



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

November 1, 2010

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

Subject: COMANCHE PEAK NUCLEAR POWER PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000445/2010004 AND 05000446/2010004

Dear Mr. Flores:

On September 18, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Comanche Peak Nuclear Power Plant. The enclosed integrated inspection report documents the inspection findings, which were discussed on September 23, 2010, with you and other members of your staff.

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

This report documents three NRC-identified findings of very low safety significance (Green). Two of these findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as noncited violations, consistent with Section 2.3.2.a of the NRC Enforcement Policy. If you contest the noncited violations or the significance of the noncited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 E. Lamar Blvd, Suite 400, Arlington, Texas, 76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Comanche Peak Nuclear Power Plant. In addition, if you disagree with the cross-cutting aspect of 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 the Comanche Peak Nuclear Power Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, and its enclosure, will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document 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/**

Wayne C. Walker, Chief  
Project Branch A  
Division of Reactor Projects

Docket: 50-445: 50-446  
License: NPF-87; NPF-89

Enclosure:  
NRC Inspection Report 05000445/2010004 and 05000446/2010004  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 50-445, 50-446

License: NPF-87, NPF-89

Report: 05000445/2010004 and 05000446/2010004

Licensee: Luminant Generation Company LLC

Facility: Comanche Peak Nuclear Power Plant, Units 1 and 2

Location: FM-56, Glen Rose, Texas

Dates: June 20 through September 18, 2010

Inspectors: J. Kramer, Senior Resident Inspector  
B. Tindell, Resident Inspector  
L. Micewski, Project Engineer  
C. Alldredge, Nuclear Safety Professional Development Program

Approved By: Wayne Walker, Chief, Project Branch A  
Division of Reactor Projects

## SUMMARY OF FINDINGS

IR 05000445/2010004, 05000446/2010004; 06/20/2010 - 09/18/2010; Comanche Peak Nuclear Power Plant, Units 1 and 2; Equipment Alignments, Operability Evaluations, Surveillance Testing, and Identification and Resolution of Problems.

The report covered a 3-month period of inspection by resident inspectors and announced baseline inspections by region based inspectors. One Green finding and two Green noncited violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 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 and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding for the failure of the licensee to adequately evaluate the past operability of the Unit 2 Train B diesel generator when its governor functioned in a droop mode during isochronous operations. As a result, the licensee's evaluation incorrectly concluded that the diesel generator was always operable. The licensee entered the finding into the corrective action program as Condition Report CR-2010-008760.

The finding was more than minor because if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern in that the licensee could have used the inadequate operability evaluation to incorrectly declare a diesel generator operable with a similar performance issue in the future. Using NRC Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance because the finding did not result in the loss of safety function for the diesel generator. The finding has a human performance crosscutting aspect associated with decision-making, in that, licensee personnel failed to use conservative assumptions [H.1b] (Section 1R15).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" for the failure of the licensee to promptly identify and correct a diesel generator operating in a droop condition instead of the isochronous mode during emergency conditions. As a result, the ability of the diesel generator to provide power to mitigating equipment at the design frequency was degraded for approximately three years. The licensee entered the finding into the corrective action program as Condition Report CR-2010-003305.

The finding was more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective, in that, the capability of the diesel generator to provide power to mitigating equipment was adversely affected by operating at a frequency lower than 60 hertz. Using NRC Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance because the finding

did not result in the loss of safety function for the mitigating equipment supported by the diesel. The finding has a human performance crosscutting aspect associated with work practices, in that, licensee personnel proceeded in the face of unexpected circumstances during diesel generator surveillances when frequency was abnormal [H.4a] (Section 1R22).

Cornerstone: Barrier Integrity

- Green. The inspectors identified a noncited violation of 10 CFR 50 Appendix B, Criterion III, "Design Control" for the failure to consider the temperature effect on the pressurization of safety-related air accumulators for containment isolation valves in the main steam line penetration room. As a result, the accumulators could exceed their design pressure during a steam line break. The licensee entered the finding into the corrective action program as Condition Report CR-2010-006349.

The finding was more than minor because it was associated with the design control attribute of the barrier integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical barriers protect the public from radionuclide releases caused by events. Using NRC Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance because the finding did not result in an actual open pathway in the physical integrity of reactor containment. The finding did not have a crosscutting aspect because the performance deficiency was not representative of current licensee performance (Section 1R04).

