



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

May 9, 2017

Mr. Ken Peters, Senior Vice President
and Chief Nuclear Officer
TEX Operations Company LLC
P.O. Box 1002
Glen Rose, TX 76043

**SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT – NRC INTEGRATED
INSPECTION REPORT 05000445/2017001 and 05000446/2017001**

Dear Mr. Peters:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Comanche Peak Nuclear Power Plant, Units 1 and 2. On March 27, 2017, the NRC inspectors discussed the results of this inspection with Mr. Tom McCool, Site Vice President, and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented four findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. Further, inspectors documented two licensee-identified violations which were determined to be of very low safety significance in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at the Comanche Peak Nuclear Power Plant..

If you disagree with a cross-cutting aspect assignment 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 Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC's Public Document Room or the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response, if any, should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Sincerely,

/RA/

Mark S. Haire, Chief
Project Branch A
Division of Reactor Projects

Docket Nos. 05000445, 05000446
License Nos. NPF-87 and NPF-89

Enclosure:
Inspection Report 05000445/2017001 and
05000446/2017001
w/ Attachment: Supplemental Information

COMANCHE PEAK NUCLEAR POWER PLANT – NRC INTEGRATED INSPECTION REPORT
05000445/2017001 and 05000446/2017001

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 05000445, 05000446

License: NPF-87, NPF-89

Report: 05000445/2017001 and 05000446/2017001

Licensee: TEX Operations Company, LLC

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

Location: 6322 N. FM-56, Glen Rose, Texas

Dates: January 1 through March 31, 2017

Inspectors: J. Josey, Senior Resident Inspector
R. Kumana, Resident Inspector
J. Braisted, Reactor Inspector
C. Smith, Reactor Inspector
W. Cullum, Reactor Inspector
E. Uribe, Reactor Inspector
G. Pick, Senior Reactor Inspector
S. Hedger, Emergency Preparedness

Approved By: Mark S. Haire
Chief, Project Branch A
Division of Reactor Projects

Enclosure

SUMMARY

IR 05000445/2017001 and 05000446/2017001; 01/01/2017-3/31/2017; Comanche Peak Nuclear Power Plant; Equipment Alignment; Heat Sink Performance; Problem Identification and Resolution

The inspection activities described in this report were performed between January 1 and March 31, 2017, by the resident inspectors on site and inspectors from the NRC's Region IV office. Four findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR 50.54(hh)(2), "Conditions of Licenses," involving the licensee's failure to maintain available equipment needed to implement mitigating strategies to provide makeup to steam generators following loss of large areas of the plant due to explosions or fire. Specifically, the licensee failed to maintain available a portable alternate mitigation equipment pump related to the steam generator makeup strategy. As an immediate corrective action the licensee put temporary heaters in place for the alternate mitigation equipment pump to ensure the equipment was stored at temperatures greater than 32 degrees Fahrenheit pending further evaluation. The licensee entered this issue into their corrective action program as Condition Report CR-2016-010832.

The failure to maintain all necessary equipment available to implement mitigating strategies as required by regulations and conditions of the operating license was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the design control attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Appendix L, "B.5.b Significance Determination Process," dated December 24, 2009, the inspectors determined the finding was of very low safety significance (Green) because it resulted in an unrecoverable unavailability of an individual mitigating strategy but did not result in multiple unavailable mitigating strategies, or loss of all on-site, self-powered, portable pumping capability. The inspectors did not assign a cross-cutting aspect because the performance deficiency was not reflective of present performance. (Section 1R04)

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to properly evaluate heat loads on the control room air conditioning system. Specifically, the licensee used a non-conservative assumption for the number of persons in the control room envelope when calculating the required capacity of the system. The licensee had assumed there would only be six personnel in the technical support center (which is included in the control room envelope) during a design basis event. However, the emergency plan nominally staffed the technical support center with 25 station personnel, and an additional five NRC personnel. The licensee implemented

immediate corrective actions by entering the issues into the corrective action program for resolution and performed an operability determination for the identified degraded condition. The licensee entered this issue into their corrective action program as Condition Report CR-2017-000744.

The failure to evaluate heat loads to determine the required system capacity was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Attachment 04, "Initial Characterization of Findings," dated October 7, 2016, and Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding was of very low safety significance (Green) because the finding: (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality, (2) did not represent a loss of system and/or function, (3) did not represent an actual loss of function of at least a single train for longer than its allowed outage time, or two separate safety systems out-of-service for longer than their technical specification allowed outage time, and (4) does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant for greater than 24 hours in accordance with the licensee's maintenance rule program. The inspectors determined that no cross-cutting aspect was assigned because the performance deficiency was not reflective of present performance. (Section 1R04)

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving the failure to use the design fouling factor for the component cooling water heat exchanger in a design basis calculation evaluating a tornado missile strike of station service water system piping. The licensee implemented immediate corrective actions by entering the issues into the corrective action program for resolution and performed an operability determination for the identified degraded conditions. The licensee entered this issue into their corrective action program as Issue Report IR-2017-001465.

The inspectors determined that the failure to use the design fouling factor for the component cooling water heat exchanger in the tornado missile analysis of the station service water system discharge piping was a performance deficiency. This finding was more-than-minor because it was associated with the design control attribute of the Mitigating Systems cornerstone 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, the use of a non-conservative heat exchanger fouling factor in a design basis accident analysis resulted in a more restrictive temperature limit (i.e., less than the technical specification allowed value) of the safe shutdown impoundment. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that (1) did not represent a loss of operability or functionality; (2) did not represent an actual loss of safety function of the system or train; (3) did not result in the loss of one or more trains of non-technical specification equipment; and (4) did not screen as potentially risk-significant due to seismic, flooding, or severe weather. The inspectors determined that this finding did not

have a cross-cutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance. Specifically, the licensee performed the calculation in 1988, therefore, the performance deficiency occurred outside of the nominal three-year period for “present performance.” (Section 1R07)

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” associated with the licensee’s failure to take timely corrective actions for a previously identified condition adverse to quality. Specifically, the licensee failed to verify the adequacy of the design of the Unit 1 120 VAC vital bus inverter 1PC1 with respect to use of alternate AC power to the inverter. The 120 VAC calculation did not properly account for low voltage when the buses are supplied from their alternate source. This issue does not represent an immediate safety concern because, following the inspectors identification, the licensee performed an operability evaluation which established a reasonable expectation of operability. The licensee implemented immediate corrective actions by entering the issues into the corrective action program for resolution and performed an operability determination for the identified degraded conditions. The licensee entered this issue into their corrective action program as CR-2017-001296.

The licensee’s failure to take timely and adequate corrective actions to correct a condition adverse to quality was a performance deficiency. The performance deficiency is more than minor, and therefore a finding, because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correct the low voltage susceptibility resulted in delayed restoration of a bus following the failure of the swing inverter to sync. Using Inspection Manual Chapter 0609, Attachment 04, “Initial Characterization of Findings,” dated October 7, 2016, and Inspection Manual Chapter 0609, Appendix A, “Significance Determination Process for Findings At-Power,” Exhibit 2, “Mitigating Systems Screening Questions,” the inspectors determined the finding was of very low safety significance (Green) because the finding: (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality, (2) did not represent a loss of system and/or function, (3) did not represent an actual loss of function of at least a single train for longer than its allowed outage time, or two separate safety systems out-of-service for longer than their technical specification allowed outage time, and (4) does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant for greater than 24 hours in accordance with the licensee’s maintenance rule program. The finding has a human performance cross-cutting aspect associated with resources, in that, the licensee failed to ensure that resources were adequate to support nuclear safety [H.1]. (Section 4OA2)

Licensee-Identified Violations

Violations of very low safety significance that were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee’s corrective action program. These violations and associated corrective action tracking numbers are listed in Section 4OA7 of this report.

PLANT STATUS

Unit 1 began the inspection period at approximately 100 percent power and operated at that power level for the entire inspection period.

Unit 2 began the inspection period at approximately 100 percent power. On March 18, 2017, Unit 2 reduced power to 45% due to a steam generator chemistry issue. Unit 2 returned to full power on March 19, 2017. On March 30, 2017, Unit 2 lowered power to 98.5 percent due to a reactor coolant boron issue, and concurrently the unit began coast down and operated at that power level for the remainder of this inspection period.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

On February 27, 2017, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions involving severe thunderstorms in the area. The inspectors reviewed plant design features, the licensee's procedures to respond to tornadoes and high winds, and the licensee's implementation of these procedures. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

These activities constituted one sample of readiness for impending adverse weather conditions, as defined in Inspection Procedure 71111.01.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walk-Down

a. Inspection Scope

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

- February 8, 2017, Unit 1, train A 118 VAC with inverter 1PC1 out of service
- February 17, 2017, Unit 1, coolant charging pump 1-02 while coolant charging pump 1-01 was out of service with a flange leak

- February 28, 2017, Unit 2, XST2 transformer during XST1A transformer modification
- March 7, 2017, Unit 1 and Unit 2, alternate mitigation equipment

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the systems were correctly aligned for the existing plant configuration.

These activities constituted four partial system walk-down samples as defined in Inspection Procedure 71111.04.

c. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR 50.54(hh)(2), "Conditions of Licenses," involving the licensee's failure to maintain available equipment needed to implement mitigating strategies to provide makeup to steam generators following loss of large areas of the plant due to explosions or fire. Specifically, the licensee failed to maintain available a portable alternate mitigation equipment pump related to the steam generator makeup strategy.

Description. During a cold weather walk-down of the station's alternate mitigation equipment, the inspectors identified that the alternate mitigation equipment pump was stored in an unheated building. This mitigating strategies equipment is associated with 10 CFR 50.54(hh)(2), which requires the licensee to implement mitigating strategies needed to maintain or restore core, containment, and spent fuel pool cooling capabilities following large fires or explosions (commonly referred to as B.5.b equipment). The inspectors questioned whether the pump was designed to start during cold ambient conditions without block heaters since it was a diesel driven pump.

The licensee reviewed the vendor technical manual and determined that the pump was not rated to start below 32 degrees Fahrenheit without assistance. Based on this, the inspectors determined that the licensee was not able to implement strategy EDMG A.4-4, "Manually Depressurize S/Gs and Use Portable AME Pump for Makeup," under all required conditions.

The licensee entered this issue into the corrective action program as Condition Report CR-2016-010832 for resolution. The licensee also took action to put temporary heaters in place for the alternate mitigation equipment pump to ensure the equipment was stored at temperatures greater than 32 degrees Fahrenheit pending final resolution of this issue.

The inspectors determined that the inadequate pump protection was in place since the original implementation of the mitigation strategies (February 2002) and was not reflective of current performance.

Analysis. The failure to maintain all necessary equipment available to implement mitigating strategies as required by regulations and conditions of the operating license was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the design control attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the

availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Appendix L, "B.5.b Significance Determination Process," dated December 24, 2009, the inspectors determined the finding was of very low safety significance (Green) because it resulted in an unrecoverable unavailability of an individual mitigating strategy; but did not result in multiple unavailable mitigating strategies, or loss of all on-site, self-powered, portable pumping capability. The inspectors did not assign a cross-cutting aspect because the performance deficiency was not reflective of present performance.

Enforcement. Title 10 CFR 50.54(hh)(2), "Conditions of Licenses," requires, in part, that the licensee develop and implement guidance and strategies intended to maintain or restore core cooling to mitigate fuel damage under the circumstances associated with loss of large areas of the plant due to explosions or fire. Contrary to the above, from February 2002 through March 2017, the licensee failed to implement guidance to maintain or restore core cooling to mitigate fuel damage under the circumstances associated with loss of large areas of the plant due to explosions or fire. Specifically, the licensee failed to maintain available all equipment needed to implement Procedure EDMG A.4-4, "Manually Depressurize S/Gs and Use Portable AME Pump for Makeup." Since this violation was of very low safety significance (Green) and has been entered into the corrective action program as Condition Report CR-2017-000744, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (05000445/2017001-01; 05000446/2017001-01, Failure to Maintain B.5.b Equipment in a State of Readiness to Support Mitigation Strategies)

.2 Complete Walk-Down

a. Inspection Scope

On February 22, 2017, the inspectors performed a complete system walk-down inspection of the control room air conditioning system. The inspectors reviewed the licensee's procedures and system design information to determine the correct system lineup for the existing plant configuration. The inspectors also reviewed outstanding work orders, open condition reports, in-process design changes, temporary modifications, and other open items tracked by the licensee's operations and engineering departments. The inspectors then visually verified that the system was correctly aligned for the existing plant configuration.

These activities constituted one complete system walk-down sample, as defined in Inspection Procedure 71111.04.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to properly evaluate heat loads on the control room air conditioning system. Specifically, the licensee used a non-conservative assumption for the number of persons in the control room envelope when calculating the required capacity of the system.

Description. While reviewing the alignment of the control room AC system the inspectors noted that the technical support center was located wholly within the control room envelope and that, during a design basis accident, it would have additional

personnel occupying the space. The inspectors asked the licensee what the capacity of the system was with respect to assumed heat loads. The licensee reviewed calculation X-EB-304-1, "Control Room Space Heat Gains and Maximum Space Temperature Limits Unit 1 and 2," Revision 5, and determined that they had assumed only six personnel would be in the technical support center during a design basis accident. The inspectors noted that the licensee's emergency plan nominally staffed the technical support center with 25 personnel, with an assumption of an additional 5 NRC personnel.

The inspectors questioned whether the control room air conditioning system was operable with the increased heat load. The control room air conditioning system consists of two trains each capable of supporting both units with 100 percent capacity. Each train consists of two 50 percent capacity units. The licensee's technical specifications allow the licensee to declare a train operable with only one unit provided environmental conditions permit one unit to meet the required safety function for a 30 day mission time. Because the licensee had used that allowance to credit operability, the licensee reviewed the system history to determine whether the control room air conditioning system was inoperable.

The licensee determined that the system had sufficient capacity to meet its safety function over the past three years, but that the criteria for determining operability were inadequate. Addition of the additional required staff resulted in approximately a 2.5 percent margin reduction for the system. The licensee entered this into their corrective action program as condition report CR-2017-000744.

The inspectors determined that the inadequate calculation was performed in February 1992, and was not reflective of present performance.

Analysis. The failure to evaluate heat loads to determine the required system capacity was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Attachment 04, "Initial Characterization of Findings," dated October 7, 2016, and Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding was of very low safety significance (Green) because the finding: (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality, (2) did not represent a loss of system and/or function, (3) did not represent an actual loss of function of at least a single train for longer than its allowed outage time, or two separate safety systems out-of-service for longer than their technical specification allowed outage time, and (4) does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant for greater than 24 hours in accordance with the licensee's maintenance rule program. The inspectors did not assign a cross-cutting aspect because the performance deficiency was not reflective of present performance.

Enforcement. Title 10 CFR 50, Appendix B, Criterion III, "Design Control" requires, in part, that the design basis "shall be correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, from February 1992, to

March 31, 2017, the licensee failed to ensure that the design basis for the CRAC system was correctly translated into specifications and procedures. The licensee performed an immediate operability evaluation to determine that the CRAC system was operable, pending further review and revision of calculation X-EB-304-1, "Control Room Space Heat Gains and Maximum Space Temperature Limits Unit 1 and 2," Revision 5. Since this violation was of very low safety significance (Green) and has been entered into the corrective action program as Condition Report CR-2017-000744, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000445/2017001-02; 05000445/2017001-02, Failure to Evaluate Heat Loads on Control Room Air Conditioning System)

1R05 Fire Protection (71111.05)

.1 Quarterly Inspection

a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on four plant areas important to safety:

- January 5, 2017, Fire zone AA40, Unit 1 and 2, Upper ventilation filter room
- February 17, 2017, Fire zone 2CA101, Unit 2, Containment refueling cavity area
- March 27, 2017, Fire area SB2B, Unit 1, Motor driven auxiliary feedwater pump/residual heat removal pump
- March 29, 2017, Fire area SB2C, Unit 1, Motor driven auxiliary feedwater pump/residual heat removal pump

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted four quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

On March 13, 2017, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis,

the inspectors chose one plant area containing risk-significant structures, systems, and components that were susceptible to flooding:

- Pathway from the circulating water discharge structure via circulating water tunnels to the turbine building and lower level of the electrical and control building

The inspectors reviewed plant design features and licensee procedures for coping with internal flooding. The inspectors walked down the selected areas to inspect the design features, including the material condition of seals, drains, and flood barriers. The inspectors evaluated whether operator actions credited for flood mitigation could be successfully accomplished.

These activities constituted completion of one flood protection measures sample, as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed licensee programs to verify heat exchanger performance and operability for the following heat exchangers:

- Ultimate Heat Sink
- Component Cooling Water Heat Exchanger 2-01
- Safety Chilled Water System Centrifugal Chiller 2-05

The inspectors verified whether testing, inspection, maintenance, and chemistry control programs are adequate to ensure proper heat transfer. The inspectors verified that the periodic testing and monitoring methods, as outlined in commitments to NRC Generic Letter 89-13, utilized proper industry heat exchanger guidance. Additionally, the inspectors verified that the licensee's chemistry program ensured that biological fouling was properly controlled between tests. The inspectors reviewed previous maintenance records of the heat exchangers to verify that the licensee's heat exchanger inspections adequately addressed structural integrity and cleanliness of their tubes. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three triennial heat sink inspection samples as defined in Inspection Procedure 71111.07-05.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving the failure to use the design fouling factor for the component cooling water heat exchanger in a design basis calculation evaluating a tornado missile strike of station service water system piping.

Description. The licensee used an inaccurate assumption of 0.0003 for the component cooling water heat exchanger fouling factor in attachment 8 of design basis document DBD-ME-229, "Component Cooling Water System," dated December 19, 1988. The licensee used attachment 8 of DBD-ME-229 to demonstrate the ability to cooldown with a single train of station service water discharge pipe damaged by an impact from a tornado missile following a single failure which removes the other station service water train from service. The station service water discharge piping is currently not protected from tornado missiles at Comanche Peak Nuclear Power Plant, hence, the necessity to prove that the station can cooldown on a single train of station service water. The assumed value of 0.0003 for the component cooling water heat exchanger fouling factor is much less than the 0.000695 actual fouling value obtained from the most recent heat exchanger thermal performance test and the 0.002 design fouling factor found in DBD-ME-229. If the correct 0.002 design fouling factor had been used, the calculation shows that the safe shutdown impoundment temperature would need to be limited to 97 degrees Fahrenheit instead of the technical specification limit of 102 degrees Fahrenheit to ensure that the analysis for a missile strike of the station service water discharge piping is bounded.

Analysis. The inspectors determined that the failure to use the design fouling factor for the component cooling water heat exchanger in the tornado missile analysis of the station service water system discharge piping was a performance deficiency. This finding was more-than-minor because it was associated with the design control attribute of the Mitigating Systems cornerstone 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, the use of a non-conservative heat exchanger fouling factor in a design basis accident analysis resulted in the licensee failing to recognize the need for a more restrictive temperature limit (i.e., less than the technical specification allowed value) of the safe shutdown impoundment. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that (1) did not represent a loss of operability or functionality; (2) did not represent an actual loss of safety function of the system or train; (3) did not result in the loss of one or more trains of non-technical specification equipment; and (4) did not screen as potentially risk-significant due to seismic, flooding, or severe weather. The inspectors determined that this finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency did not reflect current licensee performance. Specifically, the licensee performed the calculation in 1988, therefore, the performance deficiency occurred outside of the nominal three-year period for "present performance."

Enforcement. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, "Measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, from December 19, 1988, to January 31, 2017, the licensee did not establish measures to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee used 0.0003 as the component cooling water heat exchanger fouling factor

instead of the design value of 0.002 when evaluating tornado missile protection for the station service water system discharge piping. In response to this issue, the licensee performed immediate and prompt operability evaluations and determined that the station can perform the required shutdown and cooldown (given a postulated tornado missile strike of the exposed station service water system piping) as long as the safe shutdown impoundment temperature is less than 97 degrees Fahrenheit. In addition, the licensee created Standing Order TX-17-0023 to track the safe shutdown impoundment temperature to ensure it is below 97 degrees Fahrenheit until further analysis is performed. This finding was entered into the licensee's corrective action program as Issue Report IR-2017-001465. Because this finding was of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000445/2017001-03; 05000446/2017001-03, Use of Non-Design Fouling Factor for Component Cooling Water Heat Exchanger in Station Service Water Tornado Missile Calculation)

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On March 28, 2017, the inspectors observed simulator training for an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

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

b. Findings

No findings were identified.

.2 Review of Licensed Operator Performance

a. Inspection Scope

Inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity or risk due to modifications being performed on the electrical distribution system. The inspectors observed the operators' performance of the following activities:

- February 26, 2017, Surveillance Testing in preparation for XST1A alternate transformer modification
- February 27, 2017, Control room operations during XST1A alternate transformer cable cutting operations

In addition, the inspectors assessed the operators' adherence to plant procedures, including conduct of operations procedure and other operations department policies.

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

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed one instance of degraded performance or condition of safety-significant structures, systems, and components (SSCs):

- February 28, 2017, Unit 1 and Unit 2, XST2/XST1 transformer relays

The inspectors reviewed the extent of condition of possible common cause SSC failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the SSCs. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

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

b. Findings

No findings were identified.

.2 Quality Control

a. Inspection Scope

On February 17, 2017, the inspectors reviewed the licensee's quality control activities through a review of the licensee's control of quality parts during maintenance associated with emergency diesel generator reactive power (KVAR) meter replacement.

These activities constituted completion of one quality control sample, as defined in Inspection Procedure 71111.12.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- February 15, 2017, Unit 1 and Unit 2, Connection of alternate transformer XST1A to the station electrical distribution system
- March 6, 2017, Unit 1 and Unit 2, Service water unit cross connect surveillance testing

The inspectors verified that these risk assessment were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

Additionally, on March 7, 2017, the inspectors observed portions of an emergent work activity for emergency diesel generator 1-01 that had the potential to affect the functional capability of mitigating systems.

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected SSCs.

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

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed five operability determinations that the licensee performed for degraded or nonconforming SSCs:

- January 31, 2017, Unit 1, CR-2017-000789 centrifugal charging pump 1-01 piping over pressurization
- February 24, 2017, Unit 1, CR-2017-000597 118VAC with swing inverter synchronization issue
- March 14, 2017, Unit 1 and 2, CR-2017-003131, XST1 transformer with loss of forced cooling

- March 24, 2017, Unit 2, IR-2017-002867 nonfunctioning thermistor strips inside containment
- March 29, 2017, Unit 1, IR-2017-003936, Wrong lubricant added to safety chilled water recirculation pumps

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded SSC to be operable or functional, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability or functionality. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability or functionality of the degraded SSC.

These activities constituted completion of five operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

On March 8, 2017, the inspectors reviewed a permanent plant modification to connect alternate transformer XST1A with the station electrical distribution system.

The inspectors reviewed the design and implementation of the modification. The inspectors verified that work activities involved in implementing the modification did not adversely impact operator actions that may be required in response to an emergency or other unplanned event. The inspectors verified that post-modification testing was adequate to establish the operability of the SSC as modified.

These activities constituted completion of one sample of permanent modifications, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed four post-maintenance testing activities that affected risk-significant SSCs:

- February 23, 2017, Unit 1 and Unit 2, Spent fuel pool cooling pump X-02 following mechanical seal replacement, WO5257546

- March 13, 2017, Unit 1, Emergency diesel generator 1-01 following emergent maintenance
- March 14, 2017, Unit 1 and Unit 2, XST1 transformer modification
- March 27, 2017, Unit 2, Motor drive auxiliary feedwater pump 2-02 following regulator 2-PV-2454A replacement

The inspectors reviewed licensing- and design-basis documents for the SSCs and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected SSCs.

These activities constituted completion of four post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed four risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the structures, systems, and components (SSCs) were capable of performing their safety functions:

In-service tests:

- January 26, 2017, Unit 1, Turbine driven auxiliary feedwater pump

Containment isolation valve surveillance tests:

- March 6, 2017, Unit 2, OPT-218B containment integrity verification for main steam line 2-01 penetration

Other surveillance tests:

- February 10, 2017, Unit 1 and Unit 2, OPT-207A service water cross connect valve stroke
- February 27, 2017, Unit 2, OPT-414B Train A safety injection and blackout sequencer logic test

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

These activities constituted completion of four surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspector performed an in-office review of Comanche Peak Nuclear Power Plant Emergency Plan, Unit 1 and Unit 2, Revision 41. This revision:

- revised the evacuation time estimate analysis summary,
- added a description of the alternate facility site required for response to a hostile action event, and
- revised the emergency action level (EAL) scheme description to reflect the recently NRC-approved EAL revision based on NEI 99-01, Revision 6.

This revision was compared to its previous revision, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, to Nuclear Energy Institute Report 99-01, "Emergency Action Level Methodology," Revision 6, and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspector verified that the revisions did not decrease the effectiveness of the emergency plan. This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

These activities constitute completion of one emergency action level and emergency plan changes sample as defined in Inspection Procedure 71114.04.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed emergency preparedness drills on January 11, and February 15, 2017, to verify the adequacy and capability of the licensee's assessment of drill performance. The inspectors reviewed the drill scenarios, observed the drills from the emergency operations facility and simulator, and attended the post-drill critiques. The inspectors verified that the licensee's emergency classifications, off-site

notifications, and protective action recommendations were appropriate and timely. The inspectors verified that any emergency preparedness weaknesses were appropriately identified by the licensee in the post-drill critiques and entered into the corrective action program for resolution.

These activities constituted completion of two emergency preparedness drill observation samples, as defined in Inspection Procedure 71114.06.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

40A1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours (IE01)

a. Inspection Scope

The inspectors reviewed licensee event reports (LERs) for the period of January 2016, through December 2016 to determine the number of scrams that occurred. The inspectors compared the number of scrams reported in these LERs to the number reported for the performance indicator. Additionally, the inspectors reviewed monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams per 7000 critical hours performance indicator for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Unplanned Power Changes per 7000 Critical Hours (IE03)

a. Inspection Scope

The inspectors reviewed operating logs, corrective action program records, and operating reports for the period of January 2016, through December 2016 to determine the number of unplanned power changes that occurred. The inspectors compared the number of unplanned power changes documented to the number reported for the performance indicator. Additionally, the inspectors reviewed monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory

Assessment Performance Indicator Guideline,” Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned power outages per 7000 critical hours performance indicator for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Unplanned Scrams with Complications (IE04)

a. Inspection Scope

The inspectors reviewed the licensee’s basis for including or excluding in this performance indicator each scram that occurred between January 2016, and December 2016. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams with complications performance indicator for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

40A2 Problem Identification and Resolution (71152)

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee’s corrective action program and periodically attended the licensee’s condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee’s problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

.2 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, and other documentation to identify trends that might indicate the existence of a more significant safety issue. The inspectors focused on the stations corrective action program and maintenance backlogs. The inspectors reviewed documents, and planned work schedules 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 problems commensurate with their safety significance, identified appropriate corrective actions, and completed corrective actions in a timely manner commensurate with the safety significance of the issue. The inspectors verified that the licensee was taking corrective actions to address identified adverse trends.

These activities constituted completion of one semiannual trend review sample, as defined in Inspection Procedure 71152.

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected two issues for an in-depth follow-up:

- From October 3 to October 17, 2016, and January 23 to February 8, 2017, during in-office inspection, the inspectors reviewed the NRC-identified and licensee-identified issues documented in Inspection Report 05000445; 05000446/2014406 for an in-depth follow-up. The inspectors reviewed procedures, digital asset listings, and corrective action documents associated with the licensee's cyber security program. The inspectors interviewed personnel involved in implementing the corrective actions.

The inspectors assessed the licensee's cause analyses, extent of condition reviews, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were appropriate.

- The inspectors reviewed 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 on an issue with safety-related inverter 1PC1 documented in Condition Report CR-2017-000597. The inspectors assessed the licensee's problem identification threshold, cause analyses, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to correct the condition.

These activities constituted completion of two annual follow-up samples as defined in Inspection Procedure 71152.

b. Findings

Introduction. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," associated with the licensee's failure to take timely corrective actions for a previously identified condition adverse to quality.

Description. On January 15, 2017, the Unit 1 120 VAC vital bus inverter that supplies 1PC1 output voltage dropped causing an alarm due to low voltage during periodic equipment rotation. The licensee determined that the inverter was inoperable due to the inability to maintain voltage while powered from the station batteries. The licensee also had an issue with the swing inverter not syncing, so operators entered electrical power system Technical Specification 3.8.9.B, a 2 hour shutdown limiting condition of operation. Subsequently, the licensee exceeded the 2 hour limiting condition of operation time limit and was in the process of making plans to shut the unit down when they were able to place the swing inverter in service and exit Technical Specification 3.8.9.B (at approximately 2.5 hours).

The inspectors reviewed the licensee's actions and questioned why the licensee was not crediting the availability of alternate AC power to the inverter, as allowed by the technical specifications. Inspectors noted that this would have allowed entry into Technical Specification 3.8.9.A, a 24 hour limiting condition of operation, instead of Technical Specification 3.8.9.B. The licensee responded that the alternate AC power source could not be credited because of a previous NRC identified issue.

Inspectors subsequently determined that this issue had been identified by an NRC Component Design Basis Inspection team and documented in Inspection Report 2013007 as non-cited violation (NCV) 05000445; 05000446/2013007-02; "Inadequate Voltage Calculations for the 125 VDC and 120 VAC Buses." During the 2013 inspection, the team had determined that the 480/120V transformer did 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 480 VAC motor control center source. However, 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 2013 inspection team reviewed voltage calculation EE-1E-1EB4-1, which determined voltage for the 480/120V transformer. The 2013 inspection team determined that the calculation used an available voltage at the motor control center considerably higher (444.96 VAC) than the voltage afforded by the degraded voltage relays (433 VAC) under accident loading conditions. In response to the 2013 inspection team's inquiries, the licensee had initiated Condition Report CR-2013-006396.

The current inspectors reviewed CR-2013-006396 and noted that this condition report had been closed to actions to submit a license amendment. However, the license amendment was canceled and the issue was not resolved. Based on this, inspectors determined that the licensee had failed to take timely and adequate corrective actions to correct the identified condition adverse to quality associated with inadequate voltage

calculations for the 120 VAC bus. Inspectors informed the licensee of their observations and the licensee initiated Condition Report CR-2017-001296 to capture this issue in the station's corrective action program. The licensee also performed an operability determination that established a reasonable expectation of operability pending implementation of corrective actions.

Analyses. The licensee's failure to take timely and adequate corrective actions to correct a condition adverse to quality was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correct the low voltage susceptibility resulted in delayed restoration of a bus following the failure of the swing inverter to sync. Using Inspection Manual Chapter 0609, Attachment 04, "Initial Characterization of Findings," dated October 7, 2016, and Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding was of very low safety significance (Green) because the finding: (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality, (2) did not represent a loss of system and/or function, (3) did not represent an actual loss of function of at least a single train for longer than its allowed outage time, or two separate safety systems out-of-service for longer than their technical specification allowed outage time, and (4) does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant for greater than 24 hours in accordance with the licensee's maintenance rule program. The finding has a human performance cross-cutting aspect associated with resources, in that, the licensee failed to ensure that resources were adequate to support nuclear safety [H.1].

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, from June 2013 through January 26, 2017, for quality related components associated with the safety related electrical distribution system, to which 10 CFR Part 50, Appendix B applies, the licensee failed to assure that conditions adverse to quality were promptly identified and corrected. In response to this issue, the licensee also performed an operability determination which established a reasonable expectation of operability pending implementation of corrective actions. Since this violation was of very low safety significance (Green) and has been entered into the corrective action program as Condition Report CR-2017-001296, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000446/2017001-04, Failure to Promptly Correct a Condition Adverse to Quality)

40A5 Other Activities

.1 Temporary Instruction 2515/192, "Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems."

a. Inspection Scope

The objective of this performance based Temporary Instruction was to verify implementation of interim compensatory measures associated with an open phase condition design vulnerability in electric power systems for operating reactors. The inspector conducted an inspection to determine if Comanche Peak had implemented the following interim compensatory measures. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for open phase condition design vulnerability. The inspector verified the following:

- Comanche Peak identified and discussed with plant staff the lessons-learned from the open phase condition events at the US operating plants including the Byron Station open phase condition event and its consequences. This included conducting operator training for promptly diagnosing, recognizing consequences, and responding to an open phase condition event.
- Comanche Peak updated plant operating procedures to help operators promptly diagnose and respond to open phase condition events on off-site power sources credited for safe shutdown of the plant.
- Comanche Peak established and implemented periodic walk-down activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible open phase condition.
- Comanche Peak ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, the licensee assessed and managed plant risk in accordance with 10 CFR 50.65(a) (4) requirements.

b. Findings

No findings were identified.

40A6 Meetings, Including Exit

Exit Meeting Summary

On January 12, 2017, the inspector presented the final Temporary Instruction 2515/192 inspection results to Mr. T. Hope, Regulatory Affairs Manager, and other members of your staff. The licensee acknowledged the results presented. No proprietary information was identified.

On February 2, 2017, the inspectors presented the final inspection results for the triennial heat sink performance inspection to Mr. T. McCool, Site Vice President, and other members of the

licensee staff. The licensee acknowledged the issues presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On February 8, 2017, the inspectors presented the inspection results for the in-office inspection of corrective actions related to the cyber security program to Mr. T. Hope, Manager, Regulatory Affairs, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors destroyed the proprietary information reviewed during this inspection.

On March 22, 2017, the inspector conducted a telephonic exit meeting to present the results of the in-office inspection of changes to the licensee's emergency plan to Mr. J. Hull, Manager, Nuclear Emergency Planning. The licensee acknowledged the issues presented.

On March 27, 2017, the inspectors presented the inspection results to Mr. T. McCool, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

40A7 Licensee-Identified Violations

The following licensee-identified violations of NRC requirements were determined to be of very low safety significance and meet the NRC Enforcement Policy criteria for being dispositioned as Non-Cited Violations:

- Title 10 CFR 50.54(q)(2) requires, in part, that licensees shall follow and maintain the effectiveness of an emergency plan that meets the planning standards of 10 CFR 50.47(b). Title 10 CFR 50.47(b)(2) requires, in part, that timely augmentation of response capabilities be available. The licensee's emergency plan provides for the ability to augment response capabilities by use of a system to callout additional personnel to fill their emergency response organization (ERO) staffing requirements for declared emergencies. Contrary to the above, from January 5, 2017 until January 17, 2017, the licensee failed to ensure timely augmentation of response capabilities was available. Specifically, on January 5, 2017, the licensee's corporate security office removed 32 members of the ERO from the licensee's callout system, including eight personnel assigned to minimum staffing positions. The licensee identified the issue when, following an inadvertent actuation of the callout system on January 16, 2017, they discovered that multiple personnel were not called. The licensee restored all required personnel to the callout system on January 17, 2017. The violation is more than minor because it affected the ERO readiness attribute of the Emergency Preparedness cornerstone and impacted the cornerstone objective to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. Using Inspection Manual Chapter 0609, Attachment 04, "Initial Characterization of Findings," and Inspection Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process," the inspector determined that the violation is of very low safety significance (Green) because the finding represented a failure to comply with planning standard (b)(2), and, using table 5.2-1, was screened as a Green finding because the deficiency did not cause more than one required ERO functional area to not be filled. The violation was entered into the licensee's corrective action program as CR-2017-001524.

- Comanche Peak Unit 2, Operating License NPF-89, Condition 2.G, “Fire Protection,” requires, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report through Amendment 87, and as approved in the Safety Evaluation Report and its supplements through Supplement 27. The station’s approved fire protection program includes Fire Protection Report, Revision 29, Section 3.1 which requires, in part, that when fire detection equipment located inside of the containment building is inoperable then hourly monitoring of air temperature is performed as a compensatory measure. Contrary to the above, on November 22, 2016, licensee personnel identified that compensatory measures implemented for a failed detection system in the Unit 2 containment had not been implemented. The licensee had implemented a compensatory measure on December 3, 2015, to monitor containment temperature in the Unit 2 containment hourly due to a failed thermistor strip. On November 17, 2016, the licensee stopped monitoring temperature after restoring a different component to service. The licensee subsequently realized that the compensatory measure was still required and reinstated it on November 22, 2016. The violation is more than minor because it affected the protection against external events attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Attachment 04, “Initial Characterization of Findings,” and Inspection Manual Chapter 0609, Appendix F, “Fire Protection Significance Determination Process,” the inspector determined that the violation is of very low safety significance (Green) because the finding did not affect the ability of either unit to achieve safe shutdown. The violation was entered into the licensee’s corrective action program as Condition Report CR-2016-009888.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

K. Peters, Senior Vice President and Chief Nuclear Officer
T. McCool, Site Vice President
S. Sewell, Senior Director, Engineering and Regulatory Affairs
J. Dreyfuss, Plant Manager
D. Goodwin, Director, Work Management
B. St. Louis, Director, Operations
M. Stakes, Director, Maintenance
J. Taylor, Director, Site Engineering
D. Farnsworth, Director, Nuclear Oversight
H. Winn, Director, Performance Improvement
D. Christiansen, Director, Nuclear Training
T. Hope, Manager, Regulatory Affairs
J. Lloyd, Manager, Operations Support
C. Tran, Manager, Engineering Programs
J. Gumnick, Manager, Radiation Protection
J. Hull, Manager, Nuclear Emergency Preparedness
M. McNally, Manager, Nuclear Security
G. Merka, Consulting Nuclear Technologist, Regulatory Affairs
J. Barnette, Consulting Nuclear Technologist, Regulatory Affairs
J. Hicks, Consulting Nuclear Engineer, Regulatory Affairs
S. Porter, Engineer
G. Williams, Senior Nuclear Technologist
R. Green, Senior Programs Engineer
S. Clark, Engineer
B. Loose, Program Manager, Cyber Security
B. Martin, Project Lead, Cyber Security Project Lead
D. Woodard, Project Engineer, Cyber Security

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000445/2017001-01 05000446/2017001-01	NCV	Failure to Maintain B.5.b Equipment in a State of Readiness to Support Mitigation Strategies
05000445/2017001-02 05000446/2017001-02	NCV	Failure to Evaluate Heat Loads on Control Room Air Conditioning System
05000445/2017001-03 05000446/2017001-03	NCV	Use of Non-Design Fouling Factor for Component Cooling Water Heat Exchanger in Station Service Water Tornado Missile Calculation
05000445/2017001-04	NCV	Failure to Promptly Correct a Condition Adverse to Quality

Discussed

2515/192 TI Inspection of the Licensee’s Interim Compensatory Measures
Associated with the Open Phase Condition Design
Vulnerabilities in Electric Power Systems (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
ABN-907	Acts of Nature	15
ODA-308	LCO Tracking Program	15

Section 1R04: Equipment Alignment

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
SOP-802	Control Room Ventilation System	13

Condition Reports

CR-2016-010027 CR-2017-000744 CR-2016-010697 CR-2017-000164 CR-2016-009421

Section 1R05: Fire Protection

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
FPI-411	Auxiliary Building Train A Primary Plant Exhaust Filter Room Elevation 886’-6”	5
FPI-201B	Unit 2 Containment Building Elevation 808’-0”	2
FPI-102A	Unit 1 Safeguards Building Elevation 790’-0”	3

Condition Reports

CR-2016-009888

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
FPI-409	Auxiliary Building Chiller and Train B Primary Plant Exhaust Filter Room Elevation 886'-6"	5
NEC0203	Purchase Order Oil, Fuel, Diesel, ASTM D975 Grade No. 2D; Non-Safety	2
NEC00752017	Purchase Order Oil, Fuel, Diesel, ASTM D975 Grade No. 2D; Commercial Grade	12

Section 1R06: Flood Protection Measures

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2323-S-1102	Circulating Water Intake Structure Sects. & Dets-Sh. 1	6
2323-S-1103	Circulating Water Intake Structure Sects. & Dets-Sh. 2	5
2323-S-1106	Circulating Water Discharge Structure Sheet 1	3
2323-S-1115	Circulating Water Discharge Structure Sheet 2	3

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
DBD-CS-071	Probable Maximum Flood (PMF)	12

Section 1R07: Heat Sink Performance

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ABN-501	Station Service Water System Malfunction	9
ABN-907	Acts of Nature	15
CHM-140	Water Treatment	3
COP-501	Station Service Water	11
ECA-0.0A	Loss of All AC Power	9

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ENV-318	SSI Biological Monitoring and Management	6
OWI-103	Locked Component Listings and Deviation Control	16
PPT-SX-7517	Safe Shutdown Impoundment Inspection	2
STA-502A	Component Cooling Water System Operating Manual	19
STA-677	Preventive Maintenance Program	11
STA-730	Corrosion Monitoring Program	5
STA-734	Service Water System Fouling Monitoring Program	5
TDM-901A	Systems Data Throttled Valves/Flow Rates	13

Calculations

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1561600-F019	Service Water train B Fluid Transient Analysis for Pump Trip	2
15616-NP(B)-F04	Waterhammer Analysis of the Residual Heat Removal System due to RV 2-8708A/B Discharge	3
2-ME-0265	Component Cooling Water Heat Exchanger Tube Plugging Analysis	0
ME-CA-0000-3264	Safe Shutdown Impoundment Hydrothermal Analysis	3
ME-CA-0229-2188	Component Cooling Water Heat Exchanger Fouling Factor Analysis	8
ME-CA-0229-5129	CCW Parameters for Fouling Monitoring	0
ME-CA-0233-5017	SSI Heat Load Summary	5
RXE-LA-CPX/0-020	RHR Cooldown Calculations	12

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	CPNPP System Status - Service Water [CLS & SW]	3 rd Qtr FY16
	Service Water Visual Inspection Form	October 14, 2015
	Service Water Visual Inspection Form	May 9, 2016
	Service Water Visual Inspection Form	May 3, 2016
	Service Water Phosphates and MS Corrosion Rate	January 4, 2010 – April 4, 2016
	Dam Safety Inspection Report for the Nuclear Regulatory Commission (NRC)	April 11, 2013
	Volumetric and Sedimentation Survey of Squaw Creek Reservoir	August 2008
	Component (2SW003-P009) Evaluation Report	January 30, 2012
	Component (2SW962-P001) Evaluation Report	January 30, 2012
	Component (2SW960-P001) Evaluation Report	January 30, 2012
EV-CR-2014-004722-1	2014 SOER 07-2 Three-Year Review – WO 4600965	
EV-CR-2014-007235-4	Eval supporting single unit CCW supplying both SFP HXs	September 25, 2014
EV-CR-2015-004321-20	INPO 15-003, Section 4.1.14 Gap Analysis – SW Reliability Program	
TXX-90031	Comanche Peak Steam Electric Station (CPSES) Docket Nos. 50-445 and 50-446 NRC Generic Letter 89-13 Service Water Systems Affecting Safety-Related Equipment	January 26, 1990
TXX-90186	TU Electric letter TXX-90031 from Mr. W.J. Cahill, Jr. to USNRC dated January 26, 1990	May 21, 1990
TXX-90347	TU Electric letter TXX-90186 from W. J. Cahill, Jr. to USNRC dated May 21, 1990	September 21, 1990
TXX-91004	TU Electric letter TXX-90347 from W. J. Cahill, Jr. to USNRC dated September 21, 1990	January 7, 1991
	Fouling Factor Program for CCW HX 2-01	November 16, 2016

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Fouling Factor Program for CCW HX 2-01	September 12, 2016
DBD-CS-096	Safe Shutdown Impoundment/Dam	13
DBD-ME-229	Component Cooling Water System	40
DBD-ME-233	Station Service Water System	34
AH-RS-681	Residual Heat Exchanger	1
J12226ARS	York Document MN-2049	January 5, 1987

Final Design Authorizations

FDA-2015-000135-01-00 FDA-2016-000053-01-01 FDA-2014-000175-01-00

Condition Reports (Reviewed)

CR-2014-000192 CR-2014-000429 CR-2014-000443 CR-2014-001812 CR-2014-001968
CR-2014-002122 CR-2014-002272 CR-2014-002593 CR-2014-002911 CR-2014-004461
CR-2014-004749 CR-2014-005955 CR-2014-005903 CR-2014-006051 CR-2014-006201
CR-2014-006283 CR-2014-006399 CR-2014-007161 CR-2014-007431 CR-2014-007767
CR-2014-007829 CR-2014-008212 CR-2014-008449 CR-2014-009667 CR-2014-010608
CR-2014-013208 CR-2014-013245 CR-2014-013615 CR-2015-000046 CR-2015-000602
CR-2015-001525 CR-2015-001569 CR-2015-001676 CR-2015-002091 CR-2015-002835
CR-2015-004357 CR-2015-004461 CR-2015-005121 CR-2015-006902 CR-2015-006914
CR-2015-008334 CR-2015-009945 CR-2015-009957 CR-2015-010233 CR-2015-010384
CR-2015-011497 CR-2015-011663 CR-2015-012075 CR-2016-000164 CR-2016-001605
CR-2016-001864 CR-2016-002485 CR-2016-002880 CR-2016-003537 CR-2016-004366
CR-2016-004552 CR-2016-004688 CR-2016-004868 CR-2016-005650 CR-2016-006553
CR-2016-007639 CR-2016-007912 CR-2016-009417 CR-2016-009972 TR-2016-006602
TR-2016-009730 CR-2014-013613 CR-2015-001578 CR-2015-001933 CR-2015-004159
CR-2015-006765 CR-2015-008276 CR-2015-009824 CR-2015-009839 CR-2015-012118
CR-2016-000344 CR-2016-000418 CR-2016-001084 CR-2016-001219 CR-2016-003337
CR-2016-003808 CR-2016-003957 CR-2016-004024 CR-2016-004786 CR-2016-006524
CR-2016-006740 CR-2016-006845 CR-2016-006966 CR-2016-008147 TR-2015-002284

Condition Reports (Reviewed)

TR-2016-002235 TR-2016-000765 TR-2016-006227 TR-2016-008751 CR-2010-008411
CR-2012-012426 IR-2017-001398 IR-2017-001465 IR-2017-001552 IR-2017-001561
IR-2017-001569

Work Orders

4494256 3812384 3779730 4590645 4812980 4874033
5082658 4297555 4955479 5213587

Section 1R12: Maintenance Effectiveness

Condition Reports

CR-2016-008993

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	EVAL-2005-001345-001	

Work Orders

5059724

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision Date</u>
STA-629	Switchyard Control and Transmission Grid Interface	7

Condition Reports

TR-2017-001018 TR-2017-000901 CR-2013-000085

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
09-500-76001	Diesel Engine Control Panel Schematic	CP-11

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
DID XST1-01	Loss of Offsite Power and Station Blackout During XST1 Maintenance	0

Work Orders

5403331	5403401
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Section 1R15: Operability Determinations and Functionality Assessments

Calculations

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EE(B)-074	XST1 and XST2 Start-up Transformers Load Study	2

Condition Reports

CR-2017-000789 CR-2017-000597 CR-2017-003131

Section 1R18: Plant Modifications

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
ECE-5.01	Design Control Program	23
ECE-5.01-08	Electronic Design Change Process	19

Condition Reports

CR-2013-012287 CR-2014-005538

Final Design Authorizations

FDA-2012-000073-01-14	FDA-2012-000073-02-04	FDA-2012-000073-03-01
FDA-2012-000073-07-05	FDA-2012-000073-08-01	FDA-2012-000073-11-00

Section 1R19: Post-Maintenance Testing

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
SOP-609A	Diesel Generator System	21

Work Orders

5257546

Section 1R22: Surveillance Testing

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
OPT-206A	AFW System	30
OPT-207A	Service Water System	17
OPT-414B		
OPT-218B		

Work Orders

5377445

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	Comanche Peak Nuclear Power Plant Emergency Plan Unit 1 and Unit 2	41
CP-201500668, TXX-15101	Comanche Peak Nuclear Power Plant Docket Nos. 50-445 and 50-446, License Amendment Request 15-003 for Revision to Unit 1 and Unit 2 Emergency Action Levels	June 30, 2015

Section 1EP6: Drill Evaluation

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
	Exercise Report – Green Team – January 11, 2017	February 7, 2017

Section 4OA2: Problem Identification and Resolution

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
CSI-101	Cyber Security Defensive Strategy	0

Condition Reports

CR-2013-012287 CR-2014-005538 CR-2013-007383 CR-2013-010991 CR-2014-002240
CR-2014-002284 CR-2014-002286 CR-2014-002316 CR-2016-009192

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
	Cyber Security Directorate Analysis Of The Keyboard, Video, Mouse Switch Installation at Comanche Peak	November 18, 2016
FDA-2013-000142-2	Upgrade the Plant Computer System and Plant Information Isolation Hardware and Software to Support New Cyber Security Controls	March 10, 2015
NEI0809R6ITSECLAN 950SA0V-001	Schematic Architecture Overview for LAN950 and Interconnections	4