as such, no enforcement (FIN 05000255/2011009-01; Failure to Adequately Evaluate the Enclosure Installed Over the 1F/1G Buses).

.6 Operating Procedure Accident Scenario Reviews

a. Inspection Scope

The inspectors performed a detailed reviewed of the procedures listed below associated with the two selected scenarios, the station blackout (SBO) event and a small break loss-of-cooling-accident (LOCA). For the procedures listed time critical operator actions were reviewed for reasonableness, in plant action were walked down with a licensed operator, and any interfaces with other departments were evaluated. The procedures were compared to FSAR, design assumptions, and training materials to assure for constancy. The following operating procedures were reviewed in detail:

- AP 4.48, Control of Time Critical Operator Actions;
- EN-OP-104, Operability Determination Process;
- ENS-EP-302, Severe Weather Response;
- EOP 3, Station Blackout Recovery;
- EOP 4, Loss of Coolant Accident Recovery;
- EOP 9, Functional Recovery Procedure;
- EOP Supp. 7, Battery No. 1 Load Stripping;
- EOP Supp 28, Supplementary Actions for Loss of Power;
- EOP TCA, EOP Time Critical Operator Basis;

- ONP 7.1, Loss of Instrument Air;
- ONP-12, Acts of Nature;
- ONP 23.1, Primary Coolant Leak;
- SOP-3, Safety Injection and Shutdown Cooling System;
- SOP-12, Feedwater System;
- SOP-26, Make-up System; and
- SOP-30, Station Power.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Review of Items Entered Into the Corrective Action Program (CAP)

a. Inspection Scope

The inspectors reviewed a sample of the selected component problems that were identified by the licensee and entered into the CAP. The inspectors reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design issues. In addition, CAP documents written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action program. The specific corrective action documents that were sampled and reviewed by the inspectors are listed in the Attachment to this report.

The inspectors also selected 6 issues that were identified during previous CDBIs to verify that the concerns were adequately evaluated and corrective actions were identified and implemented to resolve each concern, as necessary. The following issues were reviewed:

- NCV 05000255/2006009-05, Motor Control Center (MCC) Breaker Testing Program Deficiencies;
- NCV 0500255/2006009-03, Various Issues Associated With MCC Control Voltage;
- NCV 0500255/2006009-06, Battery Terminals Not Coated with Anti-Corrosion Material;

- NCV 0500255/2006009-09, High Pressure Safety Injection Pump Vortex Limit Calculation Inaccuracies;

- NCV 0500255/2006009-11, Failure to Correctly Apply Pressure Locking Thrust in Motor Operated Valve Performance Test Procedures; and.

- NCV 05000255/2007002-07, Addition of Manual Operator Action Not Evaluated in Accordance with 10 CFR 50.59 (URI 0500255/2006009-14).

b. Findings

No findings of significance were identified.

4OA5 Other Activities

.1 (Open) NRC Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)"

a. Inspection Scope

The inspectors verified that the onsite documentation, system hardware, and licensee actions were consistent with the information provided in the licensee's response to NRC GL 2008-01, "Managing Gas Accumulation in Emergency Core Cooling (ECCS), Decay Heat Removal (DHR), and Containment Spray (CS) Systems." Specifically, the inspectors verified that the licensee has implemented or was in the process of implementing the commitments, modifications, and programmatically controlled actions described in the licensee's response to GL 2008-01. The inspection was conducted in accordance with TI 2515/177 and considered the site-specific supplemental information provided by Office of Nuclear Reactor Regulations (NRR) to the inspectors.

The documents reviewed are listed in the Attachment to this report.

b. Inspection Documentation

The selected TI areas of inspection were licensing basis, design, testing, and corrective actions. The documentation of the inspection effort and any resulting observations are below.

(1) Licensing Basis: The inspectors reviewed selected portions of licensing basis documents to verify that they were consistent with the NRR assessment report and that they were processed by the licensee. The licensing basis verification included the review of selected portions of TS, TS Bases, and FSAR. The inspectors also verified that applicable documents that described the plant and plant operation, such as calculations, piping and instrumentation diagrams (P&IDs), procedures, and CAP documents, addressed the areas of concern and were changed if needed following plant changes.

The inspectors confirmed that TS did not require verification that GL 2008-01 subject systems were full of water as indicated in the licensee's response to the GL and that

the licensee had implemented a periodic monitoring program as part of their resolution to GL 2008-01. The licensee's basis for the gas monitoring periodicity was, in part, the results of the surveillances performed up to the timeframe of this inspection. The inspectors also confirmed that the licensee's CAP captured the commitment to support the industry regarding the resolution of generic TS changes via the Technical Specification Task Force Traveler (TSTF) process and to evaluate its applicability within 3 months after NRC approval. This commitment was being tracked as LO-WTPLP-2008-00512-10.

(2) Design: The inspectors reviewed selected portions of design documents, performed system walkdowns, and interviewed plant personnel to verify that the design and operating characteristics were addressed by the licensee. Specifically:

(a) The inspectors assessed the licensee's efforts for identifying the gas intrusion mechanisms that apply to the plant and noted the following examples where the licensee failed to recognize gas intrusion mechanisms associated with the ECCS and DHR systems:

(i) The licensee did not consider the inter-connection between the chemical volume control system (CVCS) and train 2 of HPSI when performing the GL 2008-01 design reviews. This connection was a pressure boundary and leakage past this boundary could result in gas coming out of solution on the HPSI side, which was at a lower pressure. The details and enforcement of this issue are discussed in Section 4OA5.1.c(1) of this report.

(ii) The licensee did not have adequate procedures to preclude adverse effects of steam voids that could occur in the low pressure safety injection (LPSI) system during a Mode 4 LOCA. The details and enforcement of this issue are discussed in Section 4OA5.1.c(2) of this report.

(iii) The licensee did not consider the potential for vortex formation for the full range of possible flowrates allowed by procedures used during reduced inventory operations when the LPSI system was lined-up for shutdown cooling (SDC), which was Palisades' equivalent of the DHR system. The details and enforcement of this issue are discussed in Section 4OA5.1.c(2) of this report.

(b) The inspectors assessed if the licensee's void acceptance criteria was consistent with NRR's void acceptance criteria and noted the following inconsistencies:

(i) The suction void acceptance criteria were not based on limiting conditions. Specifically, it was based on a 10 percent degradation of the pumps design rated flowrates. However, the minimum required pump flowrates were lower than the resulting values assuming 10 percent degradation and were more limiting when establishing suction void acceptance criteria. In addition, the licensee used the incorrect elevation of the safety injection and refueling water (SIRW) tank. This resulted in a non-conservative adjustment of void sizes due to changes in static head. The details and enforcement of this issue are discussed in Section 4OA5.1.c(3) of this report.

(ii) The suction void acceptance criteria did not consider pump operation with respect to its best efficiency point (BEP). Specifically, the suction void acceptance criteria was based on the interim gas ingestion tolerance criteria of the PWR Owner's Group (PWROG) published in October of 2008 (i.e., PA-SEE-450, Task 2, "Pump Interim Gas Ingestion Tolerance Criteria"). This interim criterion was considered to be effective by the PWROG over a specific range of BEP flowrates. However, the licensee's void acceptance criteria were, in some cases, based on flowrates outside the specified range of BEP flowrates where the interim acceptance criterion was considered effective. The licensee had initiated an activity to review Nuclear Energy Institute (NEI) 09-10, "Guidelines for Effective Prevention and Management of System Gas Accumulation," and to evaluate its effect on current site documents including void acceptance criteria. This guidance included acceptance criteria applicable to station's range of BEP flowrates. However, the licensee had not completed this evaluation at the time of the inspection. The licensee initiated CR-HQN-2010-00852 to address this issue.

(iii) The suction void acceptance criteria were based on an average over the transient duration time. This was inconsistent with the 0.5-Second Criterion recommended by NRR in TI 2515/177 Inspection Guidance (ML111660749). The NRR-recommended methodology was more conservative because it ensures that there were no significant deviations exceeding the maximum recommended void fractions. However, because the licensee's methodology averaged over the entire transient duration time, it allowed void volumes that could significantly exceed the recommended void fraction when the actual duration transient time was shorter than the maximum duration time specified by the recommended void fraction acceptance criteria. The inspectors discussed this observation with NRR. It was determined that it required further evaluation by NRR to better understand the acceptability of the licensee's methodology and determine an adequate resolution. Therefore, this TI will remain open until this issue is resolved.

In addition, the inspectors noted that the licensee relied on the use of computer software to evaluate the past-operability of a void found at the HPSI sub-cooling line in June 2009. This evaluation was reviewed by the inspectors with the assistance of NRR in an earlier inspection period. This earlier inspection activity was documented in Inspection Report 05000255/2009004. During this inspection period, the licensee confirmed that the current plan was to use conventional methods when evaluating future voids.

(c) The inspectors reviewed selected documents, including calculations and engineering evaluations, with respect to gas accumulation. Specifically, the inspectors verified that these documents addressed venting requirements, aspects where pipes were normally voided, such as some spray piping inside containment, void control during system realignments, and the effect of debris on strainers on the containment emergency sumps causing accumulation of gas under the upper elevation of strainers. The inspectors noted the following examples where the licensee's design reviews failed to properly assess the subject of gas accumulation in piping:

(i) The design reviews concluded that two gas susceptible locations could be excluded from periodic monitoring based on the assumption that they were routinely vented. However, their respective vents were only used during post-maintenance activities. The details and enforcement of this issue are discussed in Section 4OA5.1.c(1) of this report.

(ii) Report 1918535-O-005, "GL 2008-01 Recommended Locations for UT Inspection - Inside Containment," included an equation for determining void areas that was derived incorrectly. Specifically, the area of the void was calculated by subtracting the area of the triangle of the pipe sector to the total area of the pipe sector. However, the area of the triangle was incorrectly determined because its base was assumed to always be equal to the diameter of the pipe. This error underestimated the void area for void fractions less than 50 percent. This issue was determined to be a minor design control deficiency because the equation was not used to develop void acceptance criteria, nor used to calculate void sizes of voids identified during monitoring. The licensee initiated CR-PLP-2011-02975 to address this issue.

