UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD
ARLINGTON, TX 76011-4511

November 7, 2017

EA-17-170

Adam C. Heflin, President and
Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION – NRC INTEGRATED INSPECTION REPORT 05000482/2017003 AND EXERCISE OF ENFORCEMENT DISCRETION

Dear Mr. Heflin:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Wolf Creek Generating Station. On October 23 and November 7, 2017, the NRC inspectors discussed the results of this inspection with Mr. J. McCoy, Vice President, Engineering, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. Three of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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; and the NRC resident inspector at the Wolf Creek Generating Station.

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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the Wolf Creek Generating Station.

Tornado-generated missile protection violations were identified for the following technical specifications: 3.7.1 Main Steam Safety Valves and 3.7.4 Atmospheric Relief Valves. Because the violations were identified during the discretion period covered by Enforcement Guidance Memorandum 15-002, Revision 1, “Enforcement Discretion for Tornado Missile Protection Non-compliance,” and because the licensee was implementing compensatory measures, the

NRC is exercising enforcement discretion by not issuing an enforcement action and is allowing continued reactor operation.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Nicholas H. Taylor, Branch Chief
Project Branch B
Division of Reactor Projects

Docket No. 50-482
License No. NPF-42

Enclosure:
Inspection Report 05000482/2017003
w/ Attachments:
1. Supplemental Information
2. Request for Information

WOLF CREEK GENERATING STATION – NRC INTEGRATED INSPECTION REPORT 05000482/2017003 AND EXERCISE OF ENFORCEMENT DISCRETION – DATED November 9, 2017

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000482
License:	NPF-42
Report:	05000482/2017003
Licensee:	Wolf Creek Nuclear Operating Corporation
Facility:	Wolf Creek Generating Station
Location:	1550 Oxen Lane NE Burlington, KS 66839
Dates:	July 1 through September 30, 2017
Inspectors:	D. Dodson, Senior Resident Inspector F. Thomas, Resident Inspector T. Farina, Senior Operations Engineer P. Jayroe, Reactor Engineer E. Ruesch, J.D., Senior Reactor Inspector
Approved By:	Nicholas H. Taylor Chief, Project Branch B Division of Reactor Projects

SUMMARY

IR 05000482/2017003; 07/01/2017 – 09/30/2017; Wolf Creek Generating Station; Maintenance Effectiveness, Operability Determinations and Functionality Assessments, and Follow-up of Events and Notices of Enforcement Discretion

The inspection activities described in this report were performed between July 1 and September 30, 2017, by the resident inspectors at Wolf Creek Generating Station and inspectors from the NRC's Region IV office. Three findings of very low safety significance (Green) are documented in this report. Three of these findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. 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," dated July 2016.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green non-cited violation of 10 CFR 50.65(b)(2)(ii), because the licensee did not adequately include nonsafety-related SSC functions within the scope of the maintenance rule monitoring program. Specifically, the licensee failed to adequately include within the scope of the maintenance rule monitoring program the function of draining. This scoping issue has resulted in a failure to monitor floor drain degradation and to provide reasonable assurance that safety-related SSCs in an estimated 76 rooms are capable of fulfilling their intended functions. Immediate corrective actions included entering the condition into the corrective action program as Condition Report 116319 and later as Condition Report 116851.

  The inspectors determined that the licensee's failure to meet the requirements of 10 CFR 50.65(b)(2)(ii) and appropriately place the function of draining, for nonsafety-related floor drains in up to 76 rooms containing safety-related SSCs, within the scope of the maintenance rule monitoring program was a performance deficiency. The performance deficiency was more than minor, because it is associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors evaluated the finding using Exhibit 2, "Mitigating Systems Screening Questions," of Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings At-Power," and determined the finding was of very low safety significance (Green). The inspectors determined that the finding did not have a cross-cutting aspect because the issue was not indicative of current performance. (Section 1R12)

- Green. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for the licensee's failure to establish adequate measures to ensure that the design bases are correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee did not ensure the auxiliary feedwater system design basis was adequately represented in the Technical Specification Bases; as a result, the Technical Specification Bases and other station procedures allowed

for one train of essential service water supply to the turbine-driven auxiliary feedwater pump to be removed from service without recognition that auxiliary feedwater operability was impacted. Immediate corrective actions included entering Condition Reports 113304 and 116852 into the corrective action program and incorporating a note on operations turnover documents to temporarily postpone applicable portions of the operations quarterly tasks. The licensee also completed a past operability review, and created actions to develop a license amendment request to add a specific Technical Specification condition and submit for NRC approval.

The failure to ensure the auxiliary feedwater system design basis was adequately represented in the Technical Specification Bases was a performance deficiency. This performance deficiency is more than minor, and therefore a finding, because it is associated with the design control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors evaluated the finding using Exhibit 2, “Mitigating Systems Screening Questions,” of Inspection Manual Chapter 0609, Appendix A, “Significance Determination Process (SDP) for Findings At-Power,” and determined this finding was of very low safety significance (Green). The inspectors determined that the finding has a problem identification and resolution cross-cutting aspect in the area of evaluation because the organization did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. This issue is indicative of current performance because the evaluation of Condition Report 111808 in May 2017 was a reasonable opportunity for the licensee to identify that the Technical Specification Bases was inadequate [P.2]. (Section 1R15)

- Green. The inspectors reviewed a Green, self-revealed non-cited violation of Technical Specification 5.4.1.a for the licensee’s failure to ensure that maintenance that can affect the performance of safety-related equipment was properly pre-planned and performed in accordance with written procedures, documented, instructions, or drawings appropriate to the circumstances. Specifically, the licensee failed to verify that the wiring in the transformer 7 primary differential protective relay was landed on the correct termination point, and as a result, the station experienced an unplanned loss of normal offsite power to bus NB01, the train A Class 1E electrical bus. The licensee took the immediate corrective actions of working with Westar to ensure the protective relay wiring termination issue for transformer 7 was identified and corrected, and that transformer 7 was returned to service. The licensee also updated procedure AP 21C-001 to include additional detail and steps that require work instructions for post maintenance testing of current transformer wiring to ensure independent verification of wiring terminations. The licensee entered the issue into the corrective action program as Condition Reports 109467 and 116849.

  The licensee’s failure to verify that the primary and secondary differential relay circuitry is capable of performing its intended design function following maintenance was a performance deficiency. The performance deficiency was more than minor because it affected the design control attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors evaluated the finding using Exhibit 3, "Mitigating Systems Screening Questions," of Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase I Initial Screening and Characterization of Finding," and Appendix G, "Shutdown Operations Significance Determination Process." The inspectors

determined the finding was of very low safety significance (Green). The inspectors determined that the finding has a human performance cross-cutting aspect in the area of resources because leaders did not ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. This issue is indicative of current performance because the issue occurred in the last three years [H.1].
(Section 4OA3)

PLANT STATUS

Wolf Creek Generating Station began the inspection period operating at full power. On July 26, 2017, operators reduced power to approximately 66 percent following the loss of the Wolf Creek-Benton offsite 345 kV line as a result of heavy offsite storms. The plant was restored to approximately full power on July 28, 2017, and the plant operated at or near full power for the rest of the period.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

On September 28, 2017, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to an excessive heat warning on July 21, 2017, and the licensee's planned implementation of these procedures. The inspectors evaluated 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)

Partial Walk-Down

a. Inspection Scope

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

- July 18, 2017, safety injection train B
- August 8, 2017, accumulator compressed air system
- August 22 and 24, 2017, temporary diesel fire pump
- August 29, 2017, auxiliary feedwater pump A
- September 6, 2017, component cooling water train A
- September 13, 2017, emergency diesel generator train A

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 and trains were correctly aligned for the existing plant configuration.

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

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

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:

- July 20, 2017, fire area A-24, pipe penetration room A, elevation 2,000 feet
- July 20, 2017, fire area A-25, pipe penetration room B, elevation 2,000 feet
- August 16, 2017, fire area A-1, general area (area 5), elevation 1,974 feet
- September 13, 2017, fire area C-9, engineered safety feature switchgear room (no. 1), elevation 2,000 feet

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.

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

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On September 21, 2017, the inspectors observed a portion of an evaluated simulator scenario performed by an operating crew. The inspectors assessed the performance of

the operators and the evaluators' critique of their performance. The inspectors also assessed the modeling and performance of the simulator during the requalification activities.

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

On August 17, 2017, the 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 and risk due to control rod parking activities.

In addition, the inspectors assessed the operators' adherence to plant procedures, including the 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.

.3 Annual Review of Requalification Examination Results

a. Inspection Scope

The inspector conducted an in-office review of the annual requalification training program to determine the results of this program.

On July 6, 2017, the licensee informed the inspector of the following Wolf Creek Nuclear Operating Corporation operating test results:

- 8 of 8 crews passed the simulator portion of the operating test
- 48 of 48 licensed operators passed the simulator portion of the operating test
- 48 of 48 licensed operators passed the job performance measure portion of the operating test

There were no remediations performed for the operating tests. One licensed reactor operator did not take the annual operating test due to current enrollment in an initial license training class.

The inspector completed one inspection sample of the annual licensed operator requalification program.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

Routine Maintenance Effectiveness

a. Inspection Scope

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

- September 25, 2016, safety injection pump A, failed pump performance test during Mode 6
- April 25, 2017, train A pipe penetration room clogged floor drains

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 two maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of 10 CFR 50.65(b)(2)(ii), because the licensee did not adequately include nonsafety-related SSC functions within the scope of the maintenance rule monitoring program. Specifically, the licensee failed to adequately include within the scope of the maintenance rule monitoring program the function of draining. This scoping issue has resulted in a failure to monitor floor drain degradation and to provide reasonable assurance that safety-related SSCs in an estimated 76 rooms are capable of fulfilling their intended functions.

Description. The inspectors documented NRC-identified non-cited violation 05000482/2017002-01, "Failure to Ensure Safety-Related Valves were Adequately Protected from Internal Flooding Hazards," in the 2017002 integrated inspection report (ADAMS Accession Number ML17223A285). This issue focused on the licensee's failure to establish adequate measures to ensure that floor drains in safety-related areas remained free of debris and safety-related components remained capable of performing their function. Specifically, on April 25, 2017, two of three floor drains were found clogged in the train A safety-related piping penetration room.

The inspectors noted that five functions were identified in the maintenance rule as associated with the “LF” or “Floor & Equipment Drains System.” Specifically, the following five functions were included: LF-01, “Provides containment isolation for one system piping penetrating containment barrier (Penetration number P-32); LF-02, “Provides indication or alarms of a potential flooding condition in the Containment, [residual heat removal] Pump Rooms, Control Building, Fuel Building and Auxiliary Building;” LF-03, “Provides isolation of discharge of [residual heat removal], Aux Building and Control Building sumps on [safety injection] signal to prevent pumping potentially radioactive water to other parts of the plant; LF-04, “Provide detection of Spent Fuel Pool Leakage;” and LF-05, “Provides detection of leakage into refueling pool and four containment cooler standpipes, instrument tunnel, non-radioactive pipe tunnel, hot machine shop, spent fuel pool, solidification area, two radwaste building areas, and auxiliary building sumps.” Of these five functions, LF-01, LF-02, and LF-03 were included within scope.

The inspectors questioned the licensee with respect to the scoping of the floor drains and reviewed a licensee position paper that concluded, “The floor drain system does not have a Maintenance Rule function of directing water out of safety-related (SR) areas. This is primarily due to the fact if the floor drains were to fail, as in clog, you have to have another event to introduce water into the area.”

In the case of the floor drains and the function of draining, the inspectors noted that the failure of nonsafety-related floor drains at Wolf Creek could prevent a number of safety-related functions from being fulfilled. Specifically, the inspectors noted the issue described in the 2017002 inspection report, as described. The inspectors also noted that flood calculations associated with an estimated 76 safety-related rooms, could be adversely impacted such that unanticipated flood heights in these rooms due to failure of floor drains to function to remove water could impact the safety functions of safety-related SSCs in the impacted rooms. The inspectors also noted language discussed in Section 3.6.1.1.h.2.m of the Updated Safety Analysis Report, which states, in part:

> A survey of all potential internal flooding sources was performed for all rooms with safety-related components…From this survey, calculations were performed to determine the worst case flood level in each of these rooms...Assumptions used in arriving at the worst case flooding event are as follows: …Rooms drain through the floor drain(s)….

Considering the assumptions of the internal flooding analysis, as described in the Updated Safety Analysis Report, the inspectors also reviewed relevant corrective action program documents like Condition Report 2008-005940 and Performance Improvement Request 2001-2783, which reviewed the maintenance rule scoping of drains and their effect on safety related indication. The licensee noted that the LF-02 function focuses on the safety-related level transmitters located in the building sumps and noted that the level transmitters can only provide indication of flooding if water is transferred to the sump. The request goes on to note, “Non-safety related floor drains are relied upon to transfer the water to each sump. Failure or plugging of the non-safety related floor drains could cause the safety related function to provide indication of flooding to fail. Therefore the non-safety related floor drains appear to meet the maintenance rule scoping criteria.”

The Performance Improvement Request 2001-2783 evaluation later concluded, in part, that the function of the floor drains are not relied upon for accident or transient mitigation per review of Updated Safety Analysis Sections 3 and 9, and the failure of the floor drains will not prevent a safety-related SSC from fulfilling its safety-related function. The 2001-2783 Performance Improvement Request evaluation's conclusions were then incorporated into the maintenance rule scoping basis and were similarly affirmed by the conclusions of Condition Report 2008-005940.

Considering all of the above information the inspectors determined that the draining function of the floor drain system should have been included within the scope of the maintenance rule monitoring program. Immediate corrective actions included entering the condition into the corrective action program as Condition Reports 116319 and 116851.

Analysis. The inspectors determined that the licensee's failure to meet the requirements of 10 CFR 50.65(b)(2)(ii) and appropriately place the function of draining, for nonsafety-related floor drains in up to 76 rooms containing safety-related SSCs, within the scope of the maintenance rule monitoring program was a performance deficiency that was within the licensee's ability to foresee and correct and should have been prevented. The inspectors determined that the failure to scope the function of draining in the maintenance rule was more than minor, because it is associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to detect floor drain degradation associated with rooms containing safety-related equipment and to provide reasonable assurance that safety-related SSCs in an estimated 76 rooms are capable of fulfilling their intended functions. The inspectors evaluated the finding using Exhibit 2, "Mitigating Systems Screening Questions," of Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and determined this finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather initiating event (e.g., seismic snubbers, flooding barriers, tornado doors). Therefore, the inspectors determined the finding was of very low safety significance (Green).

The inspectors determined that the finding did not have a cross-cutting aspect because the issue was not indicative of current performance.

Enforcement. Title 10 CFR 50.65(b)(2)(ii) requires, in part, that the scope of the monitoring program specified in paragraph (a)(1) shall include nonsafety related SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function. Contrary to the above, until October 3, 2017, the scope of the monitoring program specified in paragraph (a)(1) did not include nonsafety related SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function. Specifically, the draining function of nonsafety related floor drains was not included within the licensee's monitoring program and the failure to drain could have prevented safety-related SSCs in an estimated 76 rooms from fulfilling their safety-related functions. Immediate corrective actions included entering the condition into the corrective action program as Condition Reports 116319 and 116851. This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC

Enforcement Policy: NCV 05000482/2017003-01, "Programmatic Failure to Scope Floor Drain Function within the Maintenance Rule Monitoring Program."

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

a. Inspection Scope

The inspectors reviewed seven 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:

- July 11, 2017, train B centrifugal charging pump planned maintenance
- July 18, 2017, train A safety injection pump and train A containment spray pump planned maintenance
- August 1, 2017, train B essential service water pump planned maintenance
- August 8, 2017, train B motor driven auxiliary feedwater pump planned maintenance
- August 22 and 23, 2017, diesel fire pump planned maintenance
- August 31, 2017, planned lightning mast installation in the switchyard and turbine driven auxiliary feedwater pump planned maintenance
- September 12, 2017, extended train B emergency diesel generator planned maintenance

The inspectors verified that these risk assessments 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 July 24, 2017, the inspectors observed emergent work activities to troubleshoot circuit breaker 13-48 annunciator ground fault indications 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 eight 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)

Operability Determinations

a. Inspection Scope

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

- June 26, 2017, past operability determination of turbine driven auxiliary feedwater with one train of essential service water supply out of service
- August 23, 2017, functionality assessment of diesel fire pump driveshaft out of tolerance
- August 31 and September 7, 2017, operability determinations of atmospheric relief valve (ARV) and main steam safety valve (MSSV) susceptibility to tornado generated missiles
- September 11, 2017, operability determination of train B emergency diesel generator tornado damper sticking
- September 12, 2017, operability determination of train B emergency diesel generator stator surface anomalies

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

.1 Failure to Ensure the Design Basis was Adequately Represented in the Technical Specification Bases

Introduction. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for the licensee's failure to establish adequate measures to ensure that the design bases are correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee did not ensure the auxiliary feedwater system design basis was adequately represented in the Technical Specification Bases; as a result, the Technical Specification Bases and other station procedures allowed for one train of essential service water supply to the turbine-driven auxiliary feedwater pump to be removed from service without entry into applicable Technical Specification action statements.

Description. The inspectors documented NRC-identified non-cited violation 05000482/2017002-02, “Failure to Declare Train A Component Cooling Water Inoperable,” in the 2017002 integrated inspection report (ADAMS Accession Number ML17223A285), for the licensee’s failure to declare the emergency make-up to train A component cooling water valve inoperable when it was out of service, which resulted in train A component cooling water out of service for longer than its Technical Specification allowed outage time. The licensee entered the issue into the corrective action program as Condition Report 111808 and completed a basic cause evaluation.

The inspectors reviewed the basic cause evaluation—completed on May 23, 2017—for Condition Report 111808 and noted that the extent of condition considered the auxiliary feedwater system as one of two systems with makeup capability from essential service water. The evaluation concluded that the extent of condition was bound to the seven events where Technical Specification 3.7.7 was not entered associated with component cooling water operability as previously described. The inspectors also noted that the cause evaluation described the Technical Specification 3.7.5 Bases, which states:

> The inoperability of a single supply line or a single suction isolation valve from an [essential service water] train to the turbine driven [auxiliary feedwater] train pump causes a loss of redundancy in [essential service water] supply to the pump but does not render the turbine driven [auxiliary feedwater] train inoperable…the turbine driven [auxiliary feedwater] train is OPERABLE based on the remaining OPERABLE [essential service water] supply line.

The inspectors noted that although the cause evaluation discussed the Technical Specification 3.7.5 Bases, the evaluation did not evaluate the adequacy of the bases or evaluate design basis information such as the Updated Safety Analysis Report.

The inspectors reviewed applicable sections of the Updated Safety Analysis Report and noted Table 15.0-7, “Single Failures Assumed in Accident Analyses,” which notes that the worst failure assumed for a feedwater system pipe break is one protection train. Section 15.2.8.2, “Analysis of Effects and Consequences,” of the accident analyses within Section 15.2.8, “Feedwater System Pipe Break,” states that the total auxiliary feedwater flow delivered to the three intact steam generators is assumed to be 563 gallons per minute, which bounds either a single failure of the turbine-driven auxiliary feedwater pump or one motor-driven auxiliary feedwater pump. Credit is also taken for the discharge flow control device installed on the auxiliary feedwater header common to both the motor driven and turbine driven auxiliary feedwater pumps. Due to this discharge flow control device, the intact steam generator receiving auxiliary feedwater from both the motor driven and turbine driven auxiliary feedwater pumps is assumed to receive no more than 250 gallons per minute. The remaining two intact steam generators, which receive auxiliary feedwater from only the turbine driven auxiliary feedwater pump, are assumed to receive approximately 157 gallons per minute each.

The inspectors noted that when an essential service water supply valve to the turbine-driven auxiliary feedwater pump is removed from service for planned maintenance, the assumptions of the accident analyses would not be met. Specifically, when the train A essential service water supply to the turbine-driven auxiliary feedwater pump is out of service for planned maintenance, a single failure of a protection train (like the train B essential service water pump, emergency diesel, or bus) could make the turbine driven

auxiliary feedwater and the train B motor-driven auxiliary feedwater pumps inoperable simultaneously. Hence, only the train A motor-driven auxiliary feedwater pump would be providing flow and would not be capable of delivering the assumed 563 gallons per minute to the three intact steam generators as assumed.

The inspectors considered Procedures SYS OQT-001A, “Operations A Train Quarterly Tasks,” and SYS OQT-001B, “Operations B Train Quarterly Tasks,” which are performed quarterly. These quarterly evolutions close the normally locked open essential service water supply manual isolation valve, but Technical Specification action statements have not been entered appropriately.

The inspectors brought up their concerns to the licensee and the licensee documented Condition Report 113304, completed a past operability review, and created actions to develop a license amendment request to add a specific Technical Specification condition and submit for NRC approval. Although the licensee did not always recognize that turbine-driven auxiliary feedwater was inoperable with one essential service water supply line isolated, no instances were identified where the essential service water supplies to the turbine-driven auxiliary feedwater pump were individually isolated for more than their Technical Specification allowed outage time—be in Mode 3 within 78 hours. The licensee's immediate corrective actions included entering Condition Report 113304 into the corrective action program and incorporating a note on operations turnover documents to temporarily postpone applicable portions of the operations quarterly tasks.

Analysis. The failure to ensure the auxiliary feedwater system design basis was adequately represented in the Technical Specification Bases was a performance deficiency. This performance deficiency is more than minor, and therefore a finding, because it is associated with the design control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, if left uncorrected, the finding could become a more significant safety concern because the Technical Specification Bases explicitly allowed the isolation of an essential service water supply to the turbine-driven auxiliary feedwater pump without entry into the appropriate Technical Specification action statement and the isolation valve could have been left in the closed position for longer than its Technical Specification allowed outage time (be in Mode 3 within 78 hours). The inspectors evaluated the finding using Exhibit 2, “Mitigating Systems Screening Questions,” of Inspection Manual Chapter 0609, Appendix A, “Significance Determination Process (SDP) for Findings At-Power,” issued June 19, 2012, and determined this finding is not a deficiency affecting the design or qualification of a mitigating SSC that maintained its operability or functionality; the finding does not represent a loss of system and/or function; the finding does not represent an actual loss of function of at least a single train for greater than its technical specification-allowed outage time; and the finding 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. Therefore, the inspectors determined the finding was of very low safety significance (Green).

The inspectors determined that the finding has a problem identification and resolution cross-cutting aspect in the area of evaluation because the organization did not thoroughly evaluate issues to ensure that resolutions address causes and extent of

conditions commensurate with their safety significance. Specifically, during evaluation of Condition Report 111808, the issues were not thoroughly investigated according to their safety significance, and the auxiliary feedwater system design basis was not adequately explored. This issue is indicative of current performance because the evaluation of Condition Report 111808 in May 2017 was a reasonable opportunity for the licensee to identify that the Technical Specification Bases was inadequate [P.2].

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, Design Control, requires, in part, that measures shall be established to assure that the design basis, is correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, until May 25, 2017, measures were not established to assure that the design basis, is correctly translated into specifications, drawings, procedures, and instructions. Specifically, the auxiliary feedwater design basis, as outlined in the Updated Safety Analysis Report, was not correctly translated into Section 3.7.5 of the Technical Specification Bases, and the Technical Specification Bases explicitly and incorrectly stated that inoperability of a single suction isolation valve from essential service water to the turbine-driven auxiliary feedwater train does not render the turbine-driven auxiliary feedwater train inoperable. Immediate corrective actions included entering Condition Reports 113304 and 116852 into the corrective action program and incorporating a note on operations turnover documents to temporarily postpone applicable portions of the operations quarterly tasks. This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000482/2017003-02, "Failure to Ensure the Design Basis was Adequately Represented in the Technical Specification Bases."

.2 Enforcement Action EA-17-170, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliances

Description. Title 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," Criterion 2, "Design Bases for Protection Against Natural Phenomena," states, in part, that SSCs important to safety shall be designed to withstand the effects of natural phenomena, such as tornadoes. Criterion 4, "Environmental and Dynamic Effects Design Basis," states, in part, that SSCs important to safety shall be appropriately protected against dynamic effects including missiles that may result from events and conditions outside the nuclear power unit. Section 3.5.3.1, "Tornado Missile Barrier Design Procedures," of the Updated Safety Analysis Report describes the parameters of tornado-resistant structures including wall thickness and concrete strength. Table 3.3-1, "Tornado-Resistant Buildings and Enclosures," of the Updated Safety Analysis Report lists the structures that are designed to withstand tornado missile impact.

On February 7, 2017, the NRC issued Enforcement Guidance Memorandum (EGM) 15-002, "Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance," Revision 1 (ADAMS Accession Number ML16355A286). The EGM referenced a bounding generic risk analysis performed by the NRC staff that concluded that tornado missile vulnerabilities pose a low risk significance to operating nuclear plants. Because of this, the EGM described the conditions under which the NRC staff may exercise enforcement discretion for noncompliance with the current licensing basis for tornado-generated missile protection. Specifically, if the licensee could not meet the technical specification required actions within the required completion time, the EGM allows the staff to exercise enforcement discretion provided the licensee implements

initial compensatory measures prior to the expiration of the time allowed by the limiting condition for operation. The compensatory actions should provide additional protection such that the likelihood of tornado missile effects are lessened. The EGM then requires the licensee to implement more comprehensive compensatory measures within approximately 60 days of issue discovery. The compensatory measures must remain in place until permanent repairs are completed, or until the NRC dispositions the non-compliance in accordance with a method acceptable to the NRC such that discretion is no longer needed. Because EGM 15-002 listed Wolf Creek as a Group A plant, enforcement discretion will expire on June 10, 2018.

Section 10.3, "Main Steam Supply System," of the Updated Safety Analysis Report describes the safety function of the Atmospheric Relief Valves (ARVs) and the main steam safety valves (MSSVs). Specifically, MSSVs provide overpressure protection in accordance with the ASME Section III code requirement for the secondary side of the steam generators and the main steam piping. The ARVs provide for controlled removal of reactor decay heat during normal reactor cooldown when the main steam isolation valves are closed or the turbine bypass system is not available. Safety design basis one of this section further states, "The safety-related portion of the [main steam supply system] is protected from the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles (GDC-2)."

On September 7, 2017, the licensee identified that there was no retrievable analysis proving that a single tornado driven design basis missile is not capable of affecting more than two ARVs. This vulnerability was identified as part of the licensee's review of operating experience from Callaway Plant regarding potential nonconforming condition regarding tornado generated missile effects on MSSVs and ARVs. This issue was entered into the corrective action program as Condition Report 115590.

As a result of this issue, the licensee declared all ARVs and MSSVs inoperable, complied with the applicable technical specification action statements, initiated Condition Report 115590, invoked the EGM discretion guidance, implemented initial compensatory measures, and returned the SSCs to an operable-degraded/non-conforming status. The licensee instituted compensatory measures intended to reduce the likelihood of tornado missile effects. These included verifying that guidance was in place for severe weather procedures, abnormal and emergency operating procedures, and FLEX support guidelines, verifying that training on these procedures was current, and verifying that a heightened level of awareness of the vulnerability was established.

Enforcement. Technical Specification 3.7.1 requires, in part, that five MSSVs per steam generator shall be operable in Modes 1, 2, and 3. Technical Specification 3.7.1.C requires that, for one or more steam generators with greater than 4 MSSVs inoperable, be in Mode 3 within 6 hours and be in Mode 4 within 12 hours. Contrary to the above, prior to September 7, 2017, one or more steam generators with greater than 4 MSSVs were not operable, and action was not initiated to be in Mode 3 within 6 hours and be in Mode 4 within 12 hours. Specifically, the discharge piping to atmosphere for MSSVs was not designed to withstand the effects of natural phenomena, such as tornadoes. The licensee initiated a Condition Report, invoked the enforcement discretion guidance, implemented initial compensatory measures, and returned the SSCs to an operable-degraded/non-conforming status. The inspectors verified through inspection sampling that the EGM 15-002 criteria were met and that the issue was documented in Condition Report 115590. Therefore, EGM 15-002 enforcement discretion was applied to the

required shutdown actions associated with this technical specification.

Technical Specification 3.7.4 requires, in part, that four ARV lines shall be operable in Modes 1, 2, and 3. Technical Specification 3.7.4.C requires that, for three or more required ARV lines inoperable for reasons other than excessive leakage, restore all but two required ARV lines to operable status within 24 hours or be in Mode 3 within 6 hours and be in Mode 4 within 12 hours. Contrary to the above, prior to September 7, 2017, four ARV lines were not operable, and action was not initiated to restore all but two required ARV lines to operable status within 24 hours or be in Mode 3 within 6 hours and be in Mode 4 within 12 hours. Specifically, the discharge piping to atmosphere for ARVs was not designed to withstand the effects of natural phenomena, such as tornadoes. The licensee initiated a Condition Report, invoked the enforcement discretion guidance, implemented initial compensatory measures, and returned the SSCs to an operable-degraded/non-conforming status. The inspectors verified through inspection sampling that the EGM 15-002 criteria were met and that the issue was documented in Condition Report 115590. Therefore, EGM 15-002 enforcement discretion was applied to the required shutdown actions associated with this technical specification.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

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

- July 18, 2017, train A safety injection pump planned maintenance
- July 19, 2017, train A containment spray pump planned maintenance
- August 1, 2017, train B essential service water pump planned maintenance
- August 8, 2017, auxiliary feedwater isolation valves to steam generators A and D (ALHV0007 and ALV0035) planned maintenance
- August 23, 2017, diesel fire pump planned maintenance
- August 28, 2017, turbine driven auxiliary feedwater discharge control valve (ALHV0006) planned maintenance
- September 14, 2017, train B emergency diesel generator planned maintenance
- September 21, 2017, train A 125 volt direct current battery charger planned maintenance

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 eight 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 three risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the SSCs were capable of performing their safety functions:

Other surveillance tests:

- August 21, 2017, STS IC-803A, "4 KV Undervoltage – Grid Degraded Voltage Channel Calibration NB01 Bus"
- August 23, 2017, STS KJ-013A, "Hot Restart of EDG NE01"
- September 5, 2017, STS EM-100B, "Safety Injection Pump 'B' Inservice Pump 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 tests satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

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

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed emergency preparedness drills on July 18, 2017, and September 19, 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 simulator, technical support center, and emergency offsite facility, 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 critique 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

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index: Emergency AC Power Systems (MS06)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of September 1, 2016, through June 30, 2017, to verify the accuracy and completeness of the reported data. 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 reported data.

These activities constituted verification of the mitigating system performance index for emergency AC power systems, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index: High Pressure Injection Systems (MS07)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of September 1, 2016, through June 30, 2017, to verify the accuracy and completeness of the reported data. 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 reported data.

These activities constituted verification of the mitigating system performance index for high pressure injection systems, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index: Cooling Water Support Systems (MS10)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of September 1, 2016, through June 30, 2017, to verify the accuracy and completeness of the reported data. 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 reported data.

These activities constituted verification of the mitigating system performance index for cooling water support systems, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

4OA2 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 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected one issue for an in-depth follow-up:

- On June 30, 2016, a team of NRC inspectors completed a biennial problem identification and resolution inspection in which they identified that individuals in some groups within the security department may not feel free to raise concerns, or may fear retaliation if they were to raise concerns. The 2016 team also noted

that a survey administered in late 2015 had provided earlier indications of this lack of a strong safety-conscious work environment (SCWE), but actions taken in response to that survey had yet to be effective.

The inspectors reviewed the licensee's actions in response to the June 30, 2016, observations, assessing the licensee's problem identification threshold, cause analyses, extent of condition reviews, and compensatory actions. The inspectors reviewed the licensee's prioritization of corrective actions and evaluated whether planned or in-progress actions appeared adequate to correct the condition. To evaluate the effectiveness of the corrective actions already implemented, the inspectors interviewed four individuals from security access screening and security support, ten individuals from maintenance support, and several managers and supervisors.

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

b. Discussion

The inspectors noted that some SCWE challenges identified during the 2016 problem identification and resolution inspection were ongoing, but that in-progress management actions appeared adequate to correct these work environment challenges. These in-progress improvements appeared to largely be the result of a reorganization of the security department. Actions taken through the corrective action program to directly address the SCWE challenges identified by the 2016 team—which were subsequently confirmed by the results of a nuclear safety culture assessment—were to brief the nuclear safety culture monitoring panel on the results of the assessment. In most cases, these briefings were completed and the actions were closed with no follow-on actions to correct the issue. The team determined that this alone would likely have been inadequate to make progress in addressing the SCWE challenges in the security department.

Although the currently in-progress actions did not appear to be driven by the CAP, the inspectors concluded that these actions were likely to be successful. However, a two-year delay from the indications of work environment challenges provided by the 2015 survey to successful implementation of corrective actions indicated a challenge to prioritization of corrective actions within the corrective action program.

The inspectors also identified significant work environment challenges in the maintenance support group that could potentially affect the safety-related aspects of their work and could be considered as a precursor to a chilled environment. During focus group discussions, nearly all of the participants expressed disappointment with the amount of resources allocated to their group including a lack of training, tools, experience, and staffing. Much of the discussion involved a dissatisfaction with the handling of several industrial safety issues and subsequent loss of confidence in the corrective action program when these issues were not addressed after attempts were made to resolve them by initiating condition reports. Furthermore, several personnel interviewed by the inspectors stated that individuals had stopped bringing up issues because they were concerned that they would be "blacklisted" or suffer other adverse consequences if they continued to raise concerns, or if they were to escalate them to a higher organizational level. Several individuals indicated a willingness to raise important

concerns, including nuclear safety concerns, despite this fear of retaliation. Additionally, interviewees stated a willingness to alert the control room to any problems identified inside the power block. However, the team determined that an unwillingness to raise other concerns indicated significant challenges to the SCWE in the maintenance support group. While much of the work performed by maintenance support occurs "outside the fence" and may not have an obvious impact on nuclear safety or the power block, certain tasks performed by members of this team, such as erecting scaffolding or assisting with maintenance can potentially impact safety related equipment. Individuals working at nuclear power plants should feel comfortable raising safety concerns and escalating issues of concern regardless of perceived impact to nuclear safety because individuals may not realize that their concern impacts nuclear safety. The licensee initiated condition report 116792 to track the resolution of these issues.

c. Findings

No findings were identified.

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153)

(Closed) Licensee Event Report (LER) 05000482/2016-002-00, Loss of Switchyard Bus Results in Emergency Diesel Generator Actuation

a. Inspection Scope

On November 16, 2016, a fault occurred that isolated the east switchyard bus from the train A safety-related 4160 volt alternating current bus NB01, while the Wolf Creek Nuclear Generating Station was in Mode 5 with the reactor coolant system filled and a bubble in the pressurizer. During refueling outage 21, a modification to transformer 7 allowed the offsite power through transformer 7 to bus NB01 to be fed from either the east or west switchyard busses through two different breakers (345-80 or 345-90). After the loss of the east switchyard bus, the second breaker unexpectedly tripped, which resulted in a loss of offsite power to bus NB01. An undervoltage condition was detected on bus NB01, which caused the train A emergency diesel generator to start and power bus NB01 as designed. All other systems functioned as expected.

The licensee documented condition report 109467, completed a cause evaluation, and updated the Wolf Creek substation procedure to include steps that require work instructions for post maintenance testing of current transformer wiring configuration to ensure independent verification of wiring terminations. The inspectors reviewed this issue and determined that this issue constituted a self-revealed more-than-minor non-cited violation.

This LER is closed.

b. Findings

Failure to Verify Equipment or Systems are Capable of Performing Their Intended Design Function Following Maintenance

Introduction. The inspectors reviewed a Green, self-revealed non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to ensure that maintenance that

can affect the performance of safety-related equipment was properly pre-planned and performed in accordance with written procedures, documented, instructions, or drawings appropriate to the circumstances. Specifically, the licensee failed to verify that the wiring in the transformer 7 primary differential protective relay was landed on the correct termination point, and as a result, the station experienced an unplanned loss of normal offsite power to bus NB01, the train A Class 1E electrical bus.

Description. On November 16, 2016, at approximately 9:09 p.m., a fault occurred that isolated the east switchyard bus from the train A safety-related 4160 volt alternating current bus NB01, while the Wolf Creek Nuclear Generating Station was in Mode 5 with the reactor coolant system filled and a bubble in the pressurizer. During refueling outage 21, a modification to transformer 7 allowed the offsite power through transformer 7 to bus NB01 to be fed from either the east or west switchyard busses through two different breakers (345-80 or 345-90). After the loss of the east switchyard bus, the second breaker unexpectedly tripped, which resulted in a loss of offsite power to NB01. An undervoltage condition was detected on bus NB01, which caused the train A emergency diesel generator to start and power bus NB01 as designed. All other systems functioned as expected.

Westar, the substation owner, determined that the initial fault was caused by a mouse on the 13-4 circuit at Wolf Creek. The 13-4 relay and breaker cleared the fault and coordinated with all upstream devices. Approximately 5.5 seconds after the initial fault, a second fault occurred in transformer 6.

The transformer 7 digital differential relay scheme provides a standard configuration with “primary” and “secondary” protective relays, each with the capability of isolating transformer 7. Troubleshooting activities focused on the reason why the primary relay tripped and the secondary relay did not trip. Westar technicians identified a jumper on the transformer 7 primary differential relay current transformer circuit that had been improperly landed. The jumper was designed to run from the neutral circuit of one current transformer to the neutral circuit of the other. However, Westar Energy technicians had incorrectly landed the jumper from the neutral of the first current transformer onto the C phase of the other. This allowed current from the transformer 6 fault event to be detected in the transformer 7 primary differential relay circuit.

The inspectors reviewed the cause evaluation completed by the licensee, which determined that the direct cause of this event was the wiring in the transformer 7 primary differential protective relay was landed on the incorrect termination point. This cause is supported by the fact that this incorrect termination allowed additional current to be introduced onto the C phase relay circuit, which initiated the trip circuit actuation.

The inspectors also reviewed corrective actions associated with the root cause evaluation for the unplanned plant shutdown, loss of offsite power, and Notification of Unusual Event declaration that occurred on January 13, 2012. An Augmented Inspection Team was chartered to review the circumstances surrounding the loss of offsite power event and Notification of Unusual Event declaration—an issue of Yellow safety significance was identified. The event from January 13, 2012, involved equipment owned by Wolf Creek (startup transformer XMR01), with work being performed by Wolf Creek contractors. The November 16, 2016, event involved equipment owned by Westar (transformer 7). While inspectors acknowledge that the two events from January 13, 2012, and November 16, 2016, are not exactly the same, the inspectors noted that

they are similar in that they both involved the modification of current transformer wiring associated with transformers that provide power to train A and B engineered safety function transformers (XNB01 and XNB02, respectively), which supply train A and B Class 1E electrical busses NB01 and NB02, respectively. The inspectors did not determine that the 2012 event actions were causal to the 2016 event; however, the inspectors noted similarities between the identified causes.

Procedure AP 21C-001, “Wolf Creek Substation,” establishes responsibilities and defines necessary interfaces and communications for the operational control, coordination and maintenance necessary to ensure Wolf Creek Substation protection, safety and reliability. The inspectors reviewed the licensee’s assessment associated with the 2016 event and concluded that the substation work control process requirements in procedure AP 21C-001 were not adequately met. Specifically, step 6.2.5.1 states, in part, that following preventive or corrective maintenance work, appropriate post-maintenance inspections, checks, and/or testing shall be performed to verify that affected equipment or systems (primary and secondary differential relay circuitry) are capable of performing their intended design function.

The wiring error on the primary differential protective relay was corrected and its functionality was verified. The secondary differential protective relay wiring was also verified to be correct. The east switchyard bus, transformer 7, and its differential relays were all restored to service. The licensee documented the event in LER 2016-002-00 and Condition Reports 109467 and 116849. The licensee also updated procedure AP 21C-001 to include additional detail and steps that require work instructions for post maintenance testing of current transformer wiring to ensure independent verification of wiring terminations.

Analysis. The licensee’s failure to verify that the primary and secondary differential relay circuitry is capable of performing its intended design function following maintenance was a performance deficiency. The performance deficiency was more than minor because it affected the design control attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to verify that the wiring terminations for the primary differential protective relay for transformer 7 were installed correctly, leading to the isolation of transformer 7, resulting in an unplanned loss of offsite power to NB01, the train A Class 1E electrical bus. The inspectors evaluated the finding using Exhibit 3, "Mitigating Systems Screening Questions," of Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase I Initial Screening and Characterization of Finding," and Appendix G, "Shutdown Operations Significance Determination Process," both issued May 9, 2014. The inspectors determined this finding is a deficiency affecting the design or qualification of a mitigating SSC, and the SSC maintained its operability or functionality. Therefore, the inspectors determined the finding was of very low safety significance (Green).

The inspectors determined that the finding has a human performance cross-cutting aspect in the area of resources because leaders did not ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. Specifically, leaders did not ensure adequate procedures were available to support successful work performance including necessary standards for verifying wiring circuitry terminations such that the loss of power to the NB01 Class 1E electrical

bus would not have occurred. This issue is indicative of current performance because the issue occurred in the last three years [H.1].

Enforcement. Technical Specification 5.4.1.a requires, in part, that procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Section 9.a of Appendix A to Regulatory Guide 1.33, Revision 2, requires, in part, that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented, instructions, or drawings appropriate to the circumstances. The licensee established Procedure AP 21C-001, "Wolf Creek Substation," to meet te Regulatory Guide 1.33 requirement. Section 6.2.5.1 of Procedure AP 21C-001 requires, in part, that following preventive or corrective maintenance work, appropriate post-maintenance inspections, checks, and/or testing shall be performed to verify that affected equipment or systems are capable of performing their intended design function. Contrary to the above, until November 17, 2016, following preventive or corrective maintenance work, appropriate post-maintenance inspections, checks, and/or testing was not performed to verify that affected equipment or systems are capable of performing their intended design function. Specifically, following maintenance work associated with the primary and secondary differential relay circuitry, post-maintenance inspections, checks, and/or testing were not adequately performed to verifying that the normal power to the NB01 Class 1E electrical bus was capable of performing its intended design function. As a result, the licensee experienced an unplanned loss of normal offsite power to bus NB01, the train A Class 1E electrical bus. The licensee took the immediate corrective actions of working with Westar to ensure the protective relay wiring termination issue for transformer 7 was identified and corrected, and that transformer 7 was returned to service. The licensee entered the issue into the corrective action program as Condition Reports 109467 and 116849. This violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy: NCV 05000482/2017003-03, "Failure to Verify Equipment or Systems are Capable of Performing Their Intended Design Function Following Maintenance."

These activities constituted completion of one event follow-up sample, as defined in Inspection Procedure 71153.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 6, 2017, a regional inspector briefed Mr. A. Servaes, Regulatory Exam Author, of the results of the licensed operator requalification program inspection. The licensee representative acknowledged the results presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On August 30, 2017, regional inspectors presented the results of the problem identification and resolution inspection to Mr. C. Reasoner, 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.

On October 23, 2017, the resident inspectors presented the inspection results to Mr. J. McCoy, Vice President, Engineering, 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.

On November 7, 2017, the resident inspectors presented the inspection results to Mr. D. Hall, Manager, Stategic Projects, 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.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

R. Adams, Supervisor, Radiation Protection
J. Ashley, Supervisor, System Engineering
R. Audano, Superintendent, Maintenance
R. Ayers, Supervisor, Radiation Protection
T. Baban, Manager, Engineering Programs
D. Bowers, Manager, Maintenance
W. Brandt, Shift Manager
K. Clark, Technician, Fire Protection
M. Corbin, Superintendent, Security Operations
J. Cuffe, Supervisor, Radiation Protection
T. East, Superintendent, Emergency Planning
J. Edwards, Manager, Operations
R. Fincher, Manager, Quality
R. French, Supervisor, Radiation Protection
J. Fritton, Oversight
G. Fugate, Director, Plant Support
L. Fure, Master Technician, Radiation Protection
A. Gilliam, Technician, Radiation Protection
C. Gross, Manager, Chemistry
C. Hafenstine, Manager, Regulatory Affairs
D. Hall, Manager, Strategic Projects
A. Heflin, President and Chief Executive Officer
P. Herrman, Manager, Design Engineering
R. Hobby, Licensing Engineer
J. Isch, Superintendent, Operations Work Controls
K. Jay, Manager, Radiation Protection
R. Jung, Instructor, Fire Protection
J. Knust, Licensing Engineer
R. Lane, Manager, Integrated Plant Scheduling
B. Lee, Superintendent, Technical Training
D. Mand, Director, Engineering
J. McCoy, Vice President, Engineering
W. Muilenburg, Supervisor, Licensing
E. Peterson, Employee Concerns Program Coordinator
C. Reasoner, Site Vice President
J. Schepers, Supervisor, Radiation Protection
A. Servaes, Licensed Instructor
M. Skiles, Manager, Security
T. Slenker, Supervisor, Operations Support
S. Smith, Plant Manager
L. Stone, Licensing Engineer
A. Stull, Vice President and Chief Administrative Officer
J. Suter, Supervisor, Fire Protection
M. Tate, Superintendent, Security Operations
J. Yunk, Manager, Training

NRC Personnel

D. Proulx, Senior Project Engineer

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000482/2017003-01	NCV	Programmatic Failure to Scope Floor Drain Function within the Maintenance Rule Monitoring Program (Section 1R12)
05000482/2017003-02	NCV	Failure to Ensure the Design Basis was Adequately Represented in the Technical Specification Bases (Section 1R15)
05000482/2017003-03	NCV	Failure to Verify Equipment or Systems are Capable of Performing Their Intended Design Function Following Maintenance (Section 4OA3)

Closed

05000482/2016-002-00	LER	Loss of Switchyard Bus Results in Emergency Diesel Generator Actuation (4OA3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

Number	Title	Revision
AI 14-006	Severe weather	17
SYS OPS-009	Hot Weather Operations	1

Condition Reports

115105

Miscellaneous

Number	Title	Date
SYS OPS-009	Hot Weather Operations	Completed October 6, 2017

Section 1R04: Equipment Alignment

Procedures

Number	Title	Revision
AP 21D-006	Safety Function Determination Program	7A
CKL AL-120	Auxiliary Feedwater Normal Lineup	42
CKL EG-120	Component Cooling Water System Valve, Switch and Breaker Lineup	49
CKL EM-120	Safety Injection System Lineup Checklists	31
CKL FP-504	Fire Protection Circ Water Screenhouse Valve Lineup	36
CKL KA-120	Compressed Air Valve, Breaker and Switch Lineup	36A
CKL KA-121	Instrument Air Valve Lineup	16
CKL KJ-121	Diesel Generator NE01 and NE02 Valve Checklist	39

Drawings

Number	Title	Revision
6998D62	Colt Industries Type “WNR” Volt Reg. & Excitation System	
M-0023, Sheet 1	Piping & Instrumentation Diagram Fire Protection System	65
M-0023, Sheet 2	Piping & Instrumentation Diagram Fire Protection System	28
M-0023, Sheet 4	Piping & Instrumentation Diagram Fire Protection System	16
M-12AL01	Piping & Instrumentation Diagram Auxiliary Feedwater System	28
M-12AP01	Piping & Instrumentation Diagram Condensate Storage and Transfer System	19
M-12EG01	Piping & Instrumentation Diagram Component Cooling Water System	24
M-12EM01	Piping & Instrumentation Diagram High Pressure Coolant Injection System	44
M-12EM02	Piping & Instrumentation Diagram High Pressure Coolant Injection System	22
M-12EM03	Piping & Instrumentation Diagram High Pressure Coolant Injection System Test Line	3
M-12KA01	Piping & Instrumentation Diagram Compressed Air System	32
M-12KA02	Piping & Instrumentation Diagram Compressed Air System (Service Air)	27
M-12KA03	Piping & Instrumentation Diagram Instrument Air System	14

Drawings

Number	Title	Revision
M-12KA04	Piping & Instrumentation Diagram Instrument Air System	21
M-12KA05	Piping & Instrumentation Diagram Compressed Air System	7
M-12KA06	Piping & Instrumentation Diagram Compressed Air System	8
M-12KA07	Piping & Instrumentation Diagram Compressed Air System	1
M-12KJ01	Piping & Instrumentation Diagram Standby Diesel Generator “A” Cooling Water System	13
M-12KJ02	Piping & Instrumentation Diagram Standby Diesel Generator “A” In take Exhaust. F.O. & Start. Air System	22
M-12KJ03	Piping & Instrumentation Diagram Standby Diesel Generator “A” Lube Oil System	17

Section 1R05: Fire Protection

Procedures

Number	Title	Revision
AP 10-106	Fire Preplans	18
AP 10-106	Fire Preplans	18A

Drawings

Number	Title	Revision
E-1F9905	Fire Hazard Analysis	8
E-1F9910	Post-Fire Safe Shutdown Area Analysis	14

Condition Reports

115103	115117	115124	115198

Miscellaneous

Number	Title	Revision
XX-X-004	Combustible Fire Loading For Each Room In The Various Fire Areas at WCNOC	4

Section 1R11: Licensed Operator Requalification Program

Procedures

Number	Title	Revision
AP 21-001	Conduct of Operations	80
EMG E-0	Reactor Trip or Safety Injection	39
EMG E-1	Loss of Reactor or Secondary Coolant	27A
EMG FR-C2	Response to Degraded Core Cooling	16
STS SF-001	Control Rod Parking	20

Miscellaneous

Number	Title	Revision/Date
	2017 Annual Operating Test Results	July 6, 2017
LR4640001	Simulator Evaluation	1

Section 1R12: Maintenance Effectiveness

Procedures

Number	Title	Revision
AP 12-001	Housekeeping Control	13A
CKL EM-120	Safety Injection System Lineup Checklists	31
STS CV-210A	ECCS [Emergency Core Cooling System] SI [Safety Injection] Comprehensive Pump and Inservice Check Valve Test	24
STS EM-003B	ECCS (SI Pump) Flow Balance	12
STS EM-100A	Safety Injection Pump “A” Inservice Pump Test	40
STS EM-100B	Safety Injection Pump “B” Inservice Pump Test	34
STS EM-201A	Safety Injection System Train A Inservice Valve Test	8
STS EM-201B	Safety Injection System Train B Inservice Valve Test	7A

Drawings

Number	Title	Revision
E-11NB01	Lower Medium Voltage Sys. [System] Class 1E 4.16 KV Single Line Meter and Relay Diagram	9
E-11NB02	Lower Medium Voltage Sys. [System] Class 1E 4.16 KV Single Line Meter and Relay Diagram	10

Drawings

Number	Title	Revision
M-10EM	High Pressure Coolant Injection System	3
M-12BG03	Piping and Instrumentation Diagram Chemical & Volume Control System	48
M-12EJ01	Piping and Instrumentation Diagram Residual Heat Removal System	53
M-12EM01	Piping and Instrumentation Diagram High Pressure Coolant Injection System	44
M-12EM02	Piping & Instrumentation Diagram High Pressure Coolant Injection System	22
M-12EM03	Piping & Instrumentation Diagram High Pressure Coolant Injection System Test Line	3

Condition Reports

77718	85417	90879	100653	100654
100655	101874	102546	102882	103008
103306	103307	103447	103450	103764
104839	104840	106165	106894	107487
107549	107709	107793	109041	109960
110572	110630	110733	110835	110955
110956	111051	111052	111210	111919
112097	112436	112503	112588	112590
112594	114054	114288	114944	115279
115300	115301	115303	115341	115442
115977	116319			

Work Orders

15-397860-000	15-409614-000	15-409614-001	16-411165-000	16-411166-000
16-411166-001	16-411403-000	16-411403-001	16-411403-002	16-414753-000
16-414753-001	16-414800-000	16-414803-000	16-414837-000	16-414850-000
16-414860-000	16-417982-000	16-417982-001	17-429068-000	

Miscellaneous

Number	Title	Revision/Date
77718	Functional Failure Determination Checklist	January 25, 2014
85417	Functional Failure Determination Checklist	July 23, 2014
107487	Functional Failure Determination Checklist	October 16, 2016
112588	Functional Failure Determination Checklist	May 17, 2017
112594	Functional Failure Determination Checklist	May 17, 2017
2008-5940	Condition Report	
EM	System Health Report	January 1 to March 31, 2016
EM	System Health Report	April 1 to June 30, 2016
EM	System Health Report	July 1 to December 31, 2016
EM	System Health Report	January 1 to June 30, 2017
EM-01	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-02	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-03	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-04	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-05	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-06	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-07	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-08	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
EM-09	Maintenance Rule Final Scope Evaluation	Printed September 22, 2017
FL-11	Flooding of Auxiliary Building Containment Penetration Areas	1
FL-11-001-CN001	Flooding of Auxiliary Building Containment Penetration Areas	1

Miscellaneous

Number	Title	Revision/Date
LF-01	Maintenance Rule Final Scope Evaluation	Printed September 14, 2017
LF-02	Maintenance Rule Final Scope Evaluation	Printed July 3, 2017
LF-03	Maintenance Rule Final Scope Evaluation	Printed September 14, 2017
LF-04	Maintenance Rule Final Scope Evaluation	Printed September 14, 2017
LF-05	Maintenance Rule Final Scope Evaluation	Printed September 14, 2017
PIR 2001-2783		
White Paper	Maintenance Rule Scoping of Floor Drains Functions	July 19, 2017

Section 1R13: Maintenance Risk Assessment and Emergent Work Controls

Procedures

Number	Title	Revision
AI 21-016	Operator Time Critical Actions Validation	13
AI 22C-013	Protected Equipment Program	20
AI 26A-006	Mitigating System Performance Index	7
ALR 00-029F	Ann [Annunciator] Ground Fault	8
AP 10-100	Fire Protection Program	20A
AP 10-103	Fire Protection Impairment Control	32
AP 22C-003	On-Line Nuclear Safety and Generation Risk Assessment	22
AP 22C-007	Risk Management and Contingency Planning	11
AP 22C-008	Qualitative Risk Management	4
AP 22C-008	Qualitative Risