UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

August 2, 2013

Rafael Flores, Senior Vice President
and Chief Nuclear Officer
Attention: Regulatory Affairs
Luminant Generation Company LLC
Comanche Peak Nuclear Power Plant
P.O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNIT 1 AND UNIT 2 – NRC COMPONENT DESIGN BASES INSPECTION, NRC INSPECTION REPORT 05000445; 05000446/2013007

Dear Mr. Flores:

On June 20, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Comanche Peak Nuclear Power Plant, Units 1 and 2. The enclosed report documents our inspection results, which were discussed on June 20, 2013, with Mr. Flores, Senior Vice President and Chief Nuclear Officer, 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 cognizant plant personnel.

Eleven NRC identified findings were identified during this inspection. Ten of the findings were determined to have very low safety significance (Green). One of the findings was determined to be a Severity Level IV violation. All of the findings were determined to involve violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCV's) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Comanche Peak Nuclear Power Plant, Units 1 and 2. The information you provide will be considered in accordance with Inspection Manual Chapter 0305. In addition, if you disagree with the characterization of the crosscutting 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 IV, and the NRC Resident Inspector at Comanche Peak Nuclear Power Plant, Units 1 and 2.

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 (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Thomas R. Farnholtz, Branch Chief
Engineering Branch One
Division of Reactor Safety

Dockets: 05000445; 05000446
Licenses: NPF-87; NPF-89

Enclosure: Inspection Report 05000445; 05000446/2013007
w/ Attachment: Supplemental Information

cc w/ encl:
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Publicly Avail	☑ Yes ☐ No	Sensitive	☐ Yes ☑ No	Sens. Type Initials	MRY

RI:DRS/EB1	RI:DRS/EB2	RI:DRS/OB	SRI:DRP/RPBC	SRI:DRS/EB1
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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Dockets:	05000445; 05000446
Licenses:	NPF-87; NPF-89
Report:	05000445; 05000446/2013007
Licensee:	Luminant Generation Company LLC
Facility:	Comanche Peak Nuclear Power Plant, Units 1 and 2
Location:	P.O. Box 1002 Glen Rose, TX 76043
Dates:	May 20, 2013 through June 20, 2013
Team Leader:	M. Young, Senior Reactor Inspector, Engineering Branch 1, Region IV
Inspectors:	B. Correll, Reactor Inspector, Engineering Branch 2, Region IV J. Braisted, Reactor Inspector, Engineering Branch 1, Region IV T. Buchanan, Operations Inspector, Operations Branch, Region IV R. Smith, Senior Resident Inspector, Reactor Projects Branch C, Region IV
Accompanying Personnel:	C. Edwards, Mechanical Contractor, Beckman and Associates G. Skinner, Electrical Contractor, Beckman and Associates
Approved By:	Thomas R. Farnholtz, Branch Chief Engineering Branch 1

SUMMARY OF FINDINGS

IR 05000445; 05000446/2013007; 05/20/2013 – 06/20/2013; Comanche Peak Nuclear Power Plant, Units 1 and 2: baseline inspection, NRC Inspection Procedure 71111.21, "Component Design Basis Inspection."

The report covers an announced inspection by a team of five regional inspectors and two contractors. Eleven NRC identified findings were identified during this inspection. Ten of the findings were determined to have very low safety significance (Green). One of the findings was determined to be a Severity Level IV violation. The final significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be 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 Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," that states, in part, "applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions." Specifically, prior to June 5, 2013, the licensee did not establish that the minimum switchyard voltages established in station procedures were adequate to prevent undesired actuation of the undervoltage protection scheme. This condition resulted from an inadequate analysis of undervoltage relay setpoints in design calculations, and the failure to provide acceptance criteria for undervoltage relay reset setpoints in relay calibration procedures. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006176.

  The inspectors determined that the failure to properly analyze minimum switchyard voltage requirements, and control relay setpoints necessary to maintain the availability of offsite power was a performance deficiency. The performance deficiency is more-than-minor because it was associated with Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, at the minimum switchyard voltages established in station procedures, actuation of the undervoltage protection scheme could have occurred and removed the reliable offsite power sources during an accident. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. The finding had a cross-cutting aspect in the Area of Problem Identification and Resolution, associated with the Operating Experience Component, since the issues noted in this finding were discussed

in Regulatory Issue Summary (RIS) 2011-12, "Adequacy of Station Electric Distribution System Voltages," and RIS 2011-12 was reviewed by the licensee as part of the self assessment conducted in February 2013. [P.2(b)] (1R21.2.1)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," that states, in part, "applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions." Specifically, prior to June 20, 2013, the 125 VDC calculation did not take into account the maximum inrush currents and actual accident loading, and the 120 VAC calculation did not properly account for low voltage when the buses are supplied from their alternate source. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006273 and CR-2013-006396.

  The inspectors determined that the failure to perform accurate voltage calculations for the 125 VDC system and 120 VAC bus was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the 125 VDC calculation did not take into account the maximum inrush currents and actual accident loading, and the 120 VAC calculation did not properly account for low voltage when the buses are supplied from their alternate source. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance. (1R21.2.2)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR 50.65(a)(1), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," that states, in part, that the licensee "shall monitor the performance or condition of structures, systems, or components, against licensee established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions." Specifically, on July 26, 2012, the licensee failed to establish goals and monitor the performance of the alternate power diesel generator system to ensure the system is capable of providing the necessary electric power onto the emergency buses. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006521.

  The inspectors determined that the failure to follow procedure to establish performance goals while performing Maintenance Rule (a)(1) monitoring to ensure the APDG system is capable and tested to meet the design basis requirements, was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Equipment Performance attribute and adversely affected the cornerstone objective to ensuring the availability and

reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the procedure directs the licensee to establish performance goals on activities that address conditions which were determined to be classified as (a)(1). In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Mitigating System Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding had a cross-cutting aspect in the area of human performance associated with the resources component because the licensee failed to ensure that emergency equipment is adequate and available to assure nuclear safety. [H.2(d)] (1R21.2.3)

- SLIV. The inspectors identified a Severity level IV, non-cited violation of 10 CFR 50.71(e)(4), requires the UFSAR be updated, at intervals not exceeding 24 months, and states in part, "the revisions must reflect all changes made in the facility or procedures described in the UFSAR." Specifically, prior to June 20, 2013, the inspectors identified the alternate power diesel generator system was not described in sufficient detail in the FSAR as required. This finding was entered into the licensee's corrective action program as Condition Report CR-2013-006256.

  The inspectors determined that the failure to update the Final Safety Analysis Report to include the description of the APDG system in section 8.3.1 "AC Power Systems" was a performance deficiency. The issue is a performance deficiency because it was a failure to meet requirement, 10 CFR 50.71(e)(4), and it was within the licensee's ability to correct the problem. Using Inspection Manual Chapter 0612, Appendix B, the performance deficiency was assessed through both the Reactor Oversight Process and traditional enforcement because the finding had the potential for impacting the NRC's ability to perform its regulatory function. The finding resulted in a minor performance deficiency. For traditional enforcement, the inspectors used the Enforcement Policy, in accordance with Section 6.1.d.3, and determined the violation to be a Severity Level IV, non-cited violation, because the licensee failed to update the UFSAR as required by 10 CFR 50.71(e)(4), but the lack of up-to-date information had not resulted in any unacceptable change to the facility or procedures. This violation did not have a cross-cutting aspect. (1R21.2.3)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," that states, in part, "measures provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Specifically, prior to May 20, 2013, the licensee failed to assess the adverse effects of 6.9kV and 480V system harmonics on the degraded voltage relays. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006230.

The inspectors determined that the failure to analyze the effect of electrical system harmonics on the degraded voltage relays was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failure to analyze the effect of electrical system harmonics on the degraded voltage relays could cause the relays to fail to actuate at the setpoint specified in Technical Specifications. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was a deficiency affecting the design or qualification that did not result in the safety-related equipment losing operability or functionality. This finding did not have a crosscutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance. (1R21.2.5)

- Green. The inspectors identified a Green, non-cited violation, with three examples, of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," that states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings and shall be accomplished in accordance with these instructions, procedures, or drawings." Specifically, for example 1 on February 28, 2013, for example 2 on June 5, 2013 and for example 3 on June 8, 2013, the licensee failed to follow procedure STI-442.01, "Operability Determination and Functionality Assessment Program," Revision 1, Attachment 8.B page 3 of 5 which states, in part, "Identify the topics that are applicable to the quick technical evaluation and include information for applicable topics within the evaluation such as: for example 1, The effect or potential effect of the degraded or nonconforming condition on the affected SSC's ability to perform its specified safety function, or for example 2, Compensatory Measures are recommended, or for example 3, Whether there is reasonable expectation of operability, including the basis for the determination." The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006599.

  The inspectors determined that the failure to perform adequate operability assessments was a performance deficiency. The performance deficiency is more-than-minor because:

  Example 1: It was associated with the Reactor Safety, Barrier Integrity Cornerstone, Configuration Control attribute and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, shutting off of the containment spray pumps during a large break LOCA inside containment would allow containment pressure to increase. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 3, the inspectors determined the finding was of very low (Green) safety significance because it did not represent an actual open pathway in the physical integrity of reactor containment (valves, airlocks, etc.), containment isolation system (logic and

instrumentation), and heat removal components or actual reduction in function of hydrogen igniters in the reactor containment.

Example 2: It was associated with the Reactor Safety, Mitigating Systems Cornerstone, Equipment Performance attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the compensatory measures established in the first operability assessment did not ensure that offsite power would be maintained at minimum grid voltage.

Example 3: It was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the operability assessment initially credited the use of the battery chargers after the emergency diesel generators restored power to the bus, without evaluating design basis for the battery chargers.

For examples 2 and 3, the inspectors used Inspection Manual Chapter 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because these examples were a deficiency affecting the design or qualification that did not result in losing operability or functionality.

This finding had a cross-cutting aspect in the area of human performance associated with the decision making component because the licensee failed in all three examples to conduct an effectiveness review of a safety-significant decision to verify the validity of the underlying assumptions to identify possible unintended consequences during the original operability assessments. [H.1(b)] (1R21.2.5)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," that states, in part, “A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.” Specifically, since 2001, the licensee failed to provide appropriate acceptance criteria and testing procedure instructions during modified performance tests involving Class 1E batteries for the 1-minute critical period testing data which incorporated the requirements of IEEE Standard 450-1995 to ensure the battery would meet the required design voltage for the duty cycle. The finding was entered into the licensee’s corrective action program as Condition Report CR-2013-005673.

  The inspectors determined that the failure to provide appropriate acceptance criteria and testing procedure instructions involving Class 1E batteries for the 1-minute critical period testing data during modified performance tests was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Procedure Quality attribute and adversely

affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Procedure MSE-S0-5715 does not direct the technicians to record and evaluate the voltage at the end of the 1-minute critical period to ensure it does not drop below the designed minimum voltage, which would indicate the battery would not be capable of meeting the required design function. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because Calculation EE-CA-0000-5121 was implemented in 2001 and did not reflect current licensee performance. (1R21.2.8)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," that states, in part, "A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents." Specifically, since 1994, the licensee failed to recognize that if the safety-related chilled water pumps were degraded to 90 percent of their reference value, as permitted by IST Procedures OPT-209A/B, the system may not be able to achieve the required design flowrates as stated in Calculation 1-EB-311-8. This finding was entered into the licensee's corrective action program as Condition Report CR-2013-006252.

  The inspectors determined that the failure to ensure appropriate acceptance criteria were incorporated into test procedures for the safety chill water pumps was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to recognize that if the safety-related chilled water pumps were degraded to 90 percent of their reference value, as permitted by IST Procedures OPT-209A/B, the system may not be able to achieve the required design flowrates as stated in Calculation 1-EB-311-8. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because Calculation 1-EB-311-8 was updated in 1994 to incorporate the uninterruptible power system fan coil units and did not reflect current licensee performance. (1R21.2.16)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," that states, in part, " measures shall be established to assure that conditions adverse to quality are promptly identified and corrected." Specifically, prior to June 17, 2013, the licensee failed to establish an activity to identify fouling of the Unit 1 emergency diesel generator building exhaust ventilation screens. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006540.

  The inspectors determined that the failure to identify fouling on the Unit 1 emergency diesel generator building exhaust ventilation screens was a performance deficiency. The performance deficiency is more-than-minor because it had the potential to lead to a more significant safety concern. Specifically, the Unit 1 emergency diesel generator rooms could have insufficient exhaust flow to meet design basis temperature requirements if left uncorrected. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the emergency diesel generators losing operability or functionality. This finding did not have a crosscutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance. (1R21.2.17)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, "measures shall be establish to assure that the design basis for systems, structures, and components are correctly translated into specifications, drawings, procedures and instructions." Specifically, since 2006 and 2007, the licensee failed to appropriately incorporate the RWST vortexing design calculation's 6 percent indicated level into the emergency operating procedures for switching containment spray pump suction from the RWST to the containment sump to prevent damage to the pumps. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-005739.