(d) The inspectors conducted a walkdown of selected regions of the GL 2008-01 scoped systems in sufficient detail to assess the licensee's walkdowns. The inspectors also verified that the information obtained during the licensee's walkdown was consistent with the items identified during the inspectors' independent walkdown. In addition, the inspectors assessed if the P&IDs accurately described the subject systems and were up-to-date with respect to recent hardware changes. The inspectors also assessed if the licensee had isometric drawings that described the configurations of the GL 2008-01 scoped systems and had confirmed the accuracy of the drawings. The inspectors noted one example of a minor error of a drawing. Specifically, drawing VEN-M107, Sheet 2173, listed a segment of pipe as GC-1-8" when it was a GC-1-10" pipe. The licensee initiated CR-PLP-2011-03010 to address this issue.

(e) The inspectors reviewed applicable documents to determine if the licensee's commitment to perform walkdowns was completed. The inspectors noted some examples of normally inaccessible locations where piping slopes were not measured. However, the licensee confirmed that the locations were visually inspected and that they were excluded from monitoring. Therefore, slope measurements were not needed.

(3) Testing: The inspectors reviewed selected surveillance and post-maintenance test procedures, and test results to assess if the licensee approved and was using procedures that were adequate to address the issue of gas accumulation and/or intrusion in the subject systems. Specifically:

(a) The inspectors reviewed procedures used for conducting void periodic monitoring and determination of void volumes to ensure that the void criteria was satisfied and the void volume could be reasonably assumed to remain within the criteria until the next scheduled void surveillance. The inspectors noted the following examples where the GL 2008-01 testing program developed by the licensee as

part of their commitment to develop appropriate procedures and administrative controls for the periodic monitoring of voids was deficient:

(i) The licensee did not evaluate the acceptability of two gas susceptible locations originally believed to be inaccessible for periodic monitoring. System operability was not assured because these locations were excluded from periodic monitoring and had not been evaluated using alternative methods. These locations were later determined to be accessible and were included in the periodic monitoring activities. The details and enforcement of this issue are discussed in Section 4OA5.1.c(1) of this report.

(ii) The procedure used to flush voids identified at the HPSI sub-cooling line did not contain adequate instructions in that it failed to: (1) specify a minimum flowrate that was sufficient to ensure that gas would be removed from the system; and (2) require verification that voids removed from the HPSI sub-cooling line were not relocated to another location of potential concern. The details and enforcement of this issue are discussed in Section 4OA5.1.c(2) of this report.

(b) The inspectors reviewed selected procedures used for void control, such as filling and venting, following conditions which may have introduced voids into the subject systems to verify that the procedures addressed testing for such voids and provided processes for their reduction or elimination. The inspectors noted an example where a procedure did not contain adequate guidance for gas removal following maintenance activities. Specifically, the licensee did not implement and maintain procedural guidance for filling the HPSI sub-cooling line prior to restoring the system to operation. As a result, the licensee found a void when inspecting this location in response to GL 2008-01 in June 2009. This issue resulted in a finding of very low safety significance (Green) and was treated as a Non-Cited Violation of TS 5.4.1, “Procedures.” This issue was identified in an earlier inspection period and documented in Inspection Report 05000255/2009004.

(4) Corrective Actions: The inspectors reviewed selected licensee’s assessment reports and CAP documents to assess the effectiveness of the licensee’s CAP when addressing the issues associated with GL 2008-01. In addition, the inspectors verified commitments were included in the CAP. The inspectors noted an example where the CAP was not used to address an issue related to gas accumulation. Specifically, the licensee discovered that gas susceptible location No. 8 was incorrectly determined to be inaccessible for periodic monitoring. Although the location was included in the periodic monitoring activities upon this discovery, the licensee did not capture this issue in the CAP. The inspectors identified that a similar condition existed with location No. 13. This observation was associated with the issue discussed in Section 4OA5.1.c(1) of this report.

The inspectors concluded this TI will remain open for Palisades Nuclear Plant and additional inspection will be necessary to address unresolved questions regarding the licensee’s acceptance criteria methodology for voids located at the pump suctions.

c. Findings

(1) GL 2008-01 Design Reviews Did Not Adequately Assess the Potential to Accumulate Voids Within Piping Systems

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to adequately review the design of ECCS and CS systems with respect to the potential to accumulate voids.

Description: On January 11, 2008, the NRC requested each addressee of GL 2008-01 to evaluate its ECCS, DHR, and CS systems licensing basis, design, testing, and corrective actions to ensure that gas accumulation was maintained less than the amount that would challenge the operability of these systems, and take appropriate actions when conditions adverse to quality were identified. The licensee's original actions to address these requests were, in part, to perform design reviews to identify gas susceptible locations, inspect or evaluate these locations to confirm the existence of voids, and evaluate the acceptability of any identified void.

However, the inspectors identified that the licensee's design reviews did not adequately assess the potential to accumulate voids as follows:

- The design reviews did not consider the CVCS cross-tie to train 2 of HPSI when identifying potential gas susceptible locations. This cross-tie was a pressure boundary and leakage past this boundary could result in gas coming out of solution on the HPSI side, which was normally at a lower pressure. The licensee initiated CR-PLP-2011-02978 and their evaluation concluded that the potential leakage would increase the pressure of the HPSI line, which would be identified during operator rounds. A review of the previous HPSI line pressures showed that the trend was stable, indicating no in-leakage. At the time of this inspection, the licensee planned to rely on pressure trends to monitor for leakage.

- The design reviews concluded that the gas susceptible location in the LPSI pump (P-67A) discharge piping could be excluded from periodic monitoring based on the assumption that it was routinely vented. However, the inspectors identified that its respective vent was only used during post-maintenance activities. The inspectors also identified a similar condition affecting the gas susceptible location in the CS pump (P-54A) discharge piping. The licensee initiated CR-PLP-2011-03029 and CR-PLP-2011-003087 to address these issues. The licensee also performed an ultrasonic test (UT) examination at these piping locations and verified that the piping were water solid. These locations were added to the licensee's periodic monitoring program.

- In April 2011, the licensee determined that gas susceptible location No. 8 was accessible for periodic monitoring, whereas it had previously been incorrectly classified as inaccessible. As a result, the licensee included this location in their periodic monitoring program, which verified there was not an adverse void at this location. However, the licensee did not document this issue in the CAP as required and was considered a weakness in their program implementation. The licensee

initiated CR-PLP-2011-03005 to address the CAP issue, which was to include a human performance error review. In addition, the inspectors identified that gas susceptible location No. 13 was also incorrectly classified as being inaccessible. The licensee performed a UT examination that verified the location was full of water and added location No. 13 to the periodic monitoring program. The licensee initiated CR-PLP-2011-03004 to address incorrect classification of these locations.

Analysis: The inspectors determined that failure to adequately assess the potential to accumulate voids within ECCS and CS systems was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more than minor because, if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to adequately assess the potential to accumulate voids would have the potential to lead to an improperly managed gas susceptible location, which does not ensure system operability. This finding affected the Mitigating System Cornerstone.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Screening and Characterization of findings," Table 4a for the Mitigating System Cornerstone. The finding screened as of very low safety significance (Green) because the finding involved a design or qualification deficiency that did not result in a loss of operability. Specifically, based on a historical review of recent maintenance activities, current process parameters, and, in some locations, UT examinations, the licensee's operability evaluation concluded there were no adverse voids at these locations. The inspectors reviewed these evaluations and did not have further concerns.

The inspectors determined that this finding had a cross-cutting aspect in the area of human performance because the licensee did not ensure supervisory oversight of work activities associated with the GL 2008-01 design reviews such that nuclear safety is supported. Specifically, oversight did not ensure that the contractor's design reviews associated with GL 2008-01 considered plant specific information such as system interactions and at-power operations. [H.4(c)]

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires in part, design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews.

Contrary to the above, as of June 12, 2011, the design control measures failed to verify the adequacy of the ECCS and CS design as evidenced by the following examples where the GL 2008-01 design reviews did not: (1) identify that the gas susceptibility of HPSI could be affected by system interactions with the CVCS system; (2) evaluate the acceptability of locations believed to be inaccessible for periodic monitoring; and (3) identify that the high point vents were not periodically used to ensure that some locations were full of water. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as CR-PLP-2011-02978, CR-PLP-2011-03087, CR-PLP-2011-03029, and CR-PLP-2011-03004, this violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the NRC

Enforcement Policy (NCV 05000255/2011009-02, GL 2008-01 Design Reviews Did Not Adequately Assess the Potential to Accumulate Voids Within Piping Systems).

(2) Procedures Were Not Appropriate To Address Gas Accumulation Issues

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings for the failure to establish appropriate procedures for managing gas accumulation issues.

Description: Through GL 2008-01, the NRC requested, in part, the licensee to evaluate its DHR system design "to ensure that gas accumulation is maintained less than the amount that challenges operability of this system, and that appropriate action is taken when conditions adverse to quality are identified." The GL provided examples on controlling gas accumulation and stated "where vents are not installed at high points, UT measurements can provide a check for gas, and a high flowrate may be useful to ensure that gas has been swept from high points." In addition, GL 2008-01 identified vortexing and temperatures above saturation temperature as gas intrusion mechanisms.

The inspectors identified the following three examples where the licensee's procedures for managing gas accumulation were inadequate:

- Procedure ESSO-10, "Shutdown Cooling Heat Exchanger and Spray Header Flush," required a minimum flowrate of 75 gpm from the CS pump, P-54B, for flushing the sub-cooling line to HPSI pump, P-66B. This minimum flowrate, intended to protect the CS pump, was not adequate for gas removal. Specifically, the resulting Froude number (N_{FR}) was about 0.58 at the sub-cooling line, which was less than the recommended value for flushing. For instance, procedure EN-DC-219, "Gas Accumulation Management," required a N_{FR} value of at least 1.0 to ensure that gas would be swept out when relying on flushing for gas removal, and Revision 11 of TI 2515/177 Inspection Guidance (ML111660749), recommended a value of 2.0. In addition, the inspectors noted that the sub-cooling line discharged into the larger diameter HPSI suction line, which would result in a lower N_{FR} value. The inspectors were concerned because the licensee relied on the flushing provided by this procedure and did not require verification (e.g., via UT examination) that the voids were: (1) removed from the sub-cooling line; and (2) not relocated to another location of concern such as the HPSI suction line. In response to the inspectors' concerns, the licensee attempted to validate the acceptability of the 75 gpm by relying on an academic paper that established that a N_{FR} value of 0.54 was adequate to sweep gas away. However, the inspectors noted that this paper established the critical value needed in order to prevent the gas on an open chamber from penetrating horizontal and vertical pipes as opposed to transporting gas inside piping at the conditions applicable to the plant. Moreover, the paper established the 0.54 value for the horizontal case only and extrapolation of the data obtained for the vertical pipe suggested that a value significantly greater than 0.54 was needed to prevent air from penetrating the vertical lines. As a result, the inspectors concluded the paper was not applicable for flushing.

The licensee initiated CR-PLP-2011-03281 to address the issue. The corrective action considered at the time of this inspection was to revise ESSO-10 to include an appropriate minimum flowrate for gas removal. In addition, the licensee confirmed that the flowrate used in 2009 during the removal of a gas void in the sub-cooling line was significantly greater than the minimum required by procedure and resulted in a N_{FR} value greater than 1.0 for the sub-cooling line. In addition, a review of subsequent periodic monitoring results confirmed that the locations downstream of the sub-cooling line where the void could have been relocated were full of water.

- Procedure SOP-3, "Safety Injection and Shutdown Cooling System," did not specify a maximum allowable flowrate for the LPSI pumps when operating in the SDC mode at reduced inventory conditions (minimum level of 617'-8" elevation) to protect the pumps from net positive suction head (NPSH) and vortexing concerns. Calculation EA-A-92-090-01, "Evaluation of LPSI Pump Operation with Reduced PCS [Primary Coolant System] Inventory When Supplying Shutdown Cooling," concluded that NPSH was adequate under limiting conditions at a flowrate not greater than 4500 gpm. In addition, it concluded vortexing was not a problem at minimum inventory (i.e., 617'-8" elevation) operation with flowrates up to 2500 gpm based on operating experience. The inspectors were concerned because the procedure did not ensure that the pumps were operated within the analyzed flow and level conditions since there were no acceptable flowrates included in the procedure.

  The licensee initiated CR-PLP-2011-03356 to address this issue. The corrective actions considered at the time of this inspection were to determine how to assess vortexing at the reduced inventory conditions and revise the appropriate procedures. A historical review determined that the licensee typically operated the system with a flowrate of 3100 to 3200 gpm just prior to entry into reduced inventory conditions and that no problems had been experienced in the past. In addition, operator training discussed the need to throttle flow when the reactor level was below the centerline of the hot leg (i.e., 618'-2.5" elevation); however, no flowrate was stated.

- Procedure SOP-3 did not contain adequate instructions to ensure that LPSI would be capable of performing its mitigating function during Mode 4 following a LOCA as required by TS 3.5.3, "ECCS – Shutdown." Specifically, high temperature water in the system has the potential to flash to steam during these conditions because the system would be aligned from its SDC mode of operation and the trapped fluid would be at PCS temperature and pressure. Procedure SOP-3 would direct the operators to manually realign the suction of the system to the SIRW tank. As a result, the trapped fluid would flash to steam due to being suddenly exposed to lower pressures. The procedure also did not contain instructions to fill and vent the common discharge piping prior to starting the pumps and the system design had not evaluated the acceptability of the resulting potential waterhammer.

  The licensee initiated CR-PLP-2011-03858 to address this issue. The corrective actions considered at the time of this inspection were to revise the appropriate procedures to vent the high point of the common LPSI discharge piping in a manner similar to the LPSI pump casing vent requirements during the manual realignment of the system.

Analysis: The inspectors determined that failure to establish appropriate procedures for managing gas accumulation issues was contrary to 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” and was a performance deficiency. The performance deficiency was determined to be more than minor because, if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to establish an appropriate procedure for flushing would have the potential of not removing voids to ensure system operability. The failure to include adequate instructions in SDC procedures to prevent operation outside of analyzed conditions regarding vortexing would have the potential to result in air binding of the LPSI pumps. Finally, the failure to include adequate instructions in LPSI procedures to ensure that steam voids were removed prior to system initiation would have the potential to result in waterhammer, which is not part of the system’s design. This finding affected the Mitigating System and Initiating Event Cornerstones.

The inspectors determined that the finding example associated with procedure ESSO-10 could be evaluated using the SDP in accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Phase I - Initial Screening and Characterization of findings,” Table 4a for the mitigating system cornerstone. The finding example screened as of very low safety significance (Green) because the finding was a design or qualification deficiency confirmed not to result in loss of operability. Specifically, a review of recent periodic gas monitoring results determined that the affected locations were full of water.

Since the concern associated with reduced inventory operations would only exist while the plant was in Mode 4, the inspectors, in consultation with the Region III Senior Reactor Analyst, evaluated this finding example in accordance with IMC 0609 Appendix G, “Shutdown Operations Significance Determination Process,” Attachment 1, “Phase I Operational Checklist for Both PWRs and BWRs,” Checklist 3, “PWR Cold Shutdown and Refueling Operation.” The finding example screened as of very low safety significance (Green) because it did not meet any of the criteria that required a Phase II or III analysis. Specifically, the procedure deficiency does not rise to the level that there was an increase in the likelihood of a loss of SDC because operator training addressed the need to throttle flow and watch for pump cavitation.

Similarly, since the concern associated with the steam void formation following a shutdown-LOCA would only exist while the plant was in Mode 4, the inspectors, in consultation with the Region III Senior Reactor Analyst, evaluated this finding example in accordance with IMC 0609 Appendix G, “Shutdown Operations Significance Determination Process,” Attachment 1, “Phase I Operational Checklist for Both PWRs and BWRs,” Checklist 1, “PWR Hot Shutdown Operation: Time to Core Boiling < 2 Hours.” The finding example screened as of very low safety significance (Green) because the finding did not require a quantitative assessment. Specifically, the finding met each item on Checklist 1 for the core heat removal, inventory control, power availability, containment control, and reactivity guidelines.

The inspectors determined that this finding had a cross-cutting aspect in the area of problem identification and resolution because the licensee did not thoroughly evaluate relevant external operating experience. Specifically, gas accumulation mechanisms such as vortexing during reduced inventory and flashing following a shutdown LOCA

were not adequately evaluated during the review of GL 2008-01. In addition, the licensee did not adequately evaluate the minimum flowrate required to remove gas in piping when flushing. [P.2(a)]

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed and accomplished by procedures appropriate to the circumstances.

Contrary to the above, as of June 30, 2011, the licensee had not established appropriate procedures for addressing gas accumulation issues as evidenced by the following examples:

a) The instructions contained in Procedure ESSO-10 did not ensure that identified voids would be successfully removed.

b) Procedure SOP-3 did not specify a maximum flowrate that was analyzed for NPSH and potential air entrainment due to vortexing during reduced inventory operations.

c) Procedure SOP-3 did not contain instructions to vent the steam that could form at the LPSI pump discharge piping following a shutdown-LOCA prior to system initiation.

Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as CR-PLP-2011-03281, CR-PLP-2011-03356, and CR-PLP-2011-03858, this violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000255/2011009-03, Procedures Were Not Appropriate to Address Gas Accumulation Issues).

(3) Void Size Acceptance Criteria is Non-Conservative

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to develop conservative void size acceptance criteria.

Description: On January 11, 2008, the NRC requested each addressee of GL 2008-01 to evaluate its ECCS, DHR, and CS systems licensing basis, design, testing, and corrective actions to ensure that gas accumulation was maintained less than the amount that would challenge the operability of these systems, and take appropriate actions when conditions adverse to quality were identified. Part of the licensee's actions to address these requests was to develop acceptance criteria for void volumes that may be found during periodic monitoring.

The inspectors noted that the acceptance criteria developed for void volumes located at pump suction piping was not conservative. Specifically, calculation EA-EC12262-02, "GL 2008-01: Evaluation of Acceptable Void Sizes," established the allowable suction gas void size using a 10 percent degradation of the pumps design flowrates. However, the inspectors noted the LPSI and CS pumps could be operated at lower flowrates. Using these lower flowrates, the acceptable void size was decreased by about 5.5 percent and 65 percent for the CS and LPSI systems respectively. In addition, the inspectors noted the licensee used an incorrect SIRW base tank level when adjusting the acceptance criteria for pressure effects. This error resulted in a non-conservative

assumption of gas compression. The inspectors were concerned these two conditions resulted in non-conservative acceptance criteria.

The licensee initiated CR-PLP-2011-03422 and CR-PLP-2011-03284 to address these issues. The licensee confirmed that there were no voids on the pumps suction side by reviewing recent periodic monitoring results. Additional corrective actions being considered at the time of the inspection were to formally revise the appropriate calculations.

Analysis: The inspectors determined that failure to develop adequate void size acceptance criteria was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating System Cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, non-conservative acceptance criteria for void sizes in piping would allow a potentially inoperable system to go undetected.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Screening and Characterization of findings," Table 4a for the Mitigating System Cornerstone. The finding screened as of very low safety significance (Green) because the finding was a design or qualification deficiency confirmed not to result in loss of operability. Specifically, a review of recent periodic gas monitoring results determined that no voids were present at the suction side of the affected pumps.

The inspectors determined that this finding had a cross-cutting aspect in the area of human performance because the licensee did not ensure supervisory oversight of work activities associated with actions related to GL 2008-01 such that nuclear safety is supported. Specifically, oversight did not ensure that the contractor's development of void acceptance criteria relied on limiting design values. [H.4(c)]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, 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.

Contrary to the above, as of July 11, 2011, the design control measures did not assure that calculations incorporated limiting input values (i.e., flowrates and SIRW base tank level) when establishing acceptance criteria for void sizes in piping. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as CR-PLP-2011-03422 and CR-PLP-2011-03284, this violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000255/2011009-04, Void Size Acceptance Criteria is Non-Conservative).

4OA6 Meeting(s)

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. A. Blind, Mr. O. Gustafson, and other members of the licensee staff on July 15, 2011, and on August 25, 2011, respectively. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. None of the information reviewed by the inspectors was considered proprietary information.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

T. Kirwin, Acting Site Vice President
A. Blind, Engineering Director
B. Baker, Maintenance Manager
B. Dotson, Licensing
J. Erickson, Licensing Department
J. Forehand, System Engineering Supervisor
T. Fouty, System Engineering Supervisor
O. Gustafson, Acting Licensing Manager,
J. Haumersen, System Engineering Manager
B. Kemp, Design Engineering Manager
D. Hamilton, Acting General Plant Manager Operations
D. MacMaster, Design Engineering Supervisor
M. McCarthy, Design Engineering Supervisor
B. Means, Operations
J. Miksa, Programs Engineering Manager
R. Moceri, Senior Staff Engineer
B. Nixon, Training Manager
C. Plachta, Palisades QA Manager
G. Schrader, Programs Engineering Supervisor
M. Sicard, Operations Manager
B. Sova, Design Engineering Supervisor
J. Spettel, System Engineer

Nuclear Regulatory Commission
J. Ellegood, Senior Resident Inspector
T. Taylor, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

05000255/2011009-01	FIN	Failure to Adequately Evaluate the Enclosure Installed Over the 1F/1G Buses (Section 1R21.5.b.(1))
05000255/2011009-02	NCV	GL 2008-01 Design Reviews Did Not Adequately Assess the Potential to Accumulate Voids Within Piping Systems (Section 4OA5.c.(1))
05000255/2011009-03	NCV	Procedures Were Not Appropriate To Address Gas Accumulation Issues (Section 4OA5.c.(2))
05000255/2011009-04	NCV	Void Size Acceptance Criteria is Non-Conservative (Section 4OA5.c.(3))

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

1R21 Component Design Bases Inspection

CALCULATIONS

Number	Description or Title	Revision
152-103-150-151	152-103 Protective Relay Setting Service Water Pump P7B	1
152-105 1C-105-151	System Protection Calc – Bus 1C Incoming Breaker 105	3
152-106 1C-106-151	System Protection Calc – Bus 1C Incoming Breaker 106	2
152-107 1C-107-151	System Protection Calc – Diesel Generator 1-1 Over Current	3
152-113 1C-113-150/151	152-113 Protective Relay Setting HP Safety Injection Pump (P-66B)	2
1C-107-187D	Protective Relay Setting - Diesel Generator 1-1 Differential Relay	2
1C-107-C22-127D-1	System Protection Calc – Diesel Generator 1-1 Undervoltage Relays	0
AOVCAP-MSS-01	Actuator Capability Review for Air Operated Valves (AOV) with Reverse Acting-Fail Closed Diaphragm Air Actuators in the MSS	1
AOVSYS-SWS-01	System Level Design Basis Review for Air Operated Valves (AOV) in the Service Water System (SWS)	4
AOVCAP-SWS-03	Actuator Capability Review for Air Operated Valves (AOV) with Direct Acting –Rotary Diaphragm Actuators in the SWS	0
AOVT/T-SWS-06	Evaluation of Stem Torque Requirements for Palisades AOV CV-0884 and CV-0885 Using the EPRI MOV Butterfly Valve PPM	1
E48-EMA-03	Westinghouse Model 68F13512 Motors	11
E48-VOP-03	Limitorque Valve Actuators With RH Motor Insulation with Markups per EC27337 and EC27338	16
EA-AOVCAP-FWS-01	System Level Design Basis Review for Air Operated Valves in the Feedwater System, Including the AFW system	3
EA-AOV-01	Air Operated Valve (AOV) Program Scope and Categorization	4
EA-AOVCAP-FWS-03	Actuator Capability Review for Air Operated Valve With Direct Opening, Failed Open Diaphragm Air Actuators in the FWS System	0
EA-AOVSYS-MSS-01	Systems Level Design Basis Review for Air Operated Valve in the Main Steam System	2
EA-AOVT/T-ESS-03	Evaluation of Stem Thrust Requirements for Palisades AOVs CV-3029 and CV-3030 Using the EPRI MOV Gate Valve Performance Prediction Methodology	1
EA-AOVT-T-Pilot-01	Thrust Requirements for Palisades Balanced Disk Air-Operated Valves With Pilot	2
EA-AOV-WKLINK-06	Weak Link Calculation for AOVs CV-3029 and CV-3O30 from Crane Valve	1
EA-A-PAL-97-064	Predicted Tree Pump Flow Rates for AOV Program Using Pipe-Flo	1
EAC-C-PAL-95-0877D	Evaluation of the Potential for Excessive Air Entrainment Caused by Vortexing in SWIRT During a LOCA	1
EA-C-PAL-97-1650A-01	Revised Hydraulic Inputs for Emergency Diesel Generator Steady State Load Calculation	2
EA-C-PAL-99-1209B-01	Generation of Flow Rate Acceptance Criteria for Technical Specification Surveillance Test RO-216	2
EA-CPCO/PAL-JCW-95-01	Remove Aux FW MOVs from the GL 89-10 Program	1
EA-EAR-2001-0333-01	Generation of ESS Pump Performance Curves for use with Pipe-Flow ESS Hydraulic Model	4

CALCULATIONS

Number	Description or Title	Revision
EA-EC-11464-01	Second Level Undervoltage Time Delay Relays 162-153 and 62-154 Uncertainty Analysis	0
EA-EC-11464-02	First Level Undervoltage Relays 127-1 and 127-2 Drift Calculations	0
EA-EC-11464-03	First Level Inverse Time Undervoltage Relays 127-1 and 127-2 Uncertainty Analysis	0
EA-EC22062-01	Calculation to Provide Level Indication for the Supplemental Diesel Fuel Oil Tank T-1001	0
EA-EC-5885-01	Evaluation of Starting Air Capacity for the Emergency DGs	0
EA-EC-7120-01	AFW Pumps Low Suction Pressure Trip (LSPT) Setpoints Change	0
EA-EC8284-02	Aux FW System Capacity	0
EA-EC9600-01	Functionality of Equipment in the Emergency Diesel Room at an Elevated Temperature	1
EA-E-ELEC-VOLT-1/92-1	ECCS Motors Acceleration Times at 70% and 100% Using the PSS/E Motor Model	0
EA-ELEC-AMP-020	Ampacity Calculation – Emergency Generator Output Power Cables	0
EA-ELEC-EDSA-01	Auxiliary AC System EDSA Model Development and Verification & Validation	2
EA-ELEC-EDSA-03	LOCA with Offsite Power Available	1
EA-ELEC-EDSA-04	Second Level Undervoltage Relay Setpoint Determination (SLUR) & EC 23175 Mark-up	0
EA-ELEC-EDSA-06	AC Short Circuit Analysis & EC 5000122058	0
EA-ELEC-EDSA-10	DC System Battery D01 EDSA Model Development and Load Flow Analysis	0
EA-ELEC-FLT-005	Short Circuit for Palisades Class 1E Station Batteries D01 and D02	1
EA-ELEC-LDTAB-005	Emergency Diesel Generators 1-1 & 1-2 Steady State Loadings & EC 19665 Markup	9
EA-ELEC-LDTAB-007	Replacement Service Water Pump P-7B Electrical Evaluation	7
EA-ELEC-LDTAB-009	Battery Sizing for the Palisades Class IE Station Batteries D01&D02	3
EA-ELEC-LDTAB-019	Auxiliary Power System Measured Load Analysis	0
EA-ELEC-VOLT-01A	Dynamic Response of Emergency Diesel Generators and ECCS Motor Acceleration Times & EC 13864 Mark-up	0
EA-ELEC-VOLT-026	Voltage Drop Model for the Palisades Class 1E Station Batteries D01 & D02	1
EA-ELEC-VOLT-033	Second Level Undervoltage Relay Setpoint	1
EA-ELEC-VOLT-037	Degraded Voltage Calculation for the Safety-Related MOVs	3
EA-ELEC-VOLT-050	Motor Control Center Control Circuit Voltage Analysis & EC-30334 Mark-up	3
EA-ELEC-VOLT-051	MCC Power Circuit Minimum Required Voltage Analysis	1
EA-ELEC-VOLT-052	DC Power Circuit Minimum Required Voltage Analysis	0
EA-E-PAL-94-019	Investigation of Requisite Tank Parameters to Ensure the Availability of 100,000 Gallons from T-2 & T81 Under Gravity Feed Conditions	0
EA-FC-935-01	MSIV Solenoid Valves	0
EA-FC-954-02	Low Pressure Suction Trip on the AFW Pump – Setpoint Change	3
EA-FES-99-024-01	Installation of Modified Stuffing Boxes for CV-0501/ CV-0510 MSIVS	1
EA-PLTB-00	Pressure Locking and Thermal Binding for Power Operated Gate Valves in Response to Generic Letter	4
EA-SDW-95-001	Generation of Minimum and Maximum HPSI/LPSI System Performance Curves Using Pipe-Flo	2
EC22062	Calculation to Provide Level Indicator Range for the Supplemental Diesel Fuel Oil Tank T-1001	0
EC25211	DC Battery Sizing and Load Tabulation	0
EC-EAR-2001-0333-01 EC1249	Generation of ESS Pump Performance Curves for Use with the Pipe Flow ECC Hydraulic Model	

CALCULATIONS

Number	Description or Title	Revision
ED-AOVCAP-GATE-E88-01	Actuator Capacity Review for Air Operated Gate Valves in the Engineered Safeguards Systems	1
ED-AOVCAP-MSS-02	Actuator Capacity Review for Air Operated Valves with Double – Acting Air Cylinder Spring Return Fail Close Actuators in the MSS	1
ES-AOVSYS-ESS-01	Systems Level Design Basis Evaluation for the Air Operated Valves in The Engineered Safeguards System	7
FAI/07-89	Test Results of Palisades CST Vortex Suppressor	1
SS 1C-103-150-151	Protective Relay Setting – Service Water Pump P7B	3
SS 1C-105-151	Protective Relay Setting – Bus 1C Incoming Breaker 105	4
SS 1C-106-151	Protective Relay Setting – Bus 1C Incoming Breaker 106	6
SS 1C-107-151	Protective Relay Setting – Diesel Generator 1-1 Overcurrent	4
SS 1C-107-187D	Protective Relay Setting – Diesel Generator 1-1 Differential	3
SS 1C-107-C22-127-D-1	Protective Relay Setting – Diesel Generator 1-1 Undervoltage Relay	3
SS 1C-108-J9400-162-153	Protective Relay Setting – Bus 1C Second Level Under Voltage Time Delay Relay 162-153	3, 4
SS 1C-108-127-1	Protective Relay Setting – Bus 1C Undervoltage Relay 127-1	1, 2
SS 1C-108-164-1	Protective Relay Setting – Bus 1C Ground Detector Over Voltage Relay 164-1	1
SS 1C-108-J9400-127-7	Protective Relay Setting – Bus 1C Second Level Under Voltage Relays 127-7	6
SS 1C-113-150-151	Protective Relay Setting – High Pressure Safety Injection (HPSI) Pump P-66B (M13)	3