**B. Licensee-Identified Violations: None.**

## REPORT DETAILS

### Summary of Plant Status

Comanche Peak Nuclear Power Plant Unit 1 operated at approximately 100 percent power for the entire reporting period.

Comanche Peak Nuclear Power Plant Unit 2 operated at approximately 100 percent power for the entire reporting period.

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope

September 7, 2010, the inspectors reviewed the licensee's overall preparations for a severe thunderstorm watch that was forecast in the vicinity of the facility. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined that the staff's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. The inspectors also reviewed a sample of corrective action program items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the corrective action program in accordance with station corrective action procedures.

These activities constitute completion of one readiness for impending adverse weather condition sample as defined in Inspection Procedure 71111.01-05.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignments (71111.04)

##### a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- July 27, 2010, Units 1 and 2 service water backup to the auxiliary feedwater pumps
- August 19, 2010, Unit 2 residual heat removal pump 2-02 when residual heat removal pump 2-01 was unavailable for maintenance
- August 25, 2010, Units 1 and 2 safety related instrument air accumulators

The inspectors selected these systems based on their risk significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed for any discrepancies that could affect the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Final Safety Analysis Report, technical specification requirements, outstanding work orders, Condition Reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization.

These activities constituted completion of three partial system walkdown samples as defined in Inspection Procedure 71111.04-05.

b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR 50 Appendix B, Criterion III, "Design Control" for the failure to consider the temperature effect on the pressurization of safety-related air accumulators for containment isolation valves in the main steam line penetration room. As a result, the accumulators could exceed their design pressure during a steam line break.

Description. The inspectors performed a walkdown of the safety-related instrument air accumulators in the main steam line penetration rooms in both units and did not observe overpressure relief devices on the accumulators. The accumulators support the air-operated turbine driven auxiliary feedwater steam supply valves and provide a source of air to close the valves for the containment isolation function. The design bases documents for the accumulators concluded that the protection from overpressure without relief valves was provided by the instrument air system and the relatively low ambient temperature in the room. However, the inspectors determined that a steam line break in the room could cause the room temperature to significantly exceed the assumed temperature in the calculation. The increase in room temperature would cause the internal pressure of the accumulators to exceed the design pressure, which was not evaluated. Therefore, the inspectors concluded that the accumulators were not properly evaluated for overpressure protection and potentially affected the containment isolation function of the supported valves.

The licensee planned to perform a stress analysis to evaluate the temperature effects on the accumulators. The inspectors concluded that, due to the robust design of the accumulators, the accumulators would likely maintain structural integrity during the worst case steam line break.

The inspectors determined that the initial calculation error occurred during original plant construction and the licensee has not recently performed modifications or design reviews of the system. Therefore, the inspectors concluded that the finding is not representative of current licensee performance.

Analysis. The failure to consider temperature effects on the overpressure protection for safety related air accumulators that support containment isolation function was a performance deficiency. The finding was more than minor because it was associated with the design control attribute of the barrier integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical barriers protect the public from radionuclide releases caused by events. Using NRC Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance because the finding did not result in an actual open pathway in the physical integrity of reactor containment. This finding did not have a crosscutting aspect because the performance deficiency was not representative of current licensee performance.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control" requires, in part, that measures shall be established for the review for suitability of application of equipment that is essential to the safety-related function of structures, systems, and components. Contrary to the above, as of September 18, 2010, the licensee had failed to review for suitability of application of instrument air accumulators essential to the safety-related containment isolation function of the air-operated turbine driven auxiliary feedwater steam supply valves. Specifically, the licensee failed to consider the temperature effects on overpressure protection of the accumulators during a steam line break condition. Because the violation was of very low safety significance and was documented in the licensee's corrective action program as Condition Report CR-2010-006349, it is being treated as a noncited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000445/2010004-01; 05000446/2010004-01 "Failure to Consider Temperature Effects on Air Accumulator Overpressure Protection."