  The inspectors determined that the failure to appropriately incorporate the RWST vortexing design calculation's 6 percent indicated level into the emergency operating procedures for switching containment spray pump suction from the RWST to the containment sump to prevent damage to the pumps was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Procedure Quality attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Emergency Operating Procedure EOS-1.3A/B allowed the operators the ability to delay transfer of containment spray pump suction source which could have caused damage to the pumps due to vortexing. Using Inspection Manual Chapter 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect

because the change to the procedure due to the addition of the sump strainers occurred in 2006 and 2007, and did not reflect current licensee performance. (1R21.4)

- Green. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, "measures shall be established to assure that conditions adverse to quality are promptly identified and corrected." Specifically, since May 2010, the licensee failed to correct a condition adverse to quality in a timely manner that involved updating design basis calculations for safety-related equipment to include the allowed technical specification frequency range of ± 2 percent for the emergency diesel generators. The finding was entered into the licensee's corrective action program as Condition Report CR-2013-006604.

  The inspectors determined that the failure to correct a condition adverse to quality in a timely manner that involved updating design basis calculations for safety-related equipment to include the allowed technical specification frequency range of ± 2 percent for the emergency diesel generators was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the calculations to support safety-related equipment did not include allowed technical specification frequency range for the emergency diesel generators to ensure the equipment would be capable of performing their safety-related functions. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was a deficiency affecting the design or qualification that did not result in the safety-related equipment losing operability or functionality. This finding had a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee failed to take appropriate corrective actions to address updating design basis calculations to include technical specification allowed emergency diesel generator frequency range in a timely manner, commensurate with their safety significance. [P.1(d)] (4OA2)

B. Licensee-Identified Violations

No findings were identified.

REPORT DETAILS

1 REACTOR SAFETY

Inspection of component design bases verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected components and operator actions to perform their design bases functions. As plants age, their design bases may be difficult to determine and important design features may be altered or disabled during modifications. The plant risk assessment 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.

1R21 Component Design Bases Inspection (71111.21)

To assess the ability of the Comanche Peak Nuclear Power Plant, Units 1 and 2, equipment and operators to perform their required safety functions, the team inspected risk significant components and the licensee's responses to industry operating experience. The team selected risk significant components for review using information contained in the Comanche Peak Nuclear Power Plant, Units 1 and 2, probabilistic risk assessment and the U. S. Nuclear Regulatory Commission's (NRC) standardized plant analysis risk model. In general, the selection process focused on components that had a risk achievement worth factor greater than 1.3 or a risk reduction worth factor greater than 1.005, or a Birnbaum value greater than 1E-6. The items selected included components in both safety-related and nonsafety-related systems including pumps, circuit breakers, heat exchangers, transformers, and valves. The team selected the risk significant operating experience to be inspected based on its collective past experience.

.1 Inspection Scope

To verify that the selected components would function as required, the team reviewed design basis assumptions, calculations, and procedures. In some instances, the team performed calculations to independently verify the licensee's conclusions. The team also verified that the condition of the components was consistent with the design bases and that the tested capabilities met the required criteria.

The team reviewed maintenance work records, corrective action documents, and industry operating experience records to verify that licensee personnel considered degraded conditions and their impact on the components. For the review of operator actions, the team observed operators during simulator scenarios, as well as during simulated actions in the plant.

The team performed a margin assessment and detailed review of the selected risk-significant components to verify that the design bases have been correctly implemented and maintained. This design margin assessment considered original design issues, margin reductions because of modifications, and margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the

selection of components for detailed review. These included items such as failed performance test results; significant corrective actions; repeated maintenance; 10 CFR 50.65(a)1 status; operable, but degraded conditions; NRC resident inspector input of problem equipment; system health reports; industry operating experience; and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in-depth margins.

The inspection procedure requires a review of 15 to 25 total samples that include risk-significant and low design margin components, containment-related components, and operating experience issues. The sample selection for this inspection was 22 components, 3 of which are containment-related, and 3 operating experience items. The selected inspection and associated operating experience items supported risk significant functions including the following:

a. Electrical power to mitigation systems: The team selected several components in the electrical power distribution systems to verify operability to supply alternating current (ac) and direct current (dc) power to risk significant and safety-related loads in support of safety system operation in response to initiating events such as loss of offsite power, station blackout, and a loss-of-coolant accident with offsite power available. As such the team selected:

- 345 kV Startup Transformer XST2 (CPX-EPTRST-02)
- 125 VDC Switchboard 1ED2 (CP1-EPSWED-02)
- Unit 1 Alternate Power Generators
- Unit 1 Diesel Generator 1-01 Emergency Feeder Breaker (1EG1)
- Unit 1 6.9kV Switchgear 1EA2 (CP1-EPSWEA-02)
- Unit 2 Emergency Diesel Generator Sequencers
- Unit 2 Containment Electrical Penetrations
- Unit 1 Class 1E Battery BT1ED2 (CP1-EPSWED-02)

b. Mitigating systems needed to attain safe shutdown: The team reviewed components and supporting equipment required to perform the safe shutdown of the plant. As such the team selected:

- Unit 1 Containment Equipment Hatch and Personnel and Emergency Airlocks
- Unit 1 Containment Purge Valves (1-HV-5536, 5537, 5538, 5539)
- Unit 1 Component Cooling Water Surge Tank 1-01 (CP1-CCATST-01)
- Unit 1 Component Cooling Water Recirculation Flow Valve (1-FV-4536)
- Unit 1 Auxiliary Feedwater System Check Valve (1AF-0032)
- Unit 1 Emergency Diesel Generator Exhaust Relief Valve
- Unit 2 Safety-related Chilled Water Recirculation Pump (2-06)
- Unit 2 Emergency Diesel Generator Building Fans
- Unit 2 Safety Injection System Recirculation Sump Isolation Valves (2-8811A/B)
- Unit 2 Residual Heat Removal Pump Mechanical Seal and Breaker Coordination
- Unit 1 Component Cooling Surge Tank Air Operated Fill Valves (1-LV-4500/4501)

.2 Results of Detailed Reviews for Components

.2.1 345 kV Startup Transformer (XST2)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the 345 kV startup transformer, XST2. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- Preventive maintenance schedules and procedures for the transformer
- Load calculations of record and supporting documentation
- Calculations of record for protection settings and alarms
- Completion of last preventive maintenance work orders
- Operating Procedures

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to properly analyze minimum voltage requirements required to maintain the availability of offsite power and the failure to control relay setpoints necessary to maintain the availability of offsite power.

Description. The safety-related 6.9kV buses can be supplied from either of two separate switchyards, the 138kV switchyard or the 345kV switchyard. The preferred source to Unit 1 is the 345kV switchyard and startup transformer, XST2; the preferred source to Unit 2 is the 138kV switchyard and startup transformer, XST1. Both of the two 6.9kV safety buses and both of the two 480V switchgear buses connected to each of the 6.9kV safety buses are equipped with undervoltage relays that will separate the 6.9kV buses from the offsite power source if the relay voltage and time delay setpoints are exceeded. These relays include the 6.9kV degraded voltage relays, the 480V low grid undervoltage relays, and the 480V degraded voltage relays. Voltage profile calculations EE-VP-U1-1E and EE-VP-U2-1E, show that during accident load sequencing, bus voltage dips below the voltage setpoints of the relays due to the starting of large motors, thereby initiating the time delay relays. If bus voltage does not recover above the reset setpoint of the relays, the time delay relays will time out, activating the load shedding scheme which will separate the 6.9kV safety buses and their associated 480V buses from the offsite power supplies. 10 CFR 50 Appendix A, Criterion 17 requires that provisions be included to minimize the probability of losing offsite power coincident with an accident when power from the generating unit is lost. FSAR 8.2.2 states, in part, that "In order to satisfy offsite power requirements, the Transmission Operator should

maintain 345kV grid system voltage at CPNPP switchyard between the voltage range of 340kV to 361kV and 138kV grid system voltage at CPNPP switchyard between the voltage range of 135kV to 144kV." These limits are implemented by station administrative procedure STA-629, "Switchyard Control and Transmission Grid Interface." The inspectors noted the following deficiencies with the licensee's control of the availability of offsite power:

- Inadequate calculations
  There was no analysis which demonstrated that the switchyard voltage limits incorporated into Procedure STA-629 were adequate to prevent actuation of the undervoltage protection schemes during accident conditions. Calculation EE-1E-871 analyzed undervoltage relay setpoints, but it did not include an analysis of undervoltage relay reset requirements. Moreover, an informal discussion of reset requirements, in Section 8.1.7a of the calculation, concluded that the 480V low grid undervoltage relays would not reset if system voltage declined to the minimum levels controlled by procedure STA-629, (340kV and 135kV). The failure to reset these relays would result in tripping of the offsite power supplies after their nominal time delay of 54 seconds. Rough calculations by the inspectors confirmed that, based on actual field as-left settings for these relays, and the uncertainties for the relays determined in Calculation EE-1E-00871, the minimum switchyard voltage limits provided in STA-629 were insufficient to prevent disconnecting the 6.9kV safety buses for either Unit experiencing an accident.

- Inadequate procedures to control relay reset setpoints
  The 6.9kV Degraded Voltage Relays are Model ITE27-H, and feature a reset setpoint which are a fixed (non-adjustable) percentage of the adjustable dropout setpoint. Vendor Instruction Bulletin IB 18.4.7-2 listed the differential voltage as approximately 3 percent. The 480V low grid voltage relays and the 480V degraded voltage relays are Model ITE-27N, and feature a reset setpoint which is an adjustable percentage of the separately adjustable dropout setpoint. The inspectors noted that calibration procedures for these relays did not specify acceptance criteria for the undervoltage relay reset setpoints. As described in the preceding paragraphs, the undervoltage reset value is a key parameter necessary to evaluate and control the availability of the offsite power supply. Specifically, if the reset setpoint is too high, the 6.9kV safety buses could become separated from the offsite power supply at the start of an accident, even if the switchyard voltage remains within its expected values. Therefore, the reset setpoints should be procedurally controlled at a value below the minimum bus recovery voltage under worst case accident loading conditions. A review of actual as-left reset setpoints for the low grid undervoltage relays revealed that the 6.9kV switchgear buses of either unit experiencing an accident could become separated from offsite power, even while the offsite power was within the limits prescribed by STA-629.

In response to the inspectors concerns, the licensee initiated CR-2013-006176, declared the offsite power sources operable but degraded, and entered a compensatory action via EVCR-2013-006176-1. This compensatory action set new minimum switchyard voltage levels of 345kV for the 345kV switchyard, and 137kV for the 138kV switchyard, which

were determined by the licensee to be adequate to prevent spurious separation from the offsite power supplies, considering actual as-left setpoints and instrument uncertainties.

Analysis. The licensee's failure to properly analyze minimum switchyard voltage requirements, and control relay setpoints necessary to maintain the availability of offsite power was a performance deficiency. The performance deficiency is more-than-minor because it was associated with Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, at the minimum switchyard voltages established in station procedures, actuation of the undervoltage protection scheme could have occurred and removed the reliable offsite power sources during an accident. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Mitigating System Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality.

The inspectors determined that this finding had a cross-cutting aspect in the Area of Problem Identification and Resolution, associated with the Operating Experience Component, since the issues noted in this finding were discussed in Regulatory Issue Summary (RIS) 2011-12, "Adequacy of Station Electric Distribution System Voltages." RIS 2011-12 was reviewed by the licensee as part of the self assessment conducted in February 2013. [P.2(b)]

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, "applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, prior to June 5, 2013, the licensee did not assure that applicable regulatory requirements and design basis relating to the availability of offsite power were correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee did not establish that the minimum switchyard voltages established in station procedures were adequate to prevent undesired actuation of the undervoltage protection scheme. This condition resulted from an inadequate analysis of undervoltage relay setpoints in design calculations, and the failure to provide acceptance criteria for undervoltage relay reset setpoints in relay calibration procedures. The violation did not present an immediate safety concern because the licensee implemented compensatory measures that require the control room operators to verify voltage will not go below the new minimum grid voltage values of 345kV and 137kV, which align with the as-left relay setpoints. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-006176. (NCV 05000445; 05000446/2013007-01; Inadequate Calculations and Procedures for Offsite Power Availability)

.2.2 125 VDC Switchboard (1ED2)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, selected drawings, maintenance and test procedures and condition reports associated with the 125 VDC switchboard, 1ED2. The inspectors conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- System design basis document
- Electrical one-line diagrams
- Technical Specifications
- Voltage Drop Calculations
- Breaker/Fuse Coordination Studies
- Maintenance Inspection Procedures

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to perform accurate voltage calculations for the 125 VDC system and 120 VAC bus.

Description.

Example 1: During review of design basis document, DBD-EE-044, "DC Power Systems," Revision 25, the minimum voltage for the battery output was assumed to be 105 VDC. This voltage was calculated to be the minimum battery output voltage at the end of the four hour discharge following a loss of all alternating current to the facility. This minimum battery output voltage was subsequently used in the 125 VDC voltage drop calculations for the direct current system. The inspectors reviewed the voltage drop calculations associated with the 125 VDC system and determined that the calculations used the normal (running) currents instead of the maximum (inrush) currents for the associated components. The inspectors also identified that the voltage drop calculations failed to calculate the worst case combination of 125 VDC loads that would be cycled on during a design basis event. The result of the failure to use the maximum currents and combination of components was a calculated higher voltage drop from the battery to the components being supplied by the battery during design basis events.

Using the worst case combination of system loads during the first minute of a design basis event, and the associated inrush currents of these loads to calculate the voltage drop, the resulting minimum calculated battery voltage required for the direct current system would be 112.5 volts instead of the previously assumed 105 volts. The licensee entered this into their corrective action program as Condition Report CR-2013-006273.