CORRECTIVE ACTION DOCUMENTS GENERATED DUE TO THE INSPECTION

Number	Description or Title	Date
2011-02901	Drawings do Not Reflect As-built Configuration	06/10/11
2011-02961	Drawing Error	06/14/11
2011-02964	References out of Date	06/14/11
2011-02972	Walkdown Issues – Hook/Ladder	06/14/11
2011-02977	FE-5 Basis Document Outdated	06/14/11
2011-02984	No Labeling of Flash Gear	06/15/11
2011-02989	Minor Corrosion on Battery Rack Ground Strap	06/15/11
2011-03012	Eval of Performing Maintenance Activities in Battery Rooms	06/16/11
2011-03084	Non Conservative Battery Load Profile	06/21/11
2011-03085	TS Basis Incorrectly List Offsite Power Sources as 1E	06/21/11
2011-03181	Revisions 0 and 1 of EC8031-01 Considered Active	06/24/11
2011-03183	PM to Inspect Coating in CST Inadequate	06/24/11
2011-03221	1F/1G Bus Enclosure Not Eval for Affects on Offsite Power	06/27/11
2011-03233	Superseded Section in EA-ELEC-VOLT-050 Not Marked	06/28/11
2011-03242	ESSO-7 Completed in December 2001 Not Retained	06/28/11
2011-02343	Maximum Switchyard Voltage Assumed in Short Circuit Analysis Exceeded	06/28/11
2011-02344	Incorrect Assumption in Calc EA-ELEC-LDTAB-005	06/28/11
2011-02356	Flushing Flowrates in ESSO-10 Not Adequate	06/29/11
2011-03258	Active Calcs Not Adequately Referenced in Merlin	06/29/11
2011-03262	Incorrect EA-ELEC-VOLT-052 Uploaded to EDMS	06/29/11
2011-03265	Incorrect Breaker Interrupting Rating in Shot Circuit Calc	06/29/11
2011-03275	Drawing Errors Identified	06/30/11
2011-03276	No Dropout Testing of 480v Motor Starters	06/30/11
2011-03282	1F/1G Bus Enclosure Eyebolts Not Adequate	06/30/11
2011-03289	E8 Sheet 2 Incorrectly Lists Loads on Breaker 72-155	06/30/11
2011-03376	EC-Markups Not Provided for Several Electrical Calcs	07/08/11
2011-03398	Calculations Not Revised Correctly	07/11/11

CORRECTIVE ACTION DOCUMENTS GENERATED DUE TO THE INSPECTION

Number	Description or Title	Date
2011-03453	Incorrect Response Version to CA-12 for CR-PLP-2009-00127	07/14/11
2011-03478	Incorrect Classification for Vlv in N_2 Supply Line to ASDV	07/14/11
2011-03480	Conclusion on Crack in AFW Turbine Not Supported	07/14/11
2011-03483	DCN Incorrectly Used to Post Change to Calculation	07/14/11
2011-03580	Calc Did Not Support Station Battery Voltage at 105v	07/20/11

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
2000-00707	PORV Stroke Time	12/02/10
2006-00659	T-2 Condensate Storage Tank and AFW Pump Design Basis Concerns	05/01/06
2006-01184	Quality Program Problems with SBO Components	03/16/06
2006-05479	Dirty EDG Room Cooling Air Intake Louver Screens	11/16/06
2006-05504	Discrepancy in Calculation EA-RTD-91-01	11/17/06
2006-05516	Error in Air Entrainment Calculation for Auxiliary Feedwater Trip Setpoint	11/18/06
2006-05571	Elevated Temperatures on Cable Resistance in Load Flow/Voltage Drop Calcs	11/22/06
2006-05661	Test Procedure Not Up to Industry Standards	12/19/06
2006-05679	Failure to Perform Tech Spec SR 3.8.4, DC Source Operating	11/30/06
2006-05805	Exclusion of Fueling Equipment in Assessment	12/07/06
2006-05854	Verification of Blade Design Settings	01/12/07
2006-05864	MOV Procedures Incorrectly Apply PL/TB Loads	12/12/06
2006-05897	01067491D Calc Does not Consider Freq. Variation in Calculating Load	12/13/06
2006-05904	Specification Change 96-012 Should Have Had 50.59 Evaluation	12/13/06
2006-05929	Overestimate of Design Margin in OPR of AR 01063336	12/14/06
2006-05930	Overestimate of Design Margin in OPR of AR 01062531	12/14/06
2007-00401	Prior NRC Approval Required for Manual Action	01/26/07
2007-00702	Revise EA-ELEC-VOLT-26 and EA-C-PAL-97-I620A-01 to Bound the Design Basis Battery Terminal Voltage of 105 Volts	02/15/07
2007-01298	Trend Identified: Improper Implementation of Tech Spec	03/21/07
2007-02624	Consolidate the Multiple “C” Level Action Requests that are Tracking the Completion of Electrical Calculations	06/26/07
2007-02624	Consolidation of Multiple “C” Level Electrical Calculation Project Action Requests	06/26/07
2007-02625	Consolidation of Multiple “B” Level Electrical Calculation Project Action Requests	06/27/07
2007-04004	Loose Washer in AFW Valve 522-B	09/15/07
2008-04580	Diesel Generator Load Calculation (EA-ELEC-LDTAB-005) Did not Account for Worst Case Load from Containment Air Cooler Fan Motors (V-1A, V-2A, V-3A)	11/07/08
2008-04747	Security Procedures did not Contain Sufficient Direction to Prevent Overloading of Emergency Diesel Generator 1-2	11/21/08
2009-01898	CV-0727 – Excessive Seat Leakage	04/11/09
2009-05592	Short Circuit Due to Mishandling of Control Cables	12/07/09
2010-00702	AFW Pump, Severity Level 2 Oil Leak From Outboard Bearing	02/17/10
2010-01508	Contradiction in SOP-22	04/13/10
2010-02431	Failure of EDG K-6B Voltage Relay	06/21/10
2010-03225	EDG System (EPS-EDG), K-6A Near (a)(1)	08/04/10
2010-03319	Steam Driven AFW Pump Absence of Observable Leakage From Seals	08/09/10
2010-04072	M-1005 “Supplemental Diesel Generator” is Still Supported on Rubber Tires	09/22/10
2010-04151	M-1005, 1-3 Supplemental DG Would Not Start for the Monthly Test Run	09/27/10
2010-04584	Carbon Seals Seized During Periodic Overhaul of AFW Turbine K-8, the Shaft Under the Seal Was Cracked	10/07/10
2010-04698	Battery Issues Identified during 2010 CDBI Self-Assessment	10/09/10
2010-05024	Discrepancy with Ohm Reading on Different Equipment during Quarterly Surv.	10/14/10
2010-05859	Evaluation of cracks on turbocharger support for the 1-1 EDG K-6A	10/31/10
2010-06130	Station Battery ED-01 Failed to Return the Specific Gravities to Pre-test Level	11/16/10
2010-06134	CCI Part 21 re Stacked Disk Separation for CV-0522B	11/16/10

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
2010-06151	Evaluation of IN 2010-23, Malfunctions of EDG Speed Switch Circuits	11/17/10
2010-06190	Loose Valve Stem on MV-DE511 D/G 1-1 Air Start Tank T-31	11/18/10
2010-06565	Cleaned P-7B SW Basket Due to Rising Differential Pressure	12/14/10
2010-06635	Review of NRC IN 2010-05: Inadequate Electrical Connections	12/18/10
2010-06665	ACE of Cracks on Turbocharger Support for the 1-1 EDG rejected by CARB	12/21/10
2010-06670	EDG System Exceeded MR Criteria for Function Failures per 20 & 50 Demands	12/21/10
2010-06764	Evaluation of Information Notice 2010-23,Submerged Electrical Cables	12/30/10
2011-00039	EDG has Exceeded its Maintenance Rule Performance Criteria for Availability	01/04/11
2011-00547	2011 CDBI Self Assessment AFI –Time Critical Operator Actions	02/04/11
2011-01140	Diesel Engine Control Relays with Broken Coil Terminals Support Tabs	05/26/11
2011-01341	Part 21 Concern Related to Electrolytic Capacitors During the Deferral of the Governor Replacement for the 1-2 EDG	03/18/11
2011-01767	Received a Fault Alarm during Performance of Monthly Test	04/10/11
2011-02323	The EDG K-6B Unavailability for April is at 68.11%	05/09/11
2011-02350	Aux FW Pump Turbine Tripped on Over-speed	05/10/11
2011-02469	EDG System (EPS/EDG) Exceeded its Maintenance Rule Performance Criteria for K-6B Unavailability and Function Failures per 20 Demands	05/17/11
2011-02495	Plant Systems are Driven to Maintenance Rule A(1) Status and System Health PI's are Negatively Impacted by Human Performance Issues	05/18/11
2011-02961	P&ID Revision Error	06/14/11
2011-03181	Editorial Issue in Documents	06/24/11
AR 1002239	EDG Stock/Spare Air Start Motor Test Discrepancy	04/25/06
CA 049613	EDG Air Start Motors have Upgraded Rotor Material	04/12/06