## **1R05 Fire Protection (71111.05)**

### **.1 Quarterly Fire Inspection Tours**

#### **a. Inspection Scope**

The inspectors conducted fire protection walkdowns in the following risk-significant plant areas:

- August 18, 2010, Unit 1, fire zone SE18, 852 foot electrical equipment area
- August 18, 2010, Unit 1, fire area SD, 810 foot electrical equipment area
- August 25, 2010, Unit 1, fire zone EA74, electrical and control building 854 foot elevation mechanical room
- August 25, 2010, Unit 2, fire zone EA73, electrical and control building 854 foot elevation mechanical room

The inspectors reviewed areas to assess if licensee personnel had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant; effectively maintained fire detection and suppression capability; maintained passive fire protection features in good material condition; and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features, in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk

as documented in the plant's individual plant examination of external events, their potential to affect equipment that could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. The inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use, that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits, and fire doors, dampers, and penetration seals appeared to be in satisfactory condition.

These activities constituted completion of four quarterly fire-protection inspection samples as defined in Inspection Procedure 71111.05-05.

b. Findings

No findings of significance were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On September 1, 2010, the inspectors observed fire brigade drill for a simulated fire in a diesel generator fuel oil day tank room. The observation evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient firefighting equipment brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of preplanned strategies; (9) adherence to the preplanned drill scenario; and (10) communication with an offsite fire department.

These activities constitute completion of one annual fire protection inspection sample as defined by Inspection Procedure 71111.05-05.

b. Findings

No findings of significance were identified.

**1R11 Licensed Operator Requalification Program (71111.11)**

a. Inspection Scope

On August 30, 2010, the inspectors observed a crew of licensed operators in the plant's simulator to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Crew's ability to take timely actions in the conservative direction
- Crew's prioritization, interpretation, and verification of annunciator alarms
- Crew's correct use and implementation of abnormal and emergency procedures

- Control board manipulations
- Oversight and direction from supervisors
- Crew's ability to implement appropriate emergency plan actions and notifications

The inspectors compared the crew's performance in these areas to pre-established operator action expectations and successful critical task completion requirements.

These activities constituted completion of one quarterly licensed operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings of significance were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

The inspectors evaluated the following risk significant systems, components, and degraded performance issues:

- Unit 1 diesel generators

The inspectors reviewed events where ineffective equipment maintenance has resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- Implementing appropriate work practices
- Identifying and addressing common cause failures
- Scoping of systems in accordance with 10 CFR 50.65(b)
- Characterizing system reliability issues for performance
- Charging unavailability for performance
- Trending key parameters for condition monitoring
- Ensuring proper classification in accordance with 10 CFR 50.65(a)(1) or (a)(2)

The inspectors verified appropriate performance criteria for structures, systems, and components classified as having an adequate demonstration of performance through preventive maintenance, as described in 10 CFR 50.65(a)(2), or as requiring the establishment of appropriate and adequate goals and corrective actions for systems classified as not having adequate performance, as described in 10 CFR 50.65(a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified that maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constituted completion of one maintenance effectiveness sample as defined in Inspection Procedure 71111.12-05.

b. Findings

No findings of significance were identified.

**1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)**

a. Inspection Scope

The inspectors reviewed licensee personnel's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- July 21, 2010, safety injection pump 2-01 maintenance during diesel generator 1-01 testing
- August 9, 2010, Unit 2, scaffold building in turbine drive auxiliary feedwater room during switchyard activities
- August 27, 2020, switchyard trenching activities, transformer XST1/2 maintenance, and Unit 1 fire protection modification

The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that licensee personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When licensee personnel performed emergent work, the inspectors verified that the licensee personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

These activities constituted completion of three maintenance risk assessments and emergent work control inspection samples as defined in Inspection Procedure 71111.13-05.

b. Findings

No findings of significance were identified.

**1R15 Operability Evaluations (71111.15)**

a. Inspection Scope

The inspectors reviewed the following issues:

- CR-2004-003620, increased capacitance of transformer XST2 neutral bushing
- CR-2010-003305, diesel generator 2-02 in droop mode during isochronous operations

- CR-2010-004905, Unit 1, pressurizer pressure not maintained with only 1 bank of heaters energized
- CR-2010-007381, diesel generator 1-01 voltage regulator trouble

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and Final Safety Analysis Report to the licensee's evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Specific documents reviewed during this inspection are listed in the attachment.

These activities constituted completion of four operability evaluation inspection samples as defined in Inspection Procedure 71111.15-05.

b. Findings

Introduction. The inspectors identified a Green finding for the failure of the licensee to adequately evaluate the past operability of the Unit 2 Train B diesel when its governor functioned in a droop mode during isochronous operations. As a result, the licensee's evaluation incorrectly concluded that the diesel was always operable.