Example 2: The 118 VAC uninterruptible power system supplies critical instrumentation and control circuits from battery powered inverters. There are four Class 1E inverters per train, two for the reactor protection system and the other two for the balance of plant systems. Each inverter is connected independently to one Class 1E distribution panel. Two sources of backup 120V AC power are also provided to the inverter panels (one source per train). Four of the eight distribution panels are connected to each source. Each distribution panel can receive power from the 120 VAC backup source under operator control. The backup source for each train consists of a 480/120V transformer connected to a Class 1E 480V Motor Control Center (MCC). The transformers do not have automatic voltage regulation capability, so when connected to the transformer source, the 120 VAC distribution panel voltage will fluctuate with fluctuations on the upstream 480V MCC source.

Branch Technical Position PSB-1, to which the licensee is committed, requires that the setpoints for the degraded voltage relays be determined from an analysis of the voltage requirements of the Class 1E loads at all onsite system distribution levels. The inspectors reviewed voltage calculation EE-1E-1EB4-1, which determined voltage at MCC 1EB4-1, for bypass transformer T1EC4. The inspectors noted that the calculation used an available voltage at the MCC considerably higher (444.96V) than the voltage afforded by the degraded voltage relays (433V) under accident loading conditions. In response to the inspector's inquiries, the licensee initiated Condition Report CR-2013-006396 and provided preliminary calculations showing that voltage required at the MCCs supplying the bypass transformers was considerably higher than previously analyzed and higher than voltage afforded by the degraded voltage relays. For instance, the preliminary calculations showed that for Transformer T1EC3, a voltage of 466.32V was required at MCC 1EB3-1 to ensure operability of downstream 120V vital loads during steady state conditions, and 505.32V was required to ensure adequate voltage to loads requiring uninterruptible power during voltage dips associated with the starting of large loads at the start of an accident. Based on these results, CR-2013-06396 concluded that when aligned to the 120 VAC transformer bypass source, the affected 120V vital bus should be considered inoperable, and LCO 3.8.9 action B1 which requires restoration of the vital bus to operable status in 2 hours would be applicable, instead of LCO 3.8.7 which would permit operation of a vital bus on 120 VAC bypass power for up to 24 hours. The licensee issued LOCAR TX-130098 to implement this action. A review of operator logs for the past three years showed that there were no instances of a 120V vital bus having been aligned to its alternate transformer source in excess of two hours.

Analysis. The licensee's failure to perform accurate voltage calculations for the 125 VDC system and 120 VAC bus was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the 125 VDC calculation did not take into account the maximum inrush currents and actual accident loading, and the 120 VAC calculation did not properly account for low voltage when the buses are supplied from their alternate source. In accordance with Inspection

Manual Chapter (IMC) 0609, Attachment 4, “Initial Characterization of Findings,” determined that finding affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” states, in part, “applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions.” Contrary to the above, prior to June 20, 2013, the licensee did not assure that applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions. Specifically, the 125 VDC calculation did not take into account the maximum inrush currents and actual accident loading, and the 120 VAC calculation did not properly account for low voltage when the buses are supplied from their alternate source. The violation did not present an immediate safety concern because the licensee ensured proper voltage was maintained during the last surveillance test for the 125 VDC system and issued a “Standing Order” to ensure that if the power is being supplied by the alternate source for the 120 VAC system, they will enter the shorter limiting condition for operation time as if the primary and alternate sources are both not available. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee’s corrective action program as Condition Report CR-2013-006273 and CR-2013-006396. (NCV 05000445; 05000446/2013007-02; Inadequate Voltage Calculations for the 125 VDC and 120 VAC Buses)

.2.3 Unit 1 Alternate Power Generators

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 alternate power generators. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Design basis documents to determine the required functional capabilities of the system
- Vendor contract test data
- Maintenance activities performed on components to ensure the required power is capable of being delivered to the safety-related buses

- Maintenance Rule scope documents to ensure the system is being properly maintained

b. Findings

.1 Introduction. The inspectors identified a Green, non-cited violation of 10 CFR 50.65(a)(1), for the licensee's failure to establish performance goals while performing Maintenance Rule (a)(1) monitoring to ensure the alternate power diesel generator (APDG) system is capable and tested to meet the design basis requirements

Description. The APDG system is a Non-Class 1E diesel generator package used to supply power to either 6.9kV safeguards bus when required due to loss of offsite power coincident with failure of both class 1E emergency diesel generators. The system consists of three diesel generators connected in parallel to a three-phase transformer, a selectable transfer/disconnect switch, and a Class 1E circuit breaker located in each 6.9kV safeguards bus.

The licensee installed and began crediting the availability of this system in 2012 to reduce the online risk of core damage to the facility. On July 26, 2012, the maintenance rule functions for the system were approved by the Maintenance Rule Review Panel to be added to the scope of Maintenance Rule for monitoring of the APDGs under the Electric Power 6.9kV Switchgear System (EPA). Since performance was not previously monitored, the EPA system for both units were placed into Maintenance Rule monitoring status (a)(1). The licensee established performance criteria for this system, but failed to establish goals, as required by the maintenance rule and licensee procedure STA-744, "Maintenance Effectiveness Monitoring Program," Revision 6, step 6.4.1.

The inspectors reviewed the system functions required by the maintenance rule, and compared this function with the design, testing, and maintenance activities for the system. The inspectors identified the following issues associated with the system's ability to perform the required and credited function:

- Acceptance testing conducted at the vendor location did not adequately show that the diesel generator units could provide the necessary power profile as described in the design basis documents. Specifically, the vendor test started a 600kW load at a 1.0 power factor, when the design basis document specified a 1000HP load, which would be approximately a power factor of 0.2.

- The licensee could not produce documentation for performing acceptance testing or maintenance testing of the cables connecting the diesel generator units to the transformer, or between the transformer and transfer/disconnect switches, nor maintenance documents for the transfer/disconnect switches.

- The licensee has not connected the diesel generator units onto either bus, for either unit, to show the system is capable of performing the credited function.

The inspectors reviewed the past six month's maintenance activity risk assessments to determine if a change in risk management actions would be warranted if the APDG system had been unavailable due to the lack of testing and maintenance. The inspectors found no instances where a change in risk management actions was warranted. The licensee entered this issue of concern into their corrective action program as Condition Report CR-2013-006521.

Analysis. The licensee's failure to follow procedure to establish performance goals while performing Maintenance Rule (a)(1) monitoring to ensure the APDG system is capable and tested to meet the design basis requirements, was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Equipment Performance attribute and adversely affected the cornerstone objective to ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the procedure directs the licensee to establish performance goals on activities that address conditions which were determined to be classified as (a)(1). In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Mitigating System Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding had a cross-cutting aspect in the area of human performance associated with the resources component because the licensee failed to ensure that emergency equipment is adequate and available to assure nuclear safety. [H.2(d)]

Enforcement. 10 CFR 50.65(a)(1), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," states, in part, that the licensee "shall monitor the performance or condition of structures, systems, or components, against licensee established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions." Contrary to the above, on July 26, 2012, the licensee failed to monitor the performance or condition of structures, systems, or components, against licensee established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions. Specifically, the licensee failed to establish goals and monitor the performance of the alternate power diesel generator system to ensure the system is capable of providing the necessary electric power onto the emergency buses. This violation did not present an immediate safety concern because the licensee has not used the APDGs and plans to monitor them to ensure they are capable of fulfilling their intended functions. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-006521. (NCV 05000445; 05000446/2013007-03; Failure To Establish 10 CFR 50.65(a)(1) Performance Goals for the APDG's)

.2 Introduction. The inspectors identified a Severity level IV, non-cited violation for the licensee's failure to update the Updated Final Safety Analysis report (UFSAR) in accordance with 10 CFR 50.71(e)(4) to include a description of the alternate power diesel generator system interconnections with the safety-related switchgear in Section 8.3.1.1.

Description. The inspectors reviewed the UFSAR to verify the alternate power diesel Generator (APDG) system interaction with the safety-related switchgear was appropriately described in UFSAR Section 8.3.1 as required by Regulatory Guide 1.70-1995, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants LWR Edition." The inspectors identified that Section 8.3.1.1, "Description," failed to discuss the APDG system interactions with safety-related equipment. The inspectors also identified that Section 8.3.1.2, "Analysis," discussed the use of the APDGs in Modes 5 and 6, but failed to mention their use in Modes 1 through 4.

The licensee made Amendment No. 105 to the UFSAR, but failed to update the appropriate description and include all modes for which the APDG system may be used. Specifically, the Regulatory Guide states that in the "Description" section of 8.3.1.1, "those portions that are not related to safety need only be described in sufficient detail to permit an understanding of their interactions with the safety-related portions." In section 8.3.1.1 of the UFSAR, the licensee failed to include a description of the interactions between the APDG system and the safety-related switchgear. In UFSAR section 8.3.1.2, "Analysis," the licensee included documentation of the APDG system as it pertains to the associated cables from non-Class 1E alternate power transfer switch to the Class 1E 6.9kV switchgear. The inspectors noted that this documentation only details the use of the APDG system in Modes 5 and 6, and fails to mention the use in Modes 1 through 4. The licensee entered this issue into their corrective action program as Condition Report CR-2013-006256.

Analysis. The licensee's failure to update the Final Safety Analysis Report to include the description of the APDG system in section 8.3.1 "AC Power Systems" was a performance deficiency. The issue is a performance deficiency because it was a failure to meet requirement, 10 CFR 50.71(e)(4), and it was within the licensee's ability to correct the problem. Using Inspection Manual Chapter 0612, Appendix B, the performance deficiency was assessed through both the Reactor Oversight Process and traditional enforcement because the finding had the potential for impacting the NRC's ability to perform its regulatory function. Screening the performance deficiency through the Reactor Oversight Process, the finding resulted in a minor performance deficiency. For traditional enforcement, the inspectors used the Enforcement Policy, in accordance with Section 6.1.d.3, and determined the violation to be a Severity Level IV, non-cited violation, because the licensee failed to update the UFSAR as required by 10 CFR 50.71(e)(4), but the lack of up-to-date information had not resulted in any unacceptable change to the facility or procedures. This violation did not have a cross-cutting aspect.

Enforcement. 10 CFR 50.71(e)(4), requires the UFSAR be updated, at intervals not exceeding 24 months, and states in part, "the revisions must reflect all changes made in the facility or procedures described in the UFSAR." Contrary to the above, prior to June 20, 2013, the licensee did not ensure that the UFSAR revision reflected all changes made in the facility or procedures described in the UFSAR. Specifically, the inspectors identified the alternate power diesel generator system was not described in sufficient detail in the FSAR as required. This violation is being treated as a Severity Level IV, non-cited violation, consistent with Section 6.1.d.3 of the Enforcement Policy and was entered into the licensee's corrective action program as CR-2013-006256. (SLIV 05000445; 05000446/2013007-04; Failure to Update the FSAR for the APDG's in Accordance with Regulatory Guide 1.70-1995)

.2.4 Unit 1 Diesel Generator 1-01 Emergency Feeder Breaker (1EG1)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 diesel generator 1-01 emergency diesel generator output breaker, 1EG1. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- Schematics and control wiring diagrams of record for the breaker
- Vendor manual and specifications for the breaker
- Load calculations of record and supporting documentation
- Calculations of record for protection settings and alarms
- Completion of last preventive maintenance work orders
- Breaker control power circuit and ancillary supporting component and equipment

b. Findings

No findings were identified.

.2.5 Unit 1 6.9kV Switchgear (1EA2)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 6.9kV switchgear, 1EA2. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- Calculations for electrical distribution system load flow/voltage drop, short-circuit, and electrical protection and coordination

- Protective device settings and circuit breaker ratings to confirm adequate selective protection and coordination of connected equipment during worst-case short circuit conditions

- Circuit breaker preventive maintenance, inspection, and testing procedures to confirm inclusion of relative industry operating experience and vendor recommendations

- Results of completed preventive maintenance on 6.9kV switchgear

- Degraded voltage and loss of voltage relay protection scheme and circuit breaker control logics that initiate automatic bus transfers

- NRC Information Notice 95-05, Undervoltage Protection Relay Settings Out of Tolerance Due To Test Equipment Harmonics

b. Findings

.1 Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to analyze the effect of electrical system harmonics on the degraded voltage relays.

Description. Each 6.9kV safety bus and each of its two associated 480V Switchgear buses is equipped with various undervoltage relays that will separate the 6.9kV buses from the offsite power source if the relay voltage and time delay setpoints are exceeded. These relays include the 6.9kV degraded voltage relays (Model ITE-27H), the 480V Low Grid Undervoltage Relays (Model ITE-27N), and the 480V Degraded Voltage Relays (Model ITE-27N).

Instruction Bulletin IB 7.4.1.7-7 for the ITE-27N relays states that, the relay employs a peak voltage detector and that harmonic distortion on the AC waveform can have a noticeable effect on the relay operating point and the measuring instruments used to calibrate the relay. The bulletin also notes that the relay is available with an internal harmonic filter for applications where waveform distortion is a factor. Similarly, Instruction Bulletin IB 18.4.7-2 for the ITE-27H relays identified the sensitivity of the relays to harmonics in the test source. In 1994, Comanche Peak identified setpoint errors for the ITE-27H relays caused by harmonic content in test source, as reported in NRC Information Notice 95-05.

The inspectors noted that Calculation EE-CA-0008-0871, "Protective relay settings for Safeguard Buses OV/UV Relays and Associated Time Delay Relays," identified the undervoltage relays as models not equipped with harmonic filters, but the calculation did not address the basis for excluding harmonic distortion, which could occur on the onsite power system, as a factor affecting relay accuracy. The inspectors were concerned that

persistent harmonics on the 6.9kV or 480V systems could cause the relays to fail to actuate at the setpoint specified in Technical Specifications. Persistent harmonics can be produced by factors external to the nuclear site or by internal phenomena. The inspectors noted that typical industry specifications for allowable power system harmonics (e.g., IEEE Std 141-1993, Table 9-6) considerably exceed the 0.3 percent Total Harmonic Distortion specified for test sources in IB 7.4.1.7-7. A typical internal source of persistent harmonics at nuclear power plants is defects in rotating equipment that are not detectable without special instrumentation. The inspectors were also concerned that transient harmonics could cause the relays to spuriously reset, in the presence of an actual degraded voltage event thereby delaying the protective function beyond the time delays stipulated in the design bases. Transient harmonics can be produced by circuit breaker switching operations such as occur at the start of an accident.

In response to the inspectors' inquiries, the licensee provided Condition Report CR-2013-001479, which had been issued during a self assessment in February 2013 and identified that Calculation EE-CA-0008-0871 did not provide bases for not using ITE-27N relays without harmonic filters. However, the condition report did not identify a similar concern for the ITE-27H relays, and characterized the issue as an administrative document issue only, not a condition adverse to quality. The inspectors advised the licensee that a similar condition had been recently been evaluated by NRR for another nuclear station with a similar design and had been confirmed to be a condition adverse to quality. Based on this advice, the licensee issued Condition Report CR-2013-006230, and identified the issue as a condition adverse to quality and performed an operability evaluation.

The inspectors noted that for this issue to present an operability concern an actual degraded voltage condition would need to exist. The inspectors further noted that per Station Administrative Procedure STA-629, the licensee has established agreements with the transmission system operator, Oncor Electric Delivery Company, to utilize a real time contingency analyzer to predict when transmission system voltage is expected to decline below acceptable levels. The inspectors further noted that per Electric Reliability Council of Texas (ERCOT) protocols for the summer months, switchyard voltage levels at Comanche Peak will be maintained well above the levels necessary to prevent a degraded voltage condition. Based on these considerations, the inspectors concluded that there was reasonable assurance of operability pending resolution.

Analysis. The licensee's failure to analyze the effect of electrical system harmonics on the degraded voltage relays was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failure to analyze the effect of electrical system harmonics on the degraded voltage relays could cause the relays to fail to actuate at the setpoint specified in Technical Specifications. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the

Mitigating System Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was a deficiency affecting the design or qualification that did not result in the safety-related equipment losing operability or functionality. This finding did not have a crosscutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance.

Enforcement. 10 CFR 50, Appendix B, Criterion III, "Design Control," states, in part, "measures provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Contrary to the above, prior to May 20, 2013, the licensee's design control measures had failed to check the adequacy of the design of the degraded voltage relays. Specifically, the licensee failed to assess the adverse effects of 6.9kV and 480V system harmonics on the degraded voltage relays. The violation did not present an immediate safety concern because the licensee has established agreements with the transmission system operator, Oncor Electric Delivery Company, to utilize a real time contingency analyzer to predict when transmission system voltage is expected to decline below acceptable levels. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-006230. (NCV 05000445; 05000446/2013007-05; Failure to Analyze Effect of System Harmonics on Degraded Voltage Relays)

.2 Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to perform adequate operability assessments with three examples. Specifically:

Example 1: The licensee did not addressed the safety function of the containment spray pumps continually running to maintain containment pressure within its design limits.

Example 2: The licensee did not ensure that compensatory measures would maintain operability of offsite power at minimum grid voltage.

Example 3: The licensee did not ensure that the basis would support crediting the use of the battery chargers after the emergency diesel generators restored power to the bus to supply emergency loads during the accident sequence.

Description.

Example 1: The inspectors reviewed Condition Report CR-2013-02031 that described a condition where the containment spray pumps will be manually shut off during a large break loss of coolant accident (LOCA) inside containment if the refueling water storage tank (RWST) reaches 0 percent indicated level or operators see indications of pump cavitation. An operability assessment was performed that stated the pumps would be restarted, if they were shut off due to 0 percent indicated level in the RWST, once the

suction of the pumps was transferred from the RWST to the containment sump. The operability failed to incorporate discussion of not restarting the pumps if they were shut off due to cavitation and potential damage to the pumps. The safety function of the containment spray pumps is to continually spray containment to maintain containment pressure within its design pressure. The operability did not address having no containment spray pumps running and the impact on containment pressure.

Additionally the inspectors observed an operation crew in the site simulator performing action during a simulated large break LOCA inside containment. The inspectors noted that operator assigned to perform the switchover actions from the RWST to the containment sump elected to use the highest of the RWST level indicators. The inspectors brought their concerns to site staff and they performed a reassessment of the operability and determined that they had no analysis to support their actions to secure containment spray pumps on 0 percent indicated level or indication of pump cavitation. Also, they agreed that operator actions during switchover were not the conservative approach to be taken.

The licensee entered this issue of concern into their corrective action program as Condition Report CR-2013-05768. The immediate corrective action included an "Operations Shift Order," explaining the concern and directing operators to perform the switchover actions based on lower of the RWST indicators until procedures could be evaluated and changed as needed.

Example 2: On June 5, 2013 the licensee initiated Condition Report CR-2013-006176 in response to the inspectors' concerns regarding calculations and procedures for the availability of offsite power. The operability assessment concluded that the procedurally controlled minimum voltage limits of 135kV for the 138kV switchyard and 340kV for the 345kV switchyard, were not adequate to ensure reset of the low grid undervoltage relays during transient conditions of a safety injection. The operability assessment concluded that this condition resulted in the offsite power sources being operable but degraded, and that to maintain operability, it was necessary to implemented measures to maintain switchyard voltages above 136kV for the 138kV switchyard and 342kV for the 345kV switchyard. However, based on calculations performed by the inspectors using actual as-left relay settings, these new limits once again appeared to be too low to ensure reset of the low grid undervoltage relays during transient conditions of a safety injection.

In response to the inspectors' inquiries, the licensee stated that no tolerances had been applied to the as-left settings because as-found as-left trend data showed very little relay drift over several calibrations. The inspectors noted that several tolerances were not measured during calibrations, and therefore would not show in as-found as-left data, including potential transformer accuracy, maintenance and test equipment accuracy, and variations in temperature and power supply voltage. Calculation EE-CA-0008-871 determined the cumulative effect of these tolerances to be 0.83 percent. When this tolerance was applied to relay settings, the licensee determined that the minimum switchyard voltages required to reset of the low grid undervoltage relays were 137kV for the 138kV switchyard and 345kV for the 345kV switchyard. The licensee revised the operability assessment of Condition Report CR-2013-006176 accordingly.

Example 3: The inspectors reviewed Condition Report CR-2013-006273 that described a condition where the minimum allowed battery voltage of 105VDC acceptance criteria applied during modified performance testing of safety-related batteries does not maintain sufficient voltage to prove that downstream equipment will function as expected during a loss of AC power event. Specifically, the current voltage drop methodology does not account for the increased voltage drop created during periods of higher current demand during the starting of equipment used to mitigate the event. An operability assessment was performed that credited use of the battery chargers during the first minute of accident mitigation to provide direct current electrical power to the 125 VDC buses to justify operability of the system, after the emergency diesel generators restored power to the bus. The operability assessment failed to verify the design basis of the battery chargers to ensure use of the chargers could be credited during the accident mitigation sequences. The design basis of the battery chargers is to supply steady state loads and recharge the battery during steady state conditions.

The licensee reevaluated the battery voltage requirements and voltage drop calculation using transient loading currents and determined that the battery remains operable during the event mitigation sequencing of loads, and that the battery chargers are not needed to support operability during this time sequence. The licensee updated the operability assessment in Condition Report CR-2013-006273.

Analysis. The licensee's the failure to perform adequate operability assessments was a performance deficiency. The performance deficiency is more-than-minor for the following reasons:

Example 1: It was associated with the Reactor Safety, Barrier Integrity Cornerstone, Configuration Control attribute and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, shutting off of the containment spray pumps during a large break LOCA inside containment would allow containment pressure to increase. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Barrier Integrity Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 3, the inspectors determined the finding was of very low (Green) safety significance because it did not represent an actual open pathway in the physical integrity of reactor containment (valves, airlocks, etc.), containment isolation system (logic and instrumentation), and heat removal components or actual reduction in function of hydrogen igniters in the reactor containment.

Example 2: It was associated with the Reactor Safety, Mitigating Systems Cornerstone, Equipment Performance attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the compensatory measures established in the first operability assessment did not ensure that offsite power would be maintained at minimum grid voltage.

Example 3: It was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the operability assessment initially credited the use of the battery chargers after the emergency diesel generators restored power to the bus, without evaluating design basis for the battery chargers.

For examples 2 and 3 the inspectors used the Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because these examples were a deficiency affecting the design or qualification that did not result in losing operability or functionality.

This finding had a cross-cutting aspect in the area of human performance associated with the decision making component because the licensee failed in all three examples to conduct an effectiveness review of a safety-significant decision to verify the validity of the underlying assumptions to identify possible unintended consequences during the original operability assessments. [H.1(b)]

Enforcement. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings and shall be accomplished in accordance with these instructions, procedures, or drawings." Contrary to the above, for example 1 on February 28, 2013, for example 2 on June 5, 2013, and for example 3 on June 8, 2013, the licensee failed to ensure activities affecting quality are prescribed by documented instructions, procedures, or drawings and accomplished in accordance with these instructions, procedures, or drawings. Specifically, the licensee failed to follow procedure STI-442.01, "Operability Determination and Functionality Assessment Program," Revision 1, Attachment 8.B page 3 of 5 which states, in part, "Identify the topics that are applicable to the quick technical evaluation and include information for applicable topics within the evaluation such as: for example 1, The effect or potential effect of the degraded or nonconforming condition on the affected SSC's ability to perform its specified safety function or for example 2, Compensatory Measures are recommended or for example 3, Whether there is reasonable expectation of operability, including the basis for the determination."

The violation did not present an immediate safety concern because:

- Example 1: The licensee issued an "Operation Shift Order," that explained the concern and directed operators to perform the switchover actions based on the lower of the RWST indicators until procedures could be evaluated and changed as needed.

- Example 2: The licensee issued an "Operation Shift Order," that explained the concern and requires the control room operators to verify voltage will not go below

the new minimum grid voltage values of 345kV and 137kV, which align with the as-left relay setpoints.

- Example 3: The licensee performed additional voltage drop analysis to verify the safety-related battery could provide sufficient voltage during the first minute of transient load sequencing.

This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as CR-2013-006599. (NCV 05000445; 05000446/2013007-06; Failure to Perform Adequate Operability Assessments)

.2.6 Unit 2 Emergency Diesel Generator Sequencers

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 2 emergency diesel generator sequencers. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Logic diagrams of record for the sequencers
- Preventive maintenance procedures for the sequencers
- Completion of last preventive maintenance work orders
- Sequencer surveillance tests
- Sequencer control power circuit
- Sequencer voltage calculations

b. Findings

No findings were identified.

.2.7 Unit 2 Containment Electrical Penetrations

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 2 containment electrical penetrations. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Ampacity sizing calculations for electrical containment penetrations

- Containment penetration protective device sizing and setting calculations
- Test procedures for containment penetration protective devices
- Completion of last preventive maintenance work orders for selected penetration protective devices

b. Findings

No findings were identified.

.2.8 Unit 1 Class 1E Battery (BT1ED2)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 class 1E battery, BT1ED2 and battery rack assembly. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- Calculations that established the basis for battery loading and sizing
- Voltage drop calculations, short circuit calculations, and coordination studies
- Results of the recent surveillance tests and maintenance activities to determine inclusion of vendor recommendations and industry standards
- Visible material condition and configuration of the component
- Pilot Cell selection criteria, selection history, and cell performance
- Service and modified performance test procedures and previous three performance data
- Battery inter-cell connection resistance to ensure battery internal voltage drop supports operability

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, “Test Control,” for the licensee’s failure to provide appropriate

acceptance criteria and testing procedure instructions during modified performance tests involving Class 1E batteries for the 1-minute critical period testing data.

Description. Comanche Peak Nuclear Power Plant Updated Safety Analysis Report, Section 8.3.2, "DC Power Systems," states, in part that "all maintenance and testing procedures and criteria for replacement are in accordance with IEEE Standard 450-1995." IEEE Standard 450-1995 requires, in part, trending battery voltage during the critical periods of the load duty cycle will provide the user with a means of predicting when the battery will no longer meet design requirements. The Standard also describes a modified performance test as "a test of the battery capacity and the battery's ability to provide a high-rate, short-duration load (usually the highest rate of the duty cycle.) This will often confirm the battery's ability to meet the critical period of the load duty cycle."

The inspectors reviewed industry standard IEEE Standard 450-1995, surveillance test procedure MSE-S0-5715 "Modified Performance Test," Calculation EE-CA-0000-5121 "Class 1E Battery Loading Duty Cycle for Modified Performance Test per IEEE 450-1995," and design basis document DBD-EE-044 "DC Power Systems." As specified in the IEEE Standard 450-1995, the modified performance test can be performed to satisfy the service test (duty cycle test) and the performance test (capacity test). The test is a simulated duty cycle consisting of two rates: a 1-minute rate enveloping the largest current load of the duty cycle, followed by the test rate employed for the performance test. Calculation EE-CA-0000-5121 established the modified performance test profile load currents used in the testing procedure, and the current revision of the calculation was implemented in 2001. The inspectors determined that the modified performance test procedure did not include acceptance criteria or procedure instructions for the voltage check at the 1-minute critical period during the test to ensure the battery would supply sufficient voltage at the end of the 1-minute critical period during the high-rate discharge.

In response to the inspector's request, the licensee reviewed the raw data from the most recent modified performance test and was able to provide reasonable assurance that the battery satisfactorily met the design voltage requirement at the 1-minute critical period during the test. The licensee initiated CR-2013-005673 in response to the concern.

Analysis. The licensee's failure to provide appropriate acceptance criteria and testing procedure instructions involving Class 1E batteries for the 1-minute critical period testing data during modified performance tests was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Procedure Quality attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Procedure MSE-S0-5715 does not direct the technicians to record and evaluate the voltage at the end of the 1-minute critical period to ensure it does not drop below the designed minimum voltage, which would indicate the battery would not be capable of meeting the required design function. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors

determined that the finding affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because Calculation EE-CA-0000-5121 was implemented in 2001 and did not reflect current licensee performance.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," states, in part, “A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.” Contrary to the above, since 2001, the licensee failed to establish a test program that assured that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents. Specifically, the licensee failed to provide appropriate acceptance criteria and testing procedure instructions during modified performance tests involving Class 1E batteries for the 1-minute critical period testing data which incorporated the requirements of IEEE Standard 450-1995 to ensure the battery would meet the required design voltage for the duty cycle. The violation did not present an immediate safety concern because the licensee reviewed the raw data from the most recent modified performance test and was able to provide reasonable assurance that the battery satisfactorily met the design voltage requirement at the 1-minute critical period during the test. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee’s corrective action program as Condition Report CR-2013-005673. (NCV 05000445; 05000446/2013007-07; Failure to Provide Appropriate Acceptance Criteria and Testing Procedure Instructions)

.2.9 Unit 1 Component Cooling Surge Tank Air Operated Fill Valves (1-LV-4500/4501)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, selected drawings, maintenance and test procedures, and condition reports associated with the Unit 1 component cooling surge tank air operated valves. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Schematics and flow diagrams of record for the air operated fill valves
- Preventive maintenance procedures for the air operated valves
- Valve actuator design calculations
- Vendor specifications for the air operated fill valves

- Original test data from air operated fill valve testing
- Completion of all preventive maintenance work orders

b. Findings

No findings were identified.

.2.10 Containment Equipment Hatch and Personnel and Emergency Airlocks

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the containment equipment hatch and personnel and emergency airlocks. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Airlock and equipment hatch procurement specification and vendor manual.
- Airlock and equipment hatch assembly drawings and bills of materials.
- Design basis accident dose rate calculations for these component locations.
- Environmental qualification for limiting temperature and radiation conditions associated with the air lock and equipment hatch door seals.

b. Findings

No findings were identified.

.2.11 Unit 1 Containment Purge Valves (1-HV-5536, 5537, 5538, 5539)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 containment purge valves, 1-HV-5536, 5537, 5538, 5539. The inspectors also performed a walkdown of the outboard containment ventilation purge isolation valves, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Valve procurement specification and vendor manual
- Valve assembly drawing and bills of material

- Design basis accident dose rate calculations for these valve locations
- Environmental qualification for limiting temperature and radiation conditions associated with the o-ring seat seals for these valves

b. Findings

No findings were identified.

.2.12 Unit 1 Component Cooling Water Surge Tank 1-01 (CP1-CCATST-01)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 component cooling water surge tank 1-01, CP1-CCATST-01. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- System Design Basis Document and operator lesson plan/study guide
- System piping and instrumentation diagrams
- Tank procurement specification
- Tank assembly drawing and bill of materials
- Level set point calculations for compliance with pump net positive suction head requirements and system expansion/contraction conditions
- Vent sizing calculations for vacuum relief and maximum tank pressure
- Seismic design documentation to verify tank design is consistent with limiting seismic conditions

b. Findings

No findings were identified.

.2.13 Unit 1 Component Cooling Water Pump Recirculation Flow Valve (1-FV-4536)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and

condition reports associated with the Unit 1 component cooling water pump recirculation flow valve, 1-FV-4536. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- System Design Basis Document and operator lesson plan/study guide
- Valve procurement specification and vendor manual
- Valve assembly drawing and bill of materials
- Preventative & corrective maintenance procedures and completed work orders
- IST acceptance criteria, trend data, and completed work orders
- Differential pressure and required torque calculations
- Seismic design documentation to verify valve operator design is consistent with limiting seismic conditions

b. Findings

No findings were identified.

.2.14 Unit 1 Auxiliary Feedwater System Check Valve (1-AF-0032)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 auxiliary feedwater system check valve, 1-AF-0032. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- System Design Basis Document and operator lesson plan/study guide
- Valve procurement specification
- Valve assembly drawing and bill of materials
- Preventative & corrective maintenance procedures & completed work orders
- IST acceptance criteria, trend data, procedures and completed work orders

b. Findings

No findings were identified.

.2.15 Unit 1 Emergency Diesel Generator Exhaust Relief Valves

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 1 emergency diesel generator exhaust relief valves. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Schematics and flow diagrams of record for the air intake and exhaust system
- Preventive maintenance procedures for the relief valves
- Structural evaluation of the relief valve enclosures
- Vendor specifications for the diesel generator exhaust back pressure
- Original test data from relief valve testing
- Completion of last preventive maintenance work orders
- Condition reports regarding material condition of heat shield around relief valves

b. Findings

No findings were identified.

.2.16 Unit 2 Safety-Related Chilled Water Recirculation Pump (2-06)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 2 safety-related chilled water recirculation pump, 2-06. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- System Design Basis Document and operator lesson plan/study guide
- Pump procurement specification and vendor manual
- Pump assembly drawing and bill of materials
- Preventative and corrective maintenance procedures and completed work orders
- IST acceptance criteria, trend data, procedures and completed work orders
- Certified total developed head and net positive suction head curves

- Hydraulic calculations for compliance with total developed head and net positive suction head requirements

- Seismic design documentation to verify pump design is consistent with limiting seismic conditions

- High/moderate energy line break analysis for pump location

- Flooding analysis for pump location

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the licensee's failure to ensure adequate acceptance limits were incorporated into test procedures for the safety chill water pumps.

Description. As stated in Information Notice 97-90, licensees "need to ensure that original plant design-basis calculations, or revisions to these calculations, are properly integrated into surveillance test procedure acceptance criteria". Inspectors reviewed the hydraulic network analysis for the safety-related chilled water system (Calc No. 1-EB-311-8) and determined that the licensee failed to properly address this requirement in the Inservice Test (IST) surveillance procedures for the chilled water pumps.

The original design calculation used the pump vendor's generic catalog performance curve in the hydraulic model with no performance degradation assumed. The calculated friction losses in piping and fitting were determined by the Darcy formula using friction factors for smooth new steel pipe. For margin, these friction losses were then increased by 10 percent to determine the point at which the system curve and pump curve would intersect.

In 1994, the safety-related chilled water system was modified to add the uninterruptible power system (UPS) fan coil units. To accommodate the additional load of 55 gallons per minute (gpm) in the hydraulic analysis, the licensee: a) removed the 10 percent conservatism in the calculation for system friction losses; and b) reduced the required flowrate to other system users by eliminating unnecessary conservatisms in the heat transfer analyses for the other area coolers. The inspectors thus determined that the current hydraulic model for the chilled water system has little margin in it to compensate for the following:

- Uncertainty in parametric values (pipe roughness and L/D values for valves and fittings) used in the Darcy equation

- Potential for future increases in friction losses due to corrosion and/or scale buildup

- Potential for future need to plug tubes in the chiller or area cooler as a result of wall thinning or leaks

- Potential reduction of approximately 4 percent in pump performance during a loss of offsite power or loss of coolant accident as a result of allowance in the technical specifications for a 2 percent variance in emergency diesel generator frequency

- Pump degradation of 10 percent as allowed by the ASME Code and the licensee's current IST procedures

The IST surveillance procedures for the Train A and Train B safety-related chilled water pumps state that the quarterly test reference value for total developed head (TDH) is 93 pounds per square inch at a minimum flowrate of 290 gpm, which closely matches initial installed pump start-up test data. The inspectors noted that for the pump curve used in the analysis of record, the TDH at 290 gpm is approximately 95.2 psi. Based on this observation, the inspectors determined that after the UPS area coolers were installed in 1994, the analysis did not demonstrate that the safety-related chilled water system could achieve the required design flowrate if allowed to degrade to the IST required action value. In response to this, the licensee re-ran the computerized hydraulic model for the chilled water system using a progressively degraded pump curve until the flowrate was reduced to the design limit. These preliminary calculations indicated that Train A's flowrate would fall below the required flowrate of 297 gpm should the pump degrade to 95 percent of the reference value. The licensee confirmed that the current pump performance curve is above the 95 percent curve, which ensures design basis flow rates are maintained.

Analysis. The licensee's failure to ensure appropriate acceptance criteria were incorporated into test procedures for the safety chill water pumps was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to recognize that if the safety-related chilled water pumps were degraded to 90 percent of their reference value, as permitted by IST Procedures OPT-209A/B, the system may not be able to achieve the required design flowrates as stated in Calculation 1-EB-311-8. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because Calculation 1-EB-311-8 was updated in 1994 to incorporate the UPS fan coil units and did not reflect current licensee performance.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," states, in part, "A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents." Contrary to the above, since 1994, the licensee failed to establish a test program that assured that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents. Specifically, the licensee failed to recognize that if the safety-related chilled water pumps were degraded to 90 percent of their reference value, as permitted by IST Procedures OPT-209A/B, the system may not be able to achieve the required design flowrates as stated in Calculation 1-EB-311-8.

The violation did not present an immediate safety concern because the licensee confirmed that the current pump performance curve is greater than the minimum required, to ensure that design basis flow rates are maintained. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-006252. (NCV 05000445; 05000446/2013007-08; Failure to Provide Appropriate Acceptance Criteria for the Safety Chill Water Pumps)

.2.17 Unit 2 Emergency Diesel Generator Building Fans

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, diesel generator building ventilation system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 2 emergency diesel generator building fans. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Design basis documents for the diesel generator area ventilation system
- Calculations of the diesel generator area space heat gains, space heat losses, and maximum and minimum area temperatures
- Calculation of flow resistance across diesel generator building air intake barriers
- Diesel generator exhaust fan vibration trend data
- Maintenance records, surveillance records, and work orders

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for the licensee's failure to identify a condition adverse to quality involving the emergency diesel generator building ventilation system.

Description. The inspectors performed a review of the Unit 1 and 2 emergency diesel generator (EDG) exhaust relief valves. During their review, the inspectors conducted a walk-down of the Unit 1 EDG roof area where the exhaust relief valves for the Unit 1 EDGs are located. While in the area, the inspectors noticed that exhaust flow coming from the EDG building ventilation system of the Unit 1 EDG buildings varied significantly over the exhaust screens. Upon further examination, the inspectors noticed that half of the screens were heavily fouled with debris. The inspectors asked the licensee if the screens were ever cleaned and if sufficient exhaust flow remained to ensure EDG building temperatures would remain below equipment qualification requirements for the “as found” condition at design basis limiting conditions.

The licensee conducted a review of site documents and determined that, since plant startup, the screens had never been cleaned nor were any preventive maintenance procedures in place to clean or inspect the screens. They then conducted flow measurements of the running fans and determined they had adequate flow for EDG building cooling for the existing plant conditions. Additionally, the licensee inspected the Unit 2 EDG building exhaust screens and discovered only slight fouling of the screens. They attributed the difference in exhaust screen fouling between Units 1 and 2 to prevailing wind patterns in the area. The licensee entered this issue of concern into their corrective action program as Condition Report CR-2013-006540.

Analysis. The licensee's failure to identify fouling on the Unit 1 emergency diesel generator building exhaust ventilation screens was a performance deficiency. The performance deficiency is more-than-minor because it had the potential to lead to a more significant safety concern. Specifically, the Unit 1 emergency diesel generator rooms could have insufficient exhaust flow to meet design basis temperature requirements if left uncorrected. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, “Initial Characterization of Findings,” the inspectors determined that the finding affected the Mitigating System Cornerstone. Using IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the emergency diesel generators losing operability or functionality. This finding did not have a crosscutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, " measures shall be established to assure that conditions adverse to quality are promptly identified and corrected." Contrary to the above, before June 17, 2013, measures were not established to assure that conditions adverse to quality were promptly identified and corrected. Specifically, the licensee failed to establish an activity to identify fouling of the Unit 1 emergency diesel generator building exhaust ventilation screens. The violation does not present an immediate safety concern because the licensee measured adequate exhaust flow to maintain temperatures in the emergency diesel generator building below design basis limiting conditions. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-006540. (NCV 05000445; 05000446/2013007-09; Failure to Identify Fouling on the Emergency Diesel Generator Building Exhaust Ventilation Screens)

.2.18 Unit 2 Safety Injection System Recirculation Sump Isolation Valves (2-8811A/B)

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 2 safety injection system recirculation sump isolation valves, 2-8811A/B. The inspectors also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of these components to perform their required design basis function. Specifically the inspectors reviewed:

- Design bases documents for the safety injection system
- Calculations regarding design data for safety-related motor-operated valves within the scope of NRC Generic Letter 89-10
- Final design authorization and work orders for changing the actuator gear set
- Design change notice for replacement of the motor on isolation valve 8811B
- Trend data for the recirculation sump isolation valves
- Responses to NRC Generic Letters 89-10, 95-07, and 96-05
- Drawing for the 14" gate valve bonnet relief assembly

b. Findings

No findings were identified.

.2.19 Unit 2 Residual Heat Removal Pump Mechanical Seal and Breaker Coordination

a. Inspection Scope

The inspectors reviewed the updated safety analysis report, residual heat removal system description, the current system health report, selected drawings, maintenance and test procedures and condition reports associated with the Unit 2 residual heat removal pump mechanical seal and breaker coordination. The inspectors also conducted interviews with system engineering personnel to ensure the capability of this component to perform its required design basis function. Specifically the inspectors reviewed:

- Design bases documents for the residual heat removal system
- Maintenance records for the residual heat removal pumps and mechanical seals
- Performance records for the residual heat removal pumps
- Piping and instrumentation drawings for the residual heat removal and safety injection systems
- Calculations regarding head loss between the residual heat removal pump discharge and safety injection and charging pump takeoffs
- Calculations regarding residual heat removal pump operating point during hot leg recirculation
- Residual heat removal pump vibration trend data
- Residual heat removal pump circuit breaker coordination studies to ensure proper circuit coordination

b. Findings

No findings were identified.

.3 Results of Reviews for Operating Experience

.3.1 Inspection of Information Notice 92-18 – Potential for Loss of Remote Shutdown Capability during a Control Room Fire

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of NRC Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability during a Control Room Fire," to verify that the review adequately addressed the industry operating experience. The inspectors

specifically reviewed selected components to verify circuit modifications properly eliminated the concerns identified in the Information Notice. The components selected were:

- Unit 2 charging pumps safety injection header isolation motor operated valve (2-8801A)
- Unit 2 containment recirculation sump to residual heat removal pump motor operated valve (2-8811A)
- Unit 2 refueling water storage tank to Residual Heat Removal Pump 2 isolation motor operated valve (2-8812A)

b. Findings

No findings were identified.

.3.2 Inspection of Information Notice 1997-90 – Use of Nonconservative Acceptance Criteria in Safety-Related Pump Surveillance Tests

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of NRC Information Notice 1997-90, "Use of Nonconservative Acceptance Criteria in Safety-Related Pump Surveillance Tests," to verify that the review adequately addressed the industry operating experience. The inspectors determined that for the safety chilled water pumps, the licensee's evaluation did not adequately addressed the operating experience and use of non-conservative IST acceptance criteria identified in the Information Notice. See Section 02.16 NCV 05000445; 05000446/2013007-08 for a detailed description of this finding.

b. Findings

No findings were identified.

.3.3 Inspection of Information Notice 2012-11 – Age Related Capacitor Degradation

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of NRC Information Notice 2012-11, "Age Related Capacitor Degradation," to verify that the review adequately addressed the industry operating experience. The inspectors verified that the licensee's evaluation in CR-2012-007571 adequately addressed the issues in the Information Notice. The inspectors reviewed preventive maintenance plans and procedures for replacement of capacitors.

b. Findings

No findings were identified.

.4 Results of Reviews for Operator Actions:

The inspectors selected risk-significant components and operator actions for review using information contained in the licensee's probabilistic risk assessment. This included components and operator actions that had a risk achievement worth factor greater than two or Birnbaum value greater than 1E-6.

a. Inspection Scope

For the review of operator actions, the inspectors observed operators during simulator scenarios associated with the selected components as well as observing simulated actions in the plant.

The selected operator actions were:

- Manual fill of component cooling water surge tank on loss of instrument air
- Establish local auxiliary feedwater flow control valve control following loss of all AC power
- Establish local manual control of component cooling water to the safety chiller on loss of instrument air
- Stop reactor coolant pumps on a loss of component cooling water non-safeguards loop flow
- Manually align backup charger to Train "A" bus before the 1E battery depletes
- Align alternate power to valve 1-8702A, residual heat removal pump 1-01 recirculation isolation valve
- Transition to loss of coolant accident procedures within ten minutes of a large break loss of coolant accident
- Transfer to cold leg recirculation on large break loss of coolant accident
- Transfer containment spray system to recirculation mode
- Align alternate power diesel generators to the safety-related bus

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to appropriately incorporate the refueling water storage tank (RWST) vortexing design calculation's 6 percent indicated level into the emergency operating procedures for switching containment spray pump suction from the RWST over to the containment sump to prevent damage to the pump.

Description. The inspectors determined that the licensee had inadequately responded to a condition report written on February 28, 2013 (CR-2013-002031) expressing concern over the ability of operators to switch containment spray pump suction from the RWST over to the containment sump in the time span allocated for this in EOS-1.3A/B, given the known difficulties identified in accurately reading the analog type level indicator provided in the control room for this purpose. In reviewing the calculations backing up this operator action, the inspectors determined that the vortex calculation 16345-ME(8)-282, assumed a minimum water level of Elevation 814.1 ft. (~5.5 percent of instrumented volume). To achieve a needed increase in containment sump level after completion of the GSI-191 modifications to the sump suction strainers, the switch-over point was changed from 24 percent indicated volume to 6 percent indicated volume during the October 2006 RFO for Unit 2 and during the March 2007 RFO for Unit 1. Neither instrument uncertainty nor tank drawdown during the switchover was adequately considered when the 6 percent level was selected. The inspectors determined that for an as-read tank level of 6 percent, actual tank level could be as low as approximately 2.3 percent. Furthermore, the inspectors noted that since EOS-1.3A/B stated that RWST level is to be "less than 6 percent" before action is taken to open the containment sump isolation valves, therefore; RWST level could be allowed to fall into the vortexing region while containment spray pump suction is still being taken from the tank.

Using several different models of the suction sparger header internal to the RWST, the vortex calculation had determined the minimum required submergence to be in the range of approximately -0.7 percent to +2.6 percent of instrumented tank volume. On this basis, the adjusted minimum switchover level (i.e., 2.3 percent as noted above) would appear to be non-conservative. However, based on further discussion with the licensee, the inspectors agreed that more realistic modeling in the vortex and drawdown calculations would yield positive margin on available submergence at a switchover point of 6 percent (as read) tank volume. To resolve the inspector's concerns regarding the wording in EOS-1.3A/B, an operations shift order was issued to ensure that switchover shall commence immediately upon reaching an as-read tank level of 6 percent on either of the two tank level indicators.

Analysis. The licensee's failure to appropriately incorporate the RWST vortexing design calculation's 6 percent indicated level into the emergency operating procedures for switching containment spray pump suction from the RWST to the containment sump to prevent damage to the pumps was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Procedure Quality attribute and adversely affected the

cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Emergency Operating Procedure EOS-1.3A/B allowed the operators the ability to delay transfer of containment spray pump suction source which could have caused damage to the pumps due to vortexing. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the finding affected the Mitigating Systems Cornerstone. Using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was not a design deficiency and did not result in the loss of operability or functionality. This finding did not have a cross-cutting aspect because the change to the procedure due to the addition of the sump strainers occurred in 2006 and 2007, and did not reflect current licensee performance.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, "measures shall be establish to assure that the design basis for systems, structures, and components are correctly translated into specifications, drawings, procedures and instructions." Contrary to the above, since 2006 and 2007, the licensee failed to assure that the design basis for systems, structures, and components are correctly translated into specifications, drawings, procedures and instructions. Specifically, the licensee failed to appropriately incorporate the RWST vortexing design calculation's 6 percent indicated level into the emergency operating procedures for switching containment spray pump suction from the RWST to the containment sump to prevent damage to the pumps. The violation did not present an immediate safety concern because the licensee issued an "Operation Shift Order," to ensure that switchover shall commence immediately upon reaching an as-read tank level of 6 percent on either of the two tank level indicators. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-005739. (NCV 05000445; 05000446/2013007-10; Failure to Incorporate the Refueling Water Storage Tank Vortexing Design Calculation into the Emergency Operating Procedures for Containment Spray Pump Operation)

4 OTHER ACTIVITIES

4OA2 Identification and Resolution

a. Inspection Scope

The inspectors reviewed condition reports associated with the selected components, operator actions and operating experience notifications.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to correct a condition adverse to quality in a timely manner that involved updating design basis

calculations for safety-related equipment to include the allowed technical specification frequency range of ± 2 percent for the emergency diesel generators.

Description. The inspectors reviewed corrective actions associated with a non-cited violation written in report 05000445; 05000446/2010006, titled, “Inadequate Analysis of Emergency Diesel Generator Frequency.” The inspectors reviewed the corrective actions taken and the timeline for the remaining of the corrective actions. The licensee performed an evaluation of margins that focused on emergency core cooling system equipment to ensure that the equipment could perform their design basis function that included the allowed technical specification frequency range of ± 2 percent for the emergency diesel generators. The licensee did not evaluate all components with this allowed frequency range for steady state conditions. The licensee controls steady state frequency with the emergency diesel generator governor to a small range of ±0.1 hertz. The evaluation that the licensee performed concluded that there is a negligible effect on components when controlling to this steady state frequency range.

Future corrective actions are associated with the licensee and the Pressurized Water Reactors Owners Group initiative (submitted on May 1, 2012) which is to discuss with the NRC an action to change the technical specifications to address differentiating steady state and transient frequency ranges. This issue was identified June 18, 2010, and the NRC issued Information Notice 2008-02 that discussed the allowed technical specification frequency range for the emergency diesel generator. Therefore, the inspectors concluded, since the corrective actions are still not complete, the actions to correct a previously identified non-cited violation were not completed in a timely manner. The licensee entered this issue of concern into their corrective action program as Condition Report CR-2013-006604.

Analysis. The licensee's failure to correct a condition adverse to quality in a timely manner that involved updating design basis calculations for safety-related equipment to include the allowed technical specification frequency range of ± 2 percent for the emergency diesel generators was a performance deficiency. The performance deficiency is more-than-minor because it was associated with the Reactor Safety, Mitigating Systems Cornerstone, Design Control attribute and adversely affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the calculations to support safety-related equipment did not include allowed technical specification frequency range for the emergency diesel generators to ensure the equipment would be capable of performing their safety-related functions. In accordance with Inspection Manual Chapter (IMC) 0609, Attachment 4, “Initial Characterization of Findings,” the inspectors determined that the finding affected the Mitigating System Cornerstone. Using IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 2, the inspectors determined the finding was of very low (Green) safety significance because the finding was a deficiency affecting the design or qualification that did not result in the safety-related equipment losing operability or functionality. This finding had a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee failed to take appropriate corrective actions to address updating

design basis calculations to include technical specification allowed emergency diesel generator frequency range in a timely manner, commensurate with their safety significance. [P.1(d)]

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, "measures shall be established to assure that conditions adverse to quality are promptly identified and corrected." Contrary to the above, since May 2010, measures were not established to assure that conditions adverse to quality were promptly identified and corrected. Specifically, the licensee failed to correct a condition adverse to quality in a timely manner that involved updating design basis calculations for safety-related equipment to include the allowed technical specification frequency range of ± 2 percent for the emergency diesel generators. The violation did not present an immediate safety concern because the licensee confirmed that the safety-related equipment had enough design margin to ensure design basis functions would be maintained. This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very low (Green) safety significance and was entered into the licensee's corrective action program as Condition Report CR-2013-006604. (NCV 05000445; 05000446/2013007-11; Failure to Correct Design Calculations to Incorporate Technical Specification Allowed Frequency Range for the Emergency Diesel Generator in a Timely Manner)

4OA6 Meetings, Including Exit

On June 20, 2013, the team leader presented the preliminary inspection results to Mr. Flores, Senior Vice President and Chief Nuclear Officer, and other members of the licensee's staff. The licensee acknowledged the findings during each meeting. While some proprietary information was reviewed during this inspection, no proprietary information was included in this report.

4OA7 Licensee Identified Violations

No findings were identified.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel
I. Ahmad, Design Engineering Analysis
D. Ambrose, Corrective Action Program Manager
J. Bain, Equipment Reliability Supervisor
J. Brady, Design Engineer
D. Davis, Director, Special Projects
R. Flores, Senior Vice President and Chief Nuclear Officer
T. Gibbs, Safeteam Manager
S. Harvey, Interim Work Control/Outage Manager
J. Henderson, Engineering Smart Team Manager
J. Hicks, Regulatory Affairs
T. Hope, Nuclear Licensing Manager
K. Kirwin, Nuclear Oversight
J. Lamarca, Project Manager
F. Madden, Director, Nuclear Oversight and Regulatory Affairs
L. Meller, Operations Day Shift Supervisor
G. Merka, Regulatory Affairs
W. Moore, Director, Nuclear Training
B. Patrick, Director, Maintenance
J. Patton, Nuclear Oversight Manager
K. Peters, Site Vice President
W. Reppa, Director, Site Engineering
M. Shirey, Engineering
M. Smith, Director, Nuclear Operations
S. Smith, Plant Manager
R. Sorrell, System Engineer
J. Taylor, Technical Support Manager
G Techentine, Mechanical/Program Reliability Manager
D. Volkening, Quality Assurance Audit Supervisor
D. Whitsitt, System Engineer
L. Windham, Design Engineering Analysis Manager

NRC personnel
J. Kramer, Senior Resident Inspector
G. Replogle, Senior Reactor Analyst
M. Williams, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000445; 05000446/2013007-01	NCV	Inadequate Calculations and Procedures for Offsite Power Availability (1R21.2.1)
05000445; 05000446/2013007-02	NCV	Inadequate Voltage Calculations for the 125 VDC and 120 VAC Buses (1R21.2.2)
05000445; 05000446/2013007-03	NCV	Failure To Establish 10 CFR 50.65(a)(1) Performance Goals for the APDG's (1R21.2.3)
05000445; 05000446/2013007-04	SLIV	Failure to Update the FSAR for the APDG's in Accordance with Regulatory Guide 1.70-1995 (1R21.2.3)
05000445; 05000446/2013007-05	NCV	Failure to Analyze Effect of System Harmonics on Degraded Voltage Relays (1R21.2.5)
05000445; 05000446/2013007-06	NCV	Failure to Perform Adequate Operability Assessments (1R21.2.5)
05000445; 05000446/2013007-07	NCV	Failure to Provide Appropriate Acceptance Criteria and Testing Procedure Instructions (1R21.2.8)
05000445; 05000446/2013007-08	NCV	Failure to Provide Appropriate Acceptance Criteria for the Safety Chill Water Pumps (1R21.2.16)
05000445; 05000446/2013007-09	NCV	Failure to Identify Fouling on the Emergency Diesel Generator Building Exhaust Ventilation Screens (1R21.2.17)
05000445; 05000446/2013007-10	NCV	Failure to Incorporate the Refueling Water Storage Tank Vortexing Design Calculation into the Emergency Operating Procedures for Containment Spray Pump Operation (1R21.4)
05000445; 05000446/2013007-11	NCV	Failure to Correct Design Calculations to Incorporate Technical Specification Allowed Frequency Range for the Emergency Diesel Generator in a Timely Manner (4OA2)

LIST OF DOCUMENTS REVIEWED

Audit

NUMBER	TITLE	DATE
EVAL-2011-010	Equipment Reliability Process – Testing	March 8, 2012

Calculations

NUMBER	TITLE	REVISION
ME(B)-389	RWST Setpoints, Volume Requirements, and Time Depletion Analysis	11
ME(B)-073	CCW Surge Tank Volume	3
ME(B)-130	CCW Surge Tank Pressure	3
ME(B)-165	Normal System Leakage Rate for CCW System	1
ME(S)-059	Determination of Surge Tank Partition Cross-Over	0
ME(S)-130	CCW Surge Tank Pressure	3
1-EB-311-8	Safety Chilled Water Pump Evaluation – Unit 1	2
ME-CA-0000-5148	EPRI-AOV Differential Pressure Analysis	1
ME-CA-0000-5174	EPRI PPM Prediction for AOV Butterfly Valves	1
ME-CA-1100-3220	CCW Recirculation Orifice dP & Recirc Flow Setpoint	0
ME(B)-073	CCW Surge Tank Volume	3
ME(B)-130	CCW Surge Tank Pressure	3
ME(S)-044	Line Sizing for CCW Surge Tank Vent Line	0
ME(S)-059	Determination of Surge Tank Partition Crossflow	0
ME(S)-078	CCW Surge Tank Venting	1
2-ME-0126	Safety Chilled Water Pump Evaluation – Unit 2	1
ME-CA-0000-5412	Mechanical Equipment Qualification Doses Updated for Stretch Power Uprate	1
1-EB-302A-1	Diesel Generator Area – Space Heat Gains, Space Heat Losses & Maximum and Minimum Temperatures: Unit 1	5
1-EB-302A-3	Diesel Generator Area – Fan Lock-Out Schedule – Unit 1	0

Calculations

NUMBER	TITLE	REVISION
2-ME-0148	Head Losses from RHR to SI and Charging Pumps during Recirculation	0
2-ME-0150	RHR Pump Operating Point during Hot Leg Recirculation	0
CS-CA-0000-2186	Evaluation of Diesel Exhaust Relieft Valve Structures on the Roof of the Diesel Generator Building	0
ICS-614	Temperature Switches X-TS-6755 Thru X-TS-6758 for Auto Control of SWIS Exhaust Fans	1
MEB-029	Establishment of Design Pressures for RH System	1
MEB-326	Headloss between RHR Pump Discharge and Safety Injection and Charging Pump Takeoffs	0
MEB-328	RHR Pump #2 Operating Point during Cold Leg Recirculation	0
ME-CA-0000-1093	Design data for CPSES Unit I, 2, Common Safety-related Motor-Operated Valves (MOV) within the scope of NRC Generic Letter 89-10.	25
ME-CA-0215-5114	Diesel Generator Lube Oil Inventory Requirement	0
ME-CA-0302-5090	Calculation of Flow Resistance Across Diesel Generator Building Air Intake Barriers	0
RXE-LA-CPX/0-020	RHR Cooldown Calculations	11
X-EB-312-1	Service Water Intake Structure – Space Heat Gains and Maximum Temperatures	8
X-EB-312-4	Maximum Temperature in Room No. 277 of Service Water Intake Structure – Units 1 & 2	0
X-EB-312-5	SWIS – Process Design Limits for Pump Room Thermostats	1
16345-EE(B)-045	125V dc Short Circuit Calculation – Class 1E Distribution Panels	3
EE-1E-BT1ED2	125 VDC Battery and Charger Sizing Calculation, CP1-EPBTED-02, CP1-EPBCED-02, CP1-EPBCED-04	3
EE-BAT/CHG-Methodology	125 VDC Battery and Battery Charger Sizing Methodology	3
EE-CA-0000-5454	Safety-related Battery Duty Cycle Loads for FSAR Table 8.3-4	0

Calculations

NUMBER	TITLE	REVISION
EE-1E-1ED2	125 VDC Switchboard CP1-EPSWED-02 (1ED2) Bus Based Calculation	2
EE-CA-0008-157	Coordination Study of 6.9kV Power Distribution System	4
ME-CA-0000-5478, Att. G	Fire Safe Shutdown Analysis – MSO – RWST Gravity Drain Down Time (to Containment Sumps)	0
ME-CA-0000-5066, Att. D	Calculation of Minimum Containment Flood Level Following a Small Break LOCA (with Long Term Cooldown)	4
EE-CA-0008-182	Coordination Study – 125 VDC Class 1E Power Distribution System	3
EE(B)-069	Voltage Drop Verification – Misc. DC Control Circuits	2
EE-CA-0007-4014	Alternate Power Diesel Generator Loading	1
2-EE-0011	Protection and Ampacity of Electrical Containment Penetrations	10
EE(B)-088	Instrumentation Penetration Analysis	1
EE-1E-1EC1	118V Bus 1EC1	3
EE-1E-2EC2	118 VAC Distribution Panelboard CP2-ECDPEC-02 (2EC2) Bus-Based Calculation	5
EEB-0027	Cable Sizing Calculation – Below 480V	5
EEB-007	480V Motor Control Center Starter Coil Pickup Analysis	4
EEB048	Protection and Ampacity of Electrical Containment Penetrations	15
EEB-074	XST1 and XST2 Start-Up Transformers Load Study	2
EE-CA-0008-0263	Protective Relay Settings for Main, Auxiliary, Start-Up and Station Service Transformers.	6
EE-CA-0008-0265	Protective Relay Settings for 6.9 kV Safeguards Buses	4
EE-CA-0008-871	Protective Relay Settings for Safeguard Buses Overvoltage / Undervoltage Relays and Associated Time Delay Relays	13
EE-SC-U1-IE	Unit 1 and Unit 2 Class 1E System Short Circuit Study With Unit 1 Preferred Source Lineup	3
EE-VP-U1-1E	Unit 1 Class 1E Voltage Profile	1

Calculations

NUMBER	TITLE	REVISION
EE-1E-1EB4-1	480 VAC Motor Control Center CP-1-EPNCEB Bus Based Calculation	4
EE-CA-0008-0267	Protective Relay Settings for the Emergency Diesel Generators	9
EE-AC-METHODOLOGY	AC Distribution Panels Below 480V	4
EE-IE-2EC4-2	120V BUS 2EC4-2	1
EEB-009	Sizing of Class 1E 480V Motor Control Center Branch Feeder Cables	5
EEB-101	Voltage Drop Verification - Misc. AC Control Circuits	3

Procedures

NUMBER	TITLE	REVISION/DATE
OWI-214	Control of Time Critical Actions	2
ABN-101	Reactor Coolant Pump Trip/Malfunction	10
ABN-301	Instrument Air System Malfunction	12
ABN-803A	Response to a Fire in the Control Room or Cable Spreading Room	10
ALM-0102A	Alarm Procedure 1-ALB-10B	12
SOP-605A	125 VDC Switchgear and Distribution Systems, Batteries and Battery Chargers	11
SOP-606A	24/48V & 125/250 VDC Switchgear and Distribution Systems, Batteries & Battery Chargers	11
SOP-614A	Alternate Power Generator Operation	12
ECA-1.1A	Loss of Emergency Coolant Recirculation	8
ALM-1301A	Alarm Procedure Diesel Generator 1-01 Panel	5
ECA 0.0A	Loss of All AC Power	8
ABN-502	Component Cooling Water System Malfunctions	6
STA-202	Nuclear Generation Procedure Change Process	36
STA-214	Time Critical Action Program	1
PROC-1999-001326-01-00	Technical Review of Replacement and Modified Pumps	0

Procedures

NUMBER	TITLE	REVISION/DATE
OPT-209B	Safety Chilled Water System Surveillance Test	10
STA-697	Margin Management Program	0
TDM-901B	Systems Data, Throttled Valves/Flow Rates	7
STA-661	Non-Plant Equipment Storage and Use Inside Seismic Category I Structures	4
SOP-815B	Safety Chilled Water System	10
SOP-304A	Auxiliary Feedwater System	17
MSM-C0-8800	Borg Warner Check Valve Maintenance	1
OPT-530A	AFW Check Valve Reverse Flow Test	4
OPT-206A	AFW System	29
OPT-208A	CCW System	13
IST-302	Inservice Testing of Power Operated Valves	4
OPT-214A	Diesel Generator Operability Test	22
TDM-901B	System Data Throttled Valves/Flow Rates	7
ALM-0132	Alarm Procedures Manual	5
EPG-2.03	Environmental Qualification of Mechanical Equipment and Preparation of Mechanical Equipment Qualification Summary Packages (MEQSPs)	1
MSM-C0-7309	Residual Heat Removal (RHR) Pump Maintenance	3
MSM-C0-7317	RHR Pump Mechanical Seal Maintenance	2
MSM-P0-0051	Maintenance Section – Maintenance Manual – Gravity Operated Damper Periodic Inspection (Pacific Air Products)	2
MSM-S0-3374	Emergency Diesel Generator Lube Oil Level Inspection	0
ODA-309	Operability Determination and Functionality Assessment Program	3
OPT-203B	Residual Heat Removal System	14
SOP-102B	Residual Heat Removal System	14
SOP-813	Service Water Intake Ventilation System	10
STA-744	Maintenance Effectiveness Monitoring Program	6

Procedures

NUMBER	TITLE	REVISION/DATE
STA-630	Battery Monitoring & Maintenance Program	0
MSE-S0-5000	Class 1E Station Batteries Weekly-Monthly-Quarterly Surveillance Tests	6
MSE-S0-5715	Class 1E Station Batteries Modified Performance Discharge Test	2
MSE-P1-5003	Unit 1 Class 1E Station Batteries 18 Month Inspection	0
TSP-509	Predictive Maintenance Thermographic Analysis Program	6
MSE-P0-5304	GE DC Switchboards Inspection and Testing	2
SOP-614A	Alternate Power Generator Operation	12
ABN-803B	Response to a Fire in the Control Room or Cable Spreading Room	7
MSE-G0-0852	Alternate Power Diesel Generators Synchronism Phase Check	1
INC-7917B	Channel Calibration Solid State Safeguards Sequencer Train A	4
MSE - PX - 0762	transformer XST2 Protective Relay Functional Check	4
MSE-S2-0673A	Unit 2 Train A Sequencer Under Voltage Relay Surveillance	5
OP-41	“Hands – Off” and Grid Notification Guideline	November 22, 2011
OPT-414B	SI/Blackout Sequencers	3
OPT-420B	Train A Sequencer Automatic Lockout Actuation	4
OPT-421B	Train A SI Sequencer Operator Lockout Actuation	4
SOP-603A	6900 V Switchgear	15
SOP-607A	118 VAC Distribution System and Inverters	23
ABN-602	Response to a 6900/480V System Malfunction	8
SOP-602	138 kv AND 345Kv Transformers and Switchyard Air Switches	10
MSE-SO-6301	6.9 KV Air Circuit Breaker Inspection and Cleaning	6
STA-629	Switchyard Control and Transmission Grid Interface	7

Drawings

NUMBER	TITLE	REVISION/DATE
M1-0229	Component Cooling Water System	CP-31
M1-0236-02A	Vents & Drains System Aux Bldg	CP-12
M1-0236-01	Vents & Drains System Aux Bldg	CP-17
M1-0236	Vents & Drains System Safeguards and Aux Bldg	CP-20
M1-0266	Liquid Waste Processing Drain Channel B	CP-12
BRP-CC-2-AB-065, Sh. 1	Component Cooling Water Isometric	CP-1
M1-0301	Ventilation Containment	CP-21
M1-0300	Ventilation Containment	CP-9
2020E58	14” Gate Valve Bonnet Relief Assembly	6
2323-M1-2110-01	Instrument Detail Sheet – Detail 14	-----
2323-SI-0605	Safeguards Building – El. 810’-6’’ Outline	11
2323-SI-0635	Safeguards Building – Misc. Sects. & Dets. – Sh. 3	2
2323-SI-0655	Safeguards Building – Diesel Generator Area – Outline & Sections	3
2D-285635	Inside PTO Cartridge w/ Circulating Feature	August 8, 1994
5800-M-010	Gravity Backdraft Damper Model SL100 BPHD-N, Unit 1 and 2	CP-5
81542-001-000	Dashpot Assembly Details	C
8372D03	Motor Op Gate Valve Mod 14000GM84FEH010	October 19, 1992
M1-0215	Air Intake and Exhaust System – CP1-MEDGEE-01	CP-18
M1-0215	Air Intake and Exhaust System – CP1-MEDGEE-02	CP-13
M1-0260	Residual Heat Removal System	CP-32
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M1-0261	Safety Injection System – Sheet 5 of 5	CP-14
M1-0312	Ventilation Service Water Intake Structure and Miscellaneous Buildings	CP-17
M1-2531	Instrument Tabulation Sheet – Service Water Pumphouse	CP-4
M2-0229	Component Cooling Water System – Sheet 2 of 7	CP-14
M2-0229	Component Cooling Water System – Sheet 3 of 7	CP-15

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XCP-ME-14	Service Water Intake Exh. Fans – Air Balance Schematic	0
400046C	Layout for 2 Tier S07-074492-846 Rack for NCX-1950	F
E2-0062, Sh. 22	Motor Operated Valve 2-8811A Sump to 1 Residual Heat Removal Pump	22
E2-0062, Sh. 05	Motor Operated Valve 2-8801A Charging Pumps Safety Injection Header Isolation	CP-4
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E2-0031, Sh. 03	6.9 KV Switchgear Bus 2EA1 Start-Up Breaker 2EA1-2 Schematic Diagram	CP-10
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E2-0031, Sh. 07	6.9 KV Switchgear Bus 2EA2 Start-Up Breaker 2EA2-2 Schematic Diagram	CP-9
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E2-0511, Sh. 16C	Penetration 2-E-0016	CP-1
E2-0511, Sh. 16D	Penetration 2-E-0016	CP-1
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E2-0022, Sh. 04	Under/Over Voltage Relay Protection For Class 1E 6.9 KV/480V Buses	CP-5
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E2-2400, Sh. 165	Protective Device Settings 6.9kV Safeguard Buses	CP-7
E2-2400, Sh. 166	Protective Device Settings 6.9kV Safeguard Buses	CP-8
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E1-0018, Sh. A	120V AC Bypass Distribution One Line Diagram	CP-9
E1-031, Sh. 21	6.9 KV Switchgear Bus 1EA1 Diesel Gen Bkr 1EG1 Schematic Diagram	CP-10

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DBD-ME-206	Auxiliary Feedwater System	30
DBD-ME-311	Safety Chilled Water System	15
DBD-ME-229	Component Cooling Water System	38
DBD-ME-009	Tornado Venting Analysis	12
DBD-ME-029	Seismic Qualification of Equipment	10
DBD-ME-233	Station Service Water System	28
DBD-ME-302A	Diesel Generator Area Ventilation System	7
DBD-ME-312	Service Water Intake Structure Ventilation System	10
DBD-EE-044	DC Power Systems	25
DBD-EE-040	6.9kV Electrical Power System	16
DBD-ME-011	Diesel Generators	34

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NUMBER	TITLE	REVISION
DBD-EE-043	118 VAC Uninterruptible Power Supply System	14
DBD-EE-062	Containment Electric Penetration Assemblies	17
DBD-EE-051	Protection Philosophy	40
DBD-EE-038	Offsite Power System	20
DBD-EE-039	Onsite Power System	17
DBD-EE-041	480V and 120V AC Electrical Power System	30

Condition Reports (CR-)

2013-006540	2013-006538	2013-006369	2013-006113	2013-005889
2011-008510	2012-003185	1999-001326	1999-000362-01	2010-005563
2009-003513-00	2006-000002	2009-001285	2010-002654	2013-005727
2010-004992	2011-004484	2011-007547	2007-001810	2007-001890
2008-000718	2008-001202	2009-002996	2011-012806	2012-001473
2012-010009	2001-002214	2003-000186	2009-002747	2002-001993
2005-002652	2013-006540	2010-004974	2010-009442	2011-000532
2010-003130	2013-001427	2011-012780	2013-001479	2013-001440
2013-005013	2013-005026			

Condition Reports Generated During The Inspection (CR-)

2013-005013	2013-005026	2013-005614	2013-005619	2013-005620
2013-005623	2013-005653	2013-005670	2013-005671	2013-005673
2013-005697	2013-005719	2013-005720	2013-005722	2013-005724
2013-005727	2013-005728	2013-005730	2013-005735	2013-005736
2013-005737	2013-005739	2013-005759	2013-005767	2013-005768
2013-005772	2013-005775	2013-005787	2013-005788	2013-005793
2013-005889	2013-006104	2013-006113	2013-006115	2013-006127
2013-006173	2013-006174	2013-006176	2013-006230	2013-006252
2013-006256	2013-006257	2013-006258	2013-006273	2013-006369
2013-006396	2013-006494	2013-006509	2013-006521	2013-006538

Condition Reports Generated During The Inspection (CR-)

2013-006540	2013-006553	2013-006566	2013-006599	2013-006604

Work Orders

4195712	4-96-100793-00	4517372	1-06-166116-00	4528073
4-06-165581-00	4005-162062-00	4577649	3901892	4298440
389477	345078	327622	3528362	4042787
054670	4585686	3748065	3991455	4080305
3931260	4139431	3991455	3658774	407833
397984	3681126	3543300	1-97-113478-00	3945363
5-99-505031-AB	3611790	4430129	14650	3675216
3739304	3817830	3817832	3821134	3821136
3822065	410092	3822067	3823075	3823077
3826721	3826723	4135202	4135205	4136320
4136323	4138527	4142619	4142803	4144129
4146769	4146722	3815537	3807411	3549686
3551921	3553861	3939892	4257285	4257293
4257305	3925790	3935693	4188338	3901019
3675225				

Vendor Documents

NUMBER	TITLE	REVISION
ACD-31605006	General Arrangement, Rockwell Edward Forged Steel Valve – Globe Stop Valve, Fig. 848 YT	H
CP-0020A.1-001	VTM Rockwell Edward Valves	30
CP-0080B-002	VTM Hermetic Turbopak Safety-related Chillers	16
CP-0086-001	HVAC Containment Ventilation Valves	17
CP-0214-001	CBI Airlock System	35
CP-0015C-002	Safety Chilled water Recirculation Pumps and Motors	14
N-2640-359 Sht 1	Component Cooling Water Surge Tank Assembly	CP-1
75690	8 Inch, 150 lb Swing Check Valve Assembly	CP-2

Vendor Documents

NUMBER	TITLE	REVISION
G26246	10” Type 9510 Valve Assembly w/Fisher 656NS-60 Actuator	F
N-2640-359	Component Cooling Water Surge Tank Assembly	CP-1
14758-3	48” Class 150 150 WOG Single Flg & Weld End Valve Assy, & Matryx #45162 SR80 Fail Shut	F
D-1D750-10	CAP-Class 3 Nuclear, Sectional Drawing	A
74-2427-0101	Plan Unit 1 Personnel Lock w/Hydraulic Power Unit	CP-1
74-2427-0200	General Arrangement Escape Lock Unit 1	CP-1
VL-04-000946	Installation and Operating Instructions for Lead-Antimony, Lead-Calcium Types	-----
CP-0425-001	6.9 kV Metal Clad Switchgear	25

Miscellaneous

NUMBER	TITLE	REVISION/DATE
FDA-2010-000172-46-00	MSO-55(3c) – Mechanical Damage to Pressure Boundary MOV’s	0
WO 3658774	CTMT SMP To RHR 2-02 SUCT ISOL VLV MO	April 19, 2011
FDA-2010-000172-60-00	MSO-15a – MSO of Motor Operated Valves	0
DCN 4421	One Piece EPR Replacement Seals for Containment Ventilation & Hydrogen Purge Containment Iso Vlvs	0
2323-MS-65	Specification Shop Fabricated Tanks	3
MS-0086-01	MEQSP - Mechanical Equipment Qualification .	1
SS-015-01	MEQSP- Containment Personnel Air Lock, Equipment Hatch & Emergency Airlock	0
-----	Safety Chilled Water Study Guide	May 1, 2011
LO21SYSCH1	Safety Chilled Water Lesson Plan	February 15, 2011
----	Auxiliary Feedwater Study Guide	May 11, 2011
LO21SYSAF1	Auxiliary Feedwater Lesson Plan	November 15, 2010

Miscellaneous

NUMBER	TITLE	REVISION/DATE
LO21SYSCC1	Component Cooling Water	February 28, 2012
----	Component Cooling Water Study Guide	May 1, 2011
2323-MS-600	Specification Nuclear Safety Class Power Operated Control Valves	9
2323-MS-86	Specification HVAC-Containment Ventilation Isolation Valves	2
2323-MS-15C	Specification Station SW Screen Wash Booster Pump & Chilled Water Recirculation Pump – Nuclear	May 4, 1978
-----	Safety Chilled Water Functional Scoping Data Sheet	July 19, 2011
2323-SS-15	Specification Containment Personnel Air Lock, Equipment Hatch and Emergency Air Lock	3
ER-ME-109	Evaluation of Safety-Related Pump Degradation Issues	1
EV-2007-892-01	Post Work Stroke Time for 1-FV-4537	March 26, 2007
-----	CPNPP System Status – Diesel Generator Bldg. HVAC	4th Qtr. FY 12
-----	CPNPP System Status – Residual Heat Removal	4th Qtr. FY 12
-----	CPNPP System Status – Service Water [CLS & SW]	4th Qtr. FY 12
-----	Maximum Exhaust Back Pressure, Comanche Peak, Engines 79001-76004	December 3, 1987
#8-5017-90244	Equipment Qualification – Form Wound Motors (For Class 1E Safety-Related Service)	September 25, 1978
09KPX145819	PTO4000 Vent Plug Leak Assessment	August 6, 2009
1021067	Plant Support Engineering: Nuclear Power Plant Equipment Qualification Reference Manual	1
152017-88	Ultra Low Sulfur Diesel Materia Safety Data Bulletin	-----
1CP-SPT-32	Diesel Generator Exhaust Relief Valve Testing	0
CPSES-9509248	Telephone Conversation Record – Emergency Diesel Generator Exhaust Relieft Valves	September 29, 1995
DCN-10062	Replace Damaged Motor on Valve 2-8811B	0
NE-15594	Diesel Generator Exhaust Relief Valves	November 30, 1987
NP-9545	Notification of DMRC 88-1-240 Disposition	November 8, 1988

Miscellaneous

NUMBER	TITLE	REVISION/DATE
SWTU-12588	Field Testing 36 in. DG Exhaust Valves	March 7, 1989
SWTU-5307	Field Testing 36 in. DG Exhaust Valves	December 15, 1987
TXX-98154	Revised Response to Generic Letter 96-05, “Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves”	June 24, 1998
TXX-99149	Response to Request for Additional Information Regarding Generic Letter 95-07, “Pressure Locking and Themal Binding of Safety-related Power Operated Gate Valves”	June 14, 1999
XPT-SPT-26	Special Performance Test Procedure – SWIS Ventilation System	0
IEEE 450	IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications	1995
IEEE 485	IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications	1997
BCT-2000 Battery Load Test Report – 4430129	Modified Performance Test	April 1, 2013
Aggreko Power Analysis Summary	Alternate Power Diesel Generators Load Step Testing	Rev A, October 29, 2010
IEEE-308	IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations	1974
Unit 1 Functional Scoping Data Sheet, EPA System	AC Distribution 6.9kV Swgr	-----
Unit 2 Functional Scoping Data Sheet, EPA System	AC Distribution 6.9kV Swgr	-----
NUMARC 93-01, Section 10.0	Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	April 2011
CL-04-000946	Installation and Operating Instructions for Lead-Antimony Types, Lead-Calcium Types	-----

Miscellaneous

NUMBER	TITLE	REVISION/DATE
-----	XST2 Diagnostic Report	December 14, 2010
-----	CPSES XST2 Bushing Replacement	August 3, 2012
CP2-ECPRCR-02	PM Basis Component - Solid State Safeguards Sequencer Cabinet B 2-CR-02	N/A
System Health Report	High Voltage AC [EP,IPC & SY]	4th Qtr FY12
System Health Report	Diesel Generator	4th Qtr FY12
LOCAR A1-10-0360	One required Inverter inoperable	June 10, 2010
Specification 2323-EC-2C	Technical Specification Miscellaneous Transformers and Accessories	1
NRC Information Notice 95-05	Undervoltage Protection Relay Settings Out of Tolerance Due To Test Equipment Harmonics	January 20, 1995
CPSES-200601160	Revised Response To The 60-Day Response to NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"	June 29, 2006