DRAWINGS

Number	Description or Title	Revision
E-1, Sh. A	Single Line – Meter and Relay Diagram	9
E-3, Sh. 1	Single Line – Meter & Relay Diagram 2400 Volt System	50
E-4, Sh. 1	Single Line – Meter & Relay Diagram 480 Volt Load Centers	38
E-4, Sh. 2	Single Line – Meter & Relay Diagram 480 Volt Load Center	37
E-5, Sh. 1	Single Line – Meter & Relay Diagram 480 Volt Motor Control Centers	58
E-5, Sh. 5B	Single Line – Meter & Relay Diagram 480 Volt Motor Control Centers	12
E-5, Sh. 5C	Single Line – Meter & Relay Diagram 480 Volt Motor Control Centers	11
E-8, Sh. 1	Single Line Meter & Relay Diagram 125V DC, 120V Instrument & Preferred AC System	57
E-8, Sh. 2	Single Line Meter & Relay Diagram 125V DC, 120V Instrument & Preferred AC System	54
E-11, Sh. 1	Schematic Meter and Relay Diagram 2.4 KV System	35
E-12, Sh. 1	Schematic Meter and Relay Diagram 2.4 KV & 480V Systems	40
E-17, Sh. 1	Logic Diagram Contents and Legend	17
E-17, Sh. 4	Logic Diagram Safety Injection Actuation	17
E-17, Sh. 9	Logic Diagram Turbine-Generator Trips and Fast Transfer	A
E-17, Sh. 10	Logic Diagram 2400 V Load Shed	10
E-17, Sh. 13	Logic Diagram Diesel Generator Breakers	8
E-17, Sh. 14	Logic Diagram Bus 1C & 1D Incoming Breakers	9
E-17, Sh. 18A	Logic Diagram Safeguard Transformer 1-1	A
E-17, Sh. 20	Logic Diagram S.G. Low Pressure & Main Steam Isolation Valves	3
E-17, Sh. 21A	Logic Diagram Auxiliary Feedwater Pump PBB Control	12
E-79, Sh. 3	Schematic Diagram Indication E/P Controller	6
E-100, Sh. 1	Schematic Diagram 480V MCC Combination Starter & ACB Feeders	19

DRAWINGS

Number	Description or Title	Revision
E-117, Sh. 1	Schematic Diagram Switchyard & Power Plant Interposing Relays	A
E-129, Sh. 1	Schematic Diagram Stored Energy Circuit Breaker 2400V. & 4160V.	12
E-129, Sh. 1A	Schematic Diagram Stored Energy Circuit Breaker 2400V. & 4160V.	7
E-129, Sh. 1B	Schematic Diagram Stored Energy Circuit Breaker 2400V. & 4160V.	4
E-129, Sh. 10	Schematic Diagram Stored Energy Circuit Breaker 152-103	0
E-129, Sh. 11	Schematic Diagram Stored Energy Circuit Breaker 152-103	0
E-129, Sh. 22	Schematic Diagram Stored Energy Circuit Breaker 152-113	0
E-129, Sh. 23	Schematic Diagram Stored Energy Circuit Breaker 152-103	0
E-129, Sh. 6	Schematic Diagram Stored Energy Operated Circuit Breaker 152-107	4
E-129, Sh. 6A	Schematic Diagram Stored Energy Operated Circuit Breaker 152-107	3
E-131, Sh. 1	Schematic Diagram Station Power Transformer No. 1-2 2400V Bus 1C Incoming Breaker 152-105	26
E-131, Sh. 1A	Schematic Diagram Station Power Transformer No. 1-2 2400V Bus 1C Incoming Breaker 152-105	6
E-131, Sh. 2A	Schematic Diagram 2400 Safeguard Bus Incoming Breaker (152-401)	1
E-131, Sh. 2B	Schematic Diagram 2400 Safeguard Bus Incoming Breaker (152-402)	0
E-132, Sh. 1	Schematic Diagram Start-Up Transformer No. 1-2 2400V Bus 1C Incoming Breaker 152-106	26
E-132, Sh. 1A	Schematic Diagram Start-Up Transformer No. 1-2 2400V Bus 1D Incoming Breaker 152-202	A
E-132, Sh. 1B	Schematic Diagram Start-Up Transformer No. 1-2 2400V Bus 1E Incoming Breaker 152-303	A
E-136, Sh. 1A	Schematic Diagram 2400V AND 4160V Bus Transfer	A
E-136, Sh. 1	Schematic Diagram 2400V and 4160V Bus Transfer	31
E-136, Sh. 2	Schematic Diagram 2400V and 4160V Bus Transfer	31
E-137, Sh. 1	Schematic Diagram 2400V Bus No. 1C Undervoltage and Load Shedding	27
E-137, Sh. 2	Schematic Diagram 2400V & 4160V Bus Undervoltage Load Shedding	23
E-137, Sh. 2A	Schematic Diagram 2400V & 4160V Undervoltage & Load Shedding	6
E-137, Sh. 2B	Schematic Diagram 2400V & 4160V Undervoltage & Load Shedding	5
E-139, Sh. 1	Schematic Diagram Diesel Generator Breaker (152-107)	37
E-139, Sh. 1A	Schematic Diagram Diesel Generator Breaker (152-213)	A
E-139, Sh. 2	Schematic Diagram Diesel Generator Breakers	20
E-143, Sh. 1	Schematic Diagram Start-up Transformer Protection	16
E-143, Sh. 2	Schematic Diagram Start-up Transformer No. 1-2 Protection	15
E-154, Sh. 1	Schematic Diagram Service Water Pump	22
E-209, Sh. 1	Schematic Diagram Safety Injection and Sequence Loading Circuit No.1	
E-209, Sh. 2	Schematic Diagram Safety Injection and Sequence Loading Circuit No.1	
E-209, Sh. 3	Schematic Diagram Safety Injection and Sequencer Loading Circuits	
E-238, Sh. 1	Schematic Diagram Main Steam Isolation Valves	27
E-238, Sh. 4A	Schematic Diagram Auxiliary Feedwater System	4
E-238, Sh. 8	Schematic Diagram Auxiliary Feedwater Pump Turbine Steam Valves	10
E-242, Sh. 4A	Schematic Diagram Volume Control Shutdown Cooling Press Relief Motor Operated. Valve (MO-1043A)	1
E-246, Sh. 1	Schematic Diagram – Containment and SIRW Tank and Containment Sump Valves – Circuit 1	24
E-249, Sh. 2	Schematic Diagram High Pressure Safety Injection Pump P-66B	1
E-256, Sh. 1A	Schematic Diagram Pressurizer Power Relief Valve	12
J- 436 Q - 8	Valve data sheet for CV-727	4
JLG-144	Logic Diagram, TD Aux FW Pump JLG – 144, P2	8
JLP-61, Sh. 2	Valve CV-727, Interface Loop Diagram, Flow Control, Aux Feedwater	7
M-11, Sh. 1	Equipment Location, Turbine Building, Plan of El. 590'- 0"	47
M-44 Sh. 56	AOV Control Valve Data Sheet	0

DRAWINGS

Number	Description or Title	Revision
M-203, Sh. 1	P&ID, Safety Injection, Containment Spray & Shutdown Cooling System	48
M-203, Sh. 2	P&ID, Safety Injection, Containment Spray & Shutdown Cooling System	2
M-203, Sh. A	P&ID, Safety Injection, Containment Spray & Shutdown Cooling System	17
M-204, Sh. 1	P&ID, Safety Injection, Containment Spray & Shutdown Cooling System	83
M-204, Sh. 1A	P&ID, Safety Injection, Containment Spray & Shutdown Cooling System	40
M-204, Sh. 1B	P&ID, Safety Injection, Containment System	36
M-204, Sh. A	P&ID, Safety Injection, Containment Spray & Shutdown Cooling System	8
M-205, Sh. 1	P&ID, Main Steam, Main and Auxiliary Turbine Systems	91
M-205, Sh. 2	P&ID, Main Steam and Auxiliary Turbine System	68
M-207, Sh. 1	P&ID, Feedwater and Condensate System	91
M-207, Sh. 1A	P&ID, Feedwater and Condensate System	57
M-207, Sh. 1B	P&ID, Feedwater and Condensate System	42
M-207, Sh. 1C	P&ID, Feedwater and Condensate System	50
M-207, Sh. 2	P&ID, Feedwater and Condensate System	37
M-207, Sh. A	P&ID, Feedwater and Condensate System	17
M-208, Sh. 1A	P&ID, Service Water System	61
M-212, Sh. 3	P&ID, Service and Instrument Air	34
M-213	P&ID, Service Water, Screen Structure and Chlorinator	93
M-214, Sh. 1	P&ID, Lube Oil, Fuel Oil, and Diesel Generator Start Systems	77
M-220, Sh. 1	P&ID, Make-up Domestic Water and Chemical Systems	90
M-222, Sh.1	P&ID, Miscellaneous Gas Supply System	51
M-222, Sh.1A	P&ID, Miscellaneous Gas Supply System	40
M-222, Sh.1B	P&ID, Miscellaneous Gas Supply System	15
M-222, Sh.2	P&ID, Miscellaneous Gas Supply System	29
M-344	AO Control Valve Data Sheet Sh52	4
M-436 Sh.48	CV-727, Copes Vulcan Series 100 Valve Assembly Model 100-160-DA	4
VEN-C18, Sh. 41	Condensate Storage Tank	7
VEN-M12, Sh. 105	Schematic Engine Control D.G. 1-2	29
VEN-M232	ADV Valves	A3
VEN-M233C	Auxiliary Feedwater Control Valve CV-0522C, Layout and Details – Sh 2	0
VEN-M59	Type S Adjustax Vane Axial Fans Sheet No. 28	3

MISCELLANEOUS

Number	Description or Title	Date or Revision
	AOV Program Track and Trending Report For Cycle 21	01/28/11
	AOV Program Track and Trending Report For Cycle 20	06/29/09
	Insight Services Oil Analysis AFW Pump K8	05/26/10
	Palisades Breaker Coordination Curves for Bus 1C	2
05000255/LS05-81-06-135	Palisades – SEP Topic II.2.A, Severe Weather Phenomena	06/30/81
50.59 Eval No. 06-0208	AFW Pump Inventory Level and Temperature Alarm Modification	1
5935-E-10	General Requirements for Integral and Fractional HP Motors for Consumers Power Company –Palisades Plant	0
5935-M-11	Specification for Service Water Pumps – Palisades Plant	2
7OP-013	Engineering Specification for a High Pressure Safety Injection Pump	03/09/67
D11-1, D11-2	Fuse Coordination Drawing	1
E0007-0039	Cutler-Hammer Installation Instructions for EHD, ED, EDH, EDC, FDB, FD, HFD, FDC Circuit Breakers and Molded-Case Switches	1998
E0130-0026	Westinghouse Application and Specifications for Molded-Case Circuit Breakers Types EB, EHB 100 Amperes, Type FB 150 Amperes	03/97

MISCELLANEOUS

Number	Description or Title	Date or Revision
EA-CPCO-JCW-95-01	Acceptability of the Removal - AFS MOVs from the 89-10 Program	1
LER 2010-002*00	Condition that Could Have Prevented Fulfillment of a Safety Function	10/18/10
M0017 0013	Elliott Co. Technical Manual for DYRT Turbine	09/14/89
M0233C 0003	Control Components Inc., Operation and Maintenance Instructions for Drag Velocity Control Element	1
OP 374	T2/T81 Valve PM	05/15/11
PLPLO-2009-00127	Corrective Action 12 to CDBI Self Assessment	10/22/09
PL-SIS Training Plan	Palisades Operation Training, High Pressure Inj. Training	5
RS-1476	Standby Battery Vented Cell Installation and Operating Instructions	2010
SGT1-1-SGT1-1-LTC	Safeguards Transformer SGT1-1 Load Tap Changer Automatic Controls	08/03/10
Spec M-12A	Document Change for K-6A/B Air Start Motors	2
SUT1-2/SUT1-2/ALTC	Startup Transformer 1-2 Load Tap Changer Automatic Controls	1
SUT1-2/SUT1-2/BLTC	Startup Transformer 1-2 Load Tap Changer Backup Controls	0
TEAR 2009-626	Training Effectiveness Evaluation Worksheet for Electrical Maintenance	1

MODIFICATIONS

Number	Description or Title	Date or Revision
EC5885	EDG 1-1 and 1-2 Starting Air System Reliability Upgrades	0
EC242	Evaluation of Manufacturer Specified Material/Change for EDG ASM	05/11/06
FC-944	ASDV's Back-up Nitrogen Supply	6
EC7237	Prepare Design Package to provide Missile Barrier for CST	11/25/10
EC10382	Condensate Storage Tank Vortex Suppression Device	0
EC26866	Enclosure to Cover 4160V Buses 1F and 1G	000
EC5000122470	Improvement of Fast Transfer Capability of Station Offsite Power Supply System	0
EC19665	P26, Turning Gear Oil Pump Load Shed	0
EC22675	Remove/Spare in Place H2 Recombiners, Cables and Panels	0

OPERABILITY EVALUATIONS

Number	Description or Title	Date
OPR-112	EDG Air Start Motors have Upgraded Rotor Material	04/12/06
2011-03282	Operability Determination to Address Potential Impact to EX-04, Startup Transformer 1-2, Due to Structure Installed over Bus 1F/1G Enclosure	07/13/11

PROCEDURES

Number	Description or Title	Revision
Admin Proc 4.48	Control of Time Critical Operator Actions	1
ARP-1	Turbine Condenser and Feedwater Scheme EK-1	68
ARP-3	Electrical Auxiliaries and Diesel generator Scheme EK-05 (EC-11)	69
ARP-7	Auxiliary Systems Scheme EK-11 (C-13)	76-79
ARP-36	Aux Feedwater System Status Array Scheme EK-16 (C-11)	5

PROCEDURES

Number	Description or Title	Revision
EM-27	Lubrication Analysis and Monitoring	11
EM-28-03	Palisades Air Operates Valve Program	8
EM-28-07	MOV Diagnostic Engineering Acceptance	2
EN-OP-104	Operability Determination Process	5
EN-DC-140	Entergy Air Operated Valve Program	1
EN-DC-141	Design Inputs	9
EN-DC-167	Classification of Structures, Systems, and Components	4
EN-DC-324	Preventative Maintenance Program	7
EN-DC-325	Component Performance Monitoring	6
EN-DC-346	Cable Reliability Program	2
EN-LI-102	Corrective Action Process	16
EN-LI-104	Self-Assessment and Benchmark Process	7
EN-MA-101	Fundamental of Maintenance	9
EN-OP-104	Operability Determination Process	5
ENS-EP-302	Severe Weather Response	11
EOP-3.0	Station Blackout Recovery Basis	11
EOP-4.0	Loss of Coolant Accident	20
EOP-9.0	Functional Recovery Procedure	19
EOP Supp. 7	Battery No. 1 Load Stripping	5
EOP Supp 28	Supplementary Actions for Loss of Power	9
EOP TCA	EOP Time Critical Operator Basis	0
FE-5A	Modified Performance Test- Battery No ED-01	17
FP-SC-PE-01	Dedication of Commercial Grade Items and Services	0
ME-12A	ED-01 Battery Checks- Monthly	4
MMP-10	Review of Procurement Documents by Procurement Engineering	10
MO-7A-1	Emergency Diesel Generator 1-1	74
MSE-E-23	Equalize Charge of ED-01 & ED-02	6
MSE-E-45	Single Cell Charging for Station Batteries ED-01 & ED-02	6
ONP-12	Acts of Nature	19, 28
ONP-23.1	Primary Coolant Leak	25
ONP 7.1	Loss of Instrument Air	13
QE-35	ED-01 and ED-02 Battery Checks- Quarterly	6
QO-5	Valve Test Procedure, Stroke Test CV-2010	
RE-83A	Service Test- Battery No ED-01	18
RE-131	Diesel Generator 1-1 Load Reject	5
RE-137	Calibration of Bus 1C Undervoltage and Time Delay Relays	6
RE-139-1	Test Starting Time of Diesel Gen 1-1	6
RO-128-1	Diesel Generator 1-1 24 Hour Load Run	17
RO-145	Comprehensive Pump Test Procedure AFW, P8A, P8B, P8C	2
RT-8C	Technical Specification Surveillance Procedure Basis Document for RT-8C	7
RT-8C	Engineered Safeguards System – Left Channel	26
RT-129	Technical Specification Surveillance Procedure Basis Document for RT-129	3
RT-129	Functional Test of Bus 1C Undervoltage Relays	7
SOP-03	Safety Injection System and Shutdown Cooling System	79
SOP-12	Feedwater System	59
SOP-26	Make-up System	47
SOP-30	Station Power	61, 62
SPS-E-20	Maintenance for 2400 Volt Siemens Switchgear	5
SPS-E-23	Testing of AC & DC Molded Case Circuit Breakers Without Static Trip Devices	5
SPS-E-28	Safeguards Transformer EX-07 Load Tap Changer Set	5

PROCEDURES

Number	Description or Title	Revision
TCA-29	MSLB Containment Response – Terminate AFW	0
T-262	Test of Diesel Generator 1-1 Trips	4
T-264	Test of Diesel Generator 1-1 Breaker 152-107 Trips	3
1.01, Attachment 2	Guidelines for the Placement of Items in Areas Containing Operable Safety-Related Equipment	26

WORK DOCUMENTS

Number	Description or Title	Date
00024832	CV-885. Perform Diagnostic Testing	01/22/06
00148161	RE-139-1 – Test Starting Time of Diesel Gen 1-1	07/20/09
00148742	RT-129 - Functional Test of Bus 1C Undervoltage	07/20/09
00148744	RT-8C – Eng Safeguards Sys – Left Channel	08/20/09
00172535	RE-131 – Diesel Generator 1-1 Load Reject	10/18/09
00186505	RE-137 – D/G 1-1 Undervoltage Start Channel Cal	04/02/10
00188903	SPS-E-28 – Safeguards Transformer EX-07 Load Tap Changer Set	11/19/09
00190907	EX-04:Potential Damage to Load Tap Changer Controls T/R	06/16/09
00200636	RT-129 - Functional Test of Bus 1C Undervoltage	10/18/10
00205241	HLS, POS indicator on CV-0780, S/G E-50B Misaligned	01/18/11
00206002	RE-139-1 – Test Starting Time of Diesel Gen 1-1	05/25/11
00206007	Service Test- Battery No ED-01	10/19/10
00210153	Atmospheric Steam Dump Calibration	9/01/10
00210155	Replacement of PCV's and POC Rebuild	11/23/10
00213008	RT-8C – Eng Safeguards Sys – Left Channel	10/17/10
00214219	AFW Pump P-8B Turbine K-8 overhaul	11/29/10
00214862	EX-07, 15 Year PM to Replace Electrical Components	11/05/10
00214883	EX-07, 10 Year PM to Replace Electrical Components	11/16/10
00234152	Revise Setpoint HHM, 2nd Level Undervoltage Relays - Left	09/02/10
00253707	Investigate High Voltage Alarm Received on EX-07 Safeguard	10/25/10
00254587	EX-04; Set Point Change per SPS-e-31, EC255621	01/12/11
01627371	T2/T81 Physical Stroking	02/11/11
51618302	Test of Diesel Generator 1-1 Breaker 152-107 Trips	06/07/10
51619199	Region Repair Testing of Transformer EX-04	06/16/09
51623252	DG 1-1 Undervoltage Start Channel Cal	06/02/08
51624433	ED-01, Performance Test Per FE-5A	03/25/09
51627371	CV-2008 and CV-2010 manual Exercising	02/2011
51632313	M-1005; SUPP D/G 1-3 MONTHLY PM	05/25/07
51633487	522B Valve Leak-By Determine Cause	06/09/09
51635819	Test of Diesel Generator 1-1 Trips	07/01/10
51637262	ED-01, Replace Station Battery No. 1	11/16/10
51637409	T-2, Install Vortex Suppression Device	09/20/07
51638212	CV522B Valve Seat Leakage Repair	08/22/09
51657285	CV-3030 Diagnostics	04/14/09
51657353	CV-3030 Periodic Inspection PM	07/15/09
51691513	Aux FW Control Valve Diagnostics	09/29/09
52029453	RO-128-1 – DG1-1 24 Hour Load Run	11/23/10
52204256	SPS-E-20 - Maintenance Service Water Pump P7B Breaker 152-103	05/14/10
52242295	T2 & T81 Manual Isolation	01/13/11
52260217	RE-131 – Diesel Generator 1-1 Load Reject	05/25/11

WORK DOCUMENTS

Number	Description or Title	Date
52277067	PAL Transformer Oil Samples for Oil Testing	04/15/11
52282761	RO-128-1 – DG1-1 24 Hour Load Run	06/16/11
52295221	M-1005; SUPP D/G 1-3 QUARTERLY PM	03/02/11
52301288	EX-04: Change Desiccant in Load Tap Changer	05/19/11
52302901	QE-35A ED-01, Battery Checks- Quarterly	03/15/11
52303620	MO-7A-1 – Emergency Diesel Generator 1-1 (K-6A)	04/27/11
52307508	QO-14B-P7B, IST Service Water Pump	04/05/11
52307512	M-1005; SUPP D/G 1-3 MONTHLY PM	02/22/11
52315908	DWO-1 –OPS 1st Line Supv Review D/WO-1	06/08/11

Section 4OA5

CALCULATIONS

Number	Description or Title	Date or Revision
EA-A-PAL-92-090-01	Evaluation of LPSI Pump Operation With Reduced PCS Inventory When Supplying Shutdown Cooling	0
EA-EC12262-02	GL2008-01: Evaluation of acceptable void sizes	1
EA-EC12262-03	Summary Report Associated with GL2008-01	0
EA-SDW-97-003	Minimum post-LOCA containment water level determination	3
PLP-RTP-09-00010	Containment Sump Strainer SBLOCA Evaluation for Palisades	1
PLP-RTP-09-00011	Containment Sump Air Ingestion Evaluation	0
SPC-82-26	SIRW Tank Low Level Alarm	12/17/82

CORRECTIVE ACTION DOCUMENTS GENERATED DUE TO THE INSPECTION

Number	Description or Title	Date
2011-02975	Incorrect Equation for Void Area	06/14/11
2011-02978	CVCS Tie to the HPSI Was Not Considered in Response to GL08-01	06/14/11
2011-03004	Gas Susceptible Locations Incorrectly Determined Inaccessible for Monitoring	06/15/11
2011-03005	No Condition Report Was Generated When the Initial Condition Was Discovered	06/15/11
2011-03010	Two Drawing Errors	06/16/11
2011-03020	Fill and Vent of Instrument Lines Not Triggered By Procedure	06/16/11
2011-03027	Incorrect Statements Made in ESOMs Shift Entries	06/16/11
2011-03029	Invalid Assumption Used for Excluding a Gas Susceptible Locations From Monitoring – RFI-80	06/16/11
2011-03087	Invalid Assumption Used for Excluding a Gas Susceptible Locations From Monitoring – RFI-167	06/21/11
2011-03148	No Procedural Guidance Exist to Realign LPSI From SDC Mode to ECCS Mode While a Shutdown-LOCA	06/22/11
2011-03242	ESSO-7 Records Were Not Maintained	06/28/11
2011-03256	ESSO-10 Not Adequate to Flush SDC HX's	06/29/11
2011-03257	FSAR 6.4.2.1 Needs Clarification on The 20 Minute Injection Time	06/29/11
2011-03281	ESSO-10 Uses a Non-Conservative Minimum Flowrate for Flushing	06/30/11
2011-03284	Void Acceptance Criteria Based on Non-Conservative SIRWT Elevation	06/30/11
2011-03356	Vortexing During Mid-Loop Operations Have Not Been Analyzed for the Full Range of Possible Flow Rates	07/07/11
2011-03422	Non-conservative Acceptance Criteria for Suction Voids at LPSI and CS	07/11/11
2011-03858	Potential Waterhammer from Steam Voids during Mode 4 LOCA	08/05/11

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
1994-0130	Prevention of Waterhammer in SI Bottle Lines	05/19/94
2008-00512	GL2008-01 Commitments	10/09/08
2009-02769	T-82B SIT Level has Lowered	05/20/09
2009-04105	Expectation to Generate a CR no Matter the Size of the Gas Void Identified	08/27/09
2009-04317	Gas Void Disappeared in the Sub-cooling Line	09/15/09
2009-04558	Gas Found at Location No. 18	09/30/09
2010-00487	Inadequate Method for Venting P-54B	02/02/10
2010-00498	Lack of Site Awareness of Potential Gas Intrusion Activities	02/03/10
2010-02793	Previously Identified Void Was Not Found at Location No. 5	07/08/10
2010-04098	Void Found in the Sub-cooling Line	08/27/09
2010-06354	Void Found at the CS Header	11/30/10

DRAWINGS

Number	Description or Title	Revision
M-203-SH.1	SI, CS, and SDC	48
M-203-SH.2	SI, CS, and SDC	25
M-203-SH.A	SI, CS, and SDC	7
M-204-SH.1	SI, CS, and SDC	83
M-204-SH.1A	SI, CS, and SDC	40
M-204-SH.A	SI, CS, and SDC	8
M-398-SH.18	Level Settings Diagram for SIRW Tank	5
VEN-M107-SH.2065	HPSI to Primary Loop	5
VEN-M107-SH.2170	Primary Loop Auxiliary Piping	2
VEN-M107-SH.2171	SI, CS, and SDC	7
VEN-M107-SH.2172	SI, CS, and SDC	10
VEN-M107-SH.2173	SI, CS, and SDC	4
VEN-M107-SH.2200	SI, CS, and SDC	6
VEN-M107-SH.2244	SI, CS, and SDC	6
VEN-M107-SH.2245	HPSI discharge	5
VEN-M107-SH.2280	SI, CS, and SDC	11
VEN-M107-SH.2370	LPSI discharge	5
VEN-M107-SH.2371	SI to Primary Loop	5
VEN-M107-SH.2372	SI to Primary Loop	5
VEN-M107-SH.2376	CS	4
VEN-M107-SH.2377	CS	4
VEN-M107-SH.2378	CS	3
VEN-M107-SH.2379	CS	3
VEN-M107-SH.2456	CS	4

MISCELLANEOUS

Number	Description or Title	Date or Revision
1918535-O-005	GL2008-01 – Recommended Locations for UT Inspection	12/31/08
1918535-O-006	GL2008-01 Recommended Locations for UT Inspection Inside Containment	05/08/09
1918535-R-003	Walkdown Report Associated with NRC GL2008-01 Managing Gas Accumulation in ECCS, DHR and CS Systems – Outside Containment	0
1918535-R-004	Walkdown Report Associated with NRC GL2008-01 Managing Gas Accumulation in ECCS, DHR and CS Systems — Inside Containment	0
EC27917	Justification to Change Void Monitoring Frequency from Monthly to Quarterly	02/24/11

MISCELLANEOUS

Number	Description or Title	Date or Revision
IET-IN97-38	Evaluation of IN 97-38	01/20/00

PROCEDURES

Number	Description or Title	Revision
1918535-P-002	Field Walkdown & Data Recording for GL08-01	0
CEP-NDE-0530	Ultrasonic Examinations of Components to Determine Fluid Level	3
EN-DC-115	Engineering Change Process	11
EN-DC-219	Gas Accumulation Management	0
ESSO-10	Shutdown Cooling Heat Exchanger and Spray Header Flush	7
ESSO-13	Draining the SDC Heat Exchangers	1
ESSO-7	Draining and Refilling ESS Pump Suction Piping	4
GOP-14	Shutdown Cooling Operations	43
QO-16	IST – CS pump	31
QO-19	IST – HPSI Pump and ESS Check Valve Operability Test	31
QO-20	IST – LPPSI Pump	18
RO-147	Comprehensive Pump Test Procedure – HPSI Pumps	3
RO-98	LPSI and CS Comprehensive Pump Test & Check Valve Test	8
SOP-3	Safety Injection and Shutdown Cooling System	79

TRAINING DOCUMENTS

Number	Description or Title	Revision
PL-ISGD	Palisades Non-Licensed Operator Training Safety Injection System	20
PL-SIS	Palisades Operations Training Safety Injection System	5

WORK DOCUMENTS

Number	Description or Title	Date
09-MAO-04	UT Survey for GL08-01	07/06/09
11-MAO-37	UT for Gas Susceptible Location No. 8	04/27/11
51604513	P-67A; HLM,Oil Leak BRG Area/Casing Leak/Suct Flange Bolts	06/09/11
52306536	Monthly Void Monitoring – GL 2008-01	02/09/11
52319963	Monthly Void Monitoring – GL 2008-01/ UT for Gas Susceptible Location No. 5	05/02/11

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
ADV	Atmospheric Dump Valve
AFW	Auxiliary Feedwater
AOV	Air-Operated Valve
ASME	American Society of Mechanical Engineers
BEP	Best Efficiency Point
BWR	Boiling Water Reactor
CAP	Corrective Action Program
CDBI	Component Design Bases Inspection
CFR	Code of Federal Regulations
CR	Condition Report
CS	Containment Spray
CST	Condensate Storage Tank
CVCS	Chemical and Volume Control
DC	Direct Current
DHR	Decay Heat Removal
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
EC	Engineering Change
EDG	Emergency Diesel Generator
FC	Field Change
FIN	Finding
FSAR	Final Safety Analysis Report
GDC	General Design Criteria
GL	Generic Letter
gpm	Gallons per Minute
HPSI	High Pressure Safety Injection
IEEE	Institute of Electrical & Electronic Engineers
IMC	Inspection Manual Chapter
IN	Information Notice
IR	Inspection Report
IST	Inservice Testing
kV	Kilovolt
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
LPSI	Low Pressure Safety Injection
MCC	Motor Control Center
N_{FR}	Froude Number
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NPSH	Net Positive Suction Head
NRC	U.S. Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSR	Non-Safety Related
PARS	Publicly Available Records System
PCS	Primary Coolant System
P&ID	Piping and Instrumentation Drawing

LIST OF ACRONYMS USED (continued)

PM	Preventive Maintenance
PORV	Power-Operated Relief Valve
PRA	Probabilistic Risk Assessment
PWROG	Pressurized Water Reactor Owner's Group
RIS	Regulatory Issue Summary
SBO	Station Blackout
SDC	Shutdown Cooling
SDP	Significance Determination Process
SIRW	Safety Injection Refueling Tank
SW	Service Water
TI	Temporary Instruction
TS	Technical Specification
TSTF	Technical Specification Task Force Traveler
URI	Unresolved Item
UT	Ultrasonic Test
WO	Work Order

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Sincerely,

/RA/

Ann Marie Stone, Chief
Engineering Branch 2
Division of Reactor Safety

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