Description. On April 5, 2010, the inspectors identified that the Unit 2 Train B diesel generator had been functioning in the droop mode during isochronous operations. Section 1R22 of this report provides additional details. As part of the evaluation of the issue, the licensee performed a past operability evaluation to determine if the condition was reportable to the NRC.

Licensee Procedure STA-422, "Processing Condition Reports," Revision 24, states, in part, that operability evaluations should follow the guidance of ODA-309, "Operability Determination and Functionality Assessment Program." Procedure ODA-309, Revision 1, step 4.13 states, "In order to be considered Operable, a structure, system, or component must be capable of performing the safety functions specified by its design, within the required range of design physical conditions, initiation times, and mission times. In addition, Technical Specification operability considerations require that a structure, system, or component meet all surveillance requirements."

In the operability evaluation, the licensee failed to consider common loads shared between units supplied by the diesel generator during a loss of coolant accident coincident with a loss of offsite power. Due to the inspectors' questions, the licensee determined that the additional loading would have caused the diesel output frequency to be below the technical specification minimum 58.8 hertz surveillance requirement.

The inspectors determined that the inadequate evaluation could be used in the future to incorrectly support diesel generator operability if a similar equipment issue occurred. In

addition, the incorrect operability evaluation was used to support a decision not to report the event to the NRC. As a result of inspectors questioning, the licensee will be reporting the event. The licensee documented the issue in CR-2010-008760.

The inspectors determined through interviews that the cause of the performance deficiency was non-conservative assumptions and the failure to have a rigorous evaluation that demonstrated the proposed action was safe in order to proceed.

Analysis. The failure to adequately evaluate the past operability of the Unit 2 Train B diesel generator while its governor functioned in droop during isochronous operations was a performance deficiency. The finding was more than minor because if left uncorrected, the performance deficiency would have a potential to lead to a more significant safety concern in that the licensee could have used the inadequate operability evaluation to incorrectly declare a diesel operable with a similar performance issue in the future. Using NRC Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance because the finding did not result in the loss of safety function for the diesel generator. The finding has a human performance crosscutting aspect associated with decision-making, in that, licensee personnel failed to use conservative assumptions [H.1b].

Enforcement. This finding does not involve enforcement action because no regulatory requirement violation was identified. The licensee documented the finding in the corrective action program as Condition Report CR-2010-008760. The issue is being characterized as FIN 05000446/2010004-02, "Failure to Correctly Evaluate Diesel Generator Past Operability."

## **1R18 Plant Modifications (71111.18)**

### **a. Inspection Scope**

The inspectors reviewed a temporary modification to remove three Unit 2 pressurizer heaters from service. The inspectors reviewed the temporary modification and the associated safety evaluation screening against the system design bases documentation, including the Final Safety Analysis Report and the technical specifications, and verified that the modification did not adversely affect the system operability/availability. The inspectors also verified that the installation and restoration were consistent with the modification documents and that configuration control was adequate. Additionally, the inspectors verified that the temporary modification was identified on control room drawings, appropriate tags were placed on the affected equipment, and licensee personnel evaluated the combined effects on mitigating systems and the integrity of radiological barriers.

These activities constitute completion of one temporary plant modification sample as defined in Inspection Procedure 71111.18-05.

### **b. Findings**

No findings of significance were identified.

## 1R19 Postmaintenance Testing (71111.19)

### a. Inspection Scope

The inspectors reviewed the following postmaintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- August 19, 2010, Unit 2 residual heat removal pump 2-01 testing following pump maintenance and bearing oil change
- August 31, 2010, Unit 2, centrifugal charging pump 2-01 start following service water strainer cleaning
- September 9, 2010, Unit 1, testing of auxiliary feedwater pump 1-01 following maintenance

The inspectors selected these activities based upon the structure, system, or component's ability to affect risk. The inspectors evaluated the activities to ensure the testing was adequate for the maintenance performed, the acceptance criteria were clear, and the test ensured equipment operational readiness.

The inspectors evaluated the activities against technical specifications, the Final Safety Analysis Report, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with postmaintenance tests to determine whether the licensee was identifying problems and entering them into the corrective action program and that the problems were being corrected commensurate with their importance to safety. Specific documents reviewed during this inspection are listed in the attachment.

These activities constituted completion of three postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19-05.

### b. Findings

No findings of significance were identified.

## 1R22 Surveillance Testing (71111.22)

### a. Inspection Scope

The inspectors reviewed the Final Safety Analysis Report, procedure requirements, technical specifications, and corrective action documents to ensure that the surveillance activities listed below demonstrated that the systems, structures, and/or components tested were capable of performing their intended safety functions:

#### Pump or Valve Inservice Test

- September 16, 2010, Unit 2 auxiliary feed water pump testing in accordance with Procedure OPT-206B, "AFW System," Revision 20

## Routine Surveillance Testing

- August 4, 2010, Unit 1 hydrogen analyzer testing in accordance with Procedure INC-4322A, "Channel Calibration Post Accident Containment Hydrogen Analyzer, Train B, Channel 5506C/D," Revision 0
- October 13, 2009, Unit 2 train B diesel generator testing in accordance with Procedure OPT-435B, "Train B Integrated Test Sequence," Revision 7
- July 16, 2010, Service Water System Cross-Connect testing in accordance with OPT-207A, "Service Water System," Revision 15

The inspectors either witnessed or reviewed test data to verify that the significant surveillance test attributes were adequate to address the following:

- Preconditioning
- Evaluation of testing impact on the plant
- Acceptance criteria
- Test equipment
- Procedures
- Jumper/lifted lead controls
- Test data
- Testing frequency and method demonstrated technical specification operability
- Test equipment removal
- Restoration of plant systems
- Fulfillment of ASME Code requirements
- Updating of performance indicator data
- Reference setting data
- Annunciators and alarms setpoints

Specific documents reviewed during this inspection are listed in the attachment.

These activities constituted completion of four surveillance testing inspection samples (one inservice test sample, and three routine surveillance testing samples) as defined in Inspection Procedure 71111.22-05.

### b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" for the failure of the licensee to promptly identify and correct a diesel generator operating in a droop condition instead of the isochronous mode during emergency conditions. As a result, the ability of the diesel generator to provide power to mitigating equipment at the design frequency was degraded for approximately three years.

Description. During a review of past surveillance test data, the inspectors identified that the Unit 2 Train B diesel generator did not maintain 60 hertz during an isochronous test on October 13, 2009. The licensee initiated Condition Report CR-2010-003305 to evaluate the issue and determined that the diesel generator had been intermittently running in droop since 2006, causing the engine's electrical frequency to lower with increased load. Although one objective of the surveillance was to ensure that the diesel

generator could maintain frequency, the licensee failed to identify the degradation during an isochronous surveillance.

The licensee corrected the cause of the failure by burnishing a high resistance contact in an offsite power breaker in 2009 during maintenance unrelated to and after the surveillance test. However, the licensee failed to do a review to determine if the condition existed prior to the maintenance activity because the work was classified as broke/fix. The inspectors concluded that this was a missed opportunity to identify the significance of the issue.

While the diesel was degraded from 2006 to 2009, it was inoperable from September 8, 2008, through September 20, 2009. The diesel generator was able to maintain 58.8 hertz in droop with only unit specific loads, however, the train B common loads shared between units were aligned to the Unit 2 train B diesel generator during the above dates. The common loads increased the diesel loading so that the steady state frequency was 58.78 hertz, below the surveillance requirement of 58.8 hertz.

The inspectors reviewed Westinghouse analysis EIES-10-42, "Comanche Peak Unit 2 EDG Safety Analysis Assessment at Reduced Frequency," Revision 2. Based on this evaluation, the inspectors concluded that the inoperable diesel generator was still able to meet its safety function of supplying power to mitigating equipment during a loss of coolant accident coincident with a loss of offsite power.

The inspectors concluded through interviews that the cause of the issue was that operators who performed the surveillance proceeded in the face of unexpected circumstances when the diesel generator failed to operate at 60 hertz steady state during the surveillances.

Analysis. The licensee's failure to promptly identify and correct the intermittent failure of the Unit 2 train B diesel generator to operate in isochronous mode was a performance deficiency. As a result, the ability of the diesel generator to provide power to mitigating equipment at the design frequency was degraded for approximately three years. The finding was more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective, in that, the capability of the diesel to provide power to mitigating equipment was adversely affected. Using NRC Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance because the finding did not result in the loss of safety function for the mitigating equipment supported by the diesel. The finding has a human performance crosscutting aspect associated with work practices, in that, licensee personnel proceeded in the face of unexpected circumstances during diesel generator surveillances when frequency was abnormal [H.4a].

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures or malfunctions, are promptly identified and corrected. Contrary to the above, from October 21, 2006, to October 24, 2009, the licensee failed to promptly identify and correct the failure of diesel generator 2-02 to operate in isochronous mode. The licensee corrected the equipment issue on October 24, 2009. Since the violation was of very low safety significance and was documented in the licensee's corrective action program as Condition Report CR-2010-003305, it is being treated as a noncited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy:

NCV 05000446/2010004-03, "Failure to Promptly Identify and Correct a Diesel Generator Frequency Degradation."

#### 4. OTHER ACTIVITIES

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection**

##### 40A1 Performance Indicator Verification (71151)

###### .1 Data Submission Issue

###### a. Inspection Scope

The inspectors performed a review of the data submitted by the licensee for the second quarter 2010 performance indicators for any obvious inconsistencies prior to its public release in accordance with NRC Inspection Manual Chapter 0608, "Performance Indicator Program."

This review was performed as part of the inspectors' normal plant status activities and, as such, did not constitute a separate inspection sample.

###### b. Findings

No findings of significance were identified.

###### .2 Safety System Functional Failures (MS05)

###### a. Inspection Scope

The inspectors sampled licensee submittals for the safety system functional failures performance indicator for Units 1 and 2 for the period from the second quarter 2009 through the second quarter 2010. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," definitions and guidance were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC Integrated Inspection reports for the period of second quarter 2009 through the second quarter 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two safety system functional failures samples as defined by Inspection Procedure 71151-05.

###### b. Findings

No findings of significance were identified.

.3 Mitigating Systems Performance Index - Emergency ac Power System (MS06)

a. Inspection Scope

The inspectors sampled licensee submittals for the mitigating systems performance index - emergency ac power system performance indicator for Units 1 and 2 for the period from the third quarter 2009 through the second quarter 2010. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's operator narrative logs, mitigating systems performance index derivation reports, issue reports, event reports and NRC integrated inspection reports for the period of the third quarter 2009 through the second quarter 2010 to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable Nuclear Energy Institute guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two mitigating systems performance index emergency ac power system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.4 Mitigating Systems Performance Index - High Pressure Injection Systems (MS07)

a. Inspection Scope

The inspectors sampled licensee submittals for the mitigating systems performance index - high pressure injection systems performance indicator for Units 1 and 2 for the period from the third quarter 2009 through the second quarter 2010. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's operator narrative logs, issue reports, mitigating systems performance index derivation reports, event reports and NRC integrated inspection reports for the period of the third quarter 2009 through the second quarter 2010 to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable Nuclear Energy Institute guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two mitigating systems performance index high pressure injection system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.5 Mitigating Systems Performance Index - Heat Removal System (MS08)

a. Inspection Scope

The inspectors sampled licensee submittals for the mitigating systems performance index - heat removal system performance indicator for Units 1 and 2 for the period from the third quarter 2009 through the second quarter 2010. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, mitigating systems performance index derivation reports, and NRC integrated inspection reports for the period of the third quarter 2009 through the second quarter 2010 to validate the accuracy of the submittals. The inspectors reviewed the Mitigating Systems Performance Index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable Nuclear Energy Institute guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of two mitigating systems performance index heat removal system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

**40A2 Identification and Resolution of Problems (71152)**

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action program at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. The inspectors reviewed attributes that included: the complete and accurate identification of the problem; the timely correction, commensurate with the safety significance; the evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews; and the classification, prioritization, focus,

and timeliness of corrective actions. Minor issues entered into the licensee's corrective action program because of the inspectors' observations are included in the attached list of documents reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure, they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings of significance were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. The inspectors accomplished this through review of the station's daily corrective action documents.

The inspectors performed these daily reviews as part of their daily plant status monitoring activities, so these reviews did not constitute any separate inspection samples.

b. Findings

No findings of significance were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on repetitive equipment issues, but also considered the results of daily corrective action item screening discussed in Section 4OA2.2, above, licensee trending efforts, and licensee human performance results. The inspectors nominally considered the 6-month period of April 2010 through September 2010, although some examples expanded beyond those dates where the scope of the trend warranted.

The inspectors also included issues documented outside the normal corrective action program in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's corrective action program trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

These activities constitute completion of one semi-annual trend inspection sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

.4 Selected Issue Follow-up Inspection

a. Inspection Scope

On August 3, 2010, the inspectors reviewed the licensee's corrective actions with regard to a diesel generator trouble alarm. The inspectors reviewed documents and interviewed personnel to determine if the licensee completely and accurately identified problems in a timely manner commensurate with its significance, evaluated and dispositioned operability issues, considered the extent of condition, prioritized the problem commensurate with its safety significance, identified root and contributing causes of significant conditions adverse to quality, identified appropriate corrective actions, and completed corrective actions in a timely manner commensurate with the safety significance of the issue.

These activities constitute completion of one in-depth problem identification and resolution sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

**40A6 Meetings**

Exit Meeting Summary

On September 23, 2010, the inspectors presented the resident inspection results to Mr. R. Flores, Senior Vice President and Chief Nuclear Officer, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors acknowledged review of proprietary material during the inspection. No proprietary information has been included in the report.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

R. Flores, Senior Vice President and Chief Nuclear Officer  
M. Lucas, Site Vice President  
B. Mays, Vice President, Nuclear Engineering and Plant Support  
S. Bradley, Manager, Radiation Protection  
D. Fuller, Manager, Emergency Preparedness  
T. Hope, Manager, Nuclear Licensing  
D. Kross, Assistant to Senior Vice President and Chief Nuclear Officer  
F. Madden, Director, Oversight and Regulatory Affairs  
B. Patrick, Director, Maintenance  
S. Sewell, Director, Operations  
S. Smith, Plant Manager  
K. Tate, Manager, Security  
D. Wilder, Manager, Plant Support

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened and Closed**

05000445/2010004-01	NCV	Failure to Consider Temperature Effects on Air Accumulator
05000446/2010004-01		Overpressure Protection (Section 1R04)
05000446/2010004-02	FIN	Failure to Correctly Evaluate Diesel Generator Past Operability (Section 1R15)
05000446/2010004-03	NCV	Failure to Promptly Identify and Correct a Diesel Generator Frequency Degradation (Section 1R22)

## LIST OF DOCUMENTS REVIEWED

### Section 1R04: Equipment Alignments

#### CONDITION REPORTS

2010-001736                      2010-006349

#### PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ABN-305	Auxiliary Feedwater System Malfunction	6
FRH-0.1A	Response to Loss of Secondary Heat Sink	8

#### MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
M1-0206	Flow Diagram Auxiliary Feedwater System Pump Trains	CP-15
3972-301-2, Sheet 1	Air Accumulator Tanks	CP-3
Calculation 16345-ME(B)- 092	Determination of Design Pressure and Temperature for Specific Portions of ASME III Piping in the Instrument Air System	n/a

### Section 1R05: Fire Protection

#### PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
FPI-508	Electrical and Control Building Elevation 854'-4"	4

#### CONDITION REPORTS

2010-008091

### Section 1R15: Operability Evaluations

#### CONDITION REPORTS

2009-006404	2002-001529	2009-004162	2009-005353
2010-003194	2010-003196	2010-004511	2010-004825
2010-000277			

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OPT-435B	Train B Integrated Test Sequence	7

WORK ORDERS

3503320                      3502018                      3825002

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
	Westinghouse Guidelines for Estimating Condition of Resin Bonded Bushings in Service	11/15/88
ER-ME-109	Evaluation of Safety-Related Pump Degradation Issues	

**Section 1R18: Plant Modifications**

CONDITION REPORTS

2008-000989                      2005-001483

**Section 1R19: Postmaintenance Testing**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OPT-203B	Residual Heat Removal System	12
OPT-206A	AFW System	28

WORK ORDERS

4013679

CONDITION REPORTS

2010-008221                      2010-008233

**Section 1R22: Surveillance Testing**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ODA-407	Operations Department Procedure Use and Adherence	13
OPT-435B	Train B Integrated Test Sequence	7

CONDITION REPORTS

2009-006404                      2002-001529

WORK ORDERS

3952414                              3978454

**Section 40A2: Identification and Resolution of Problems**

CONDITION REPORTS

2010-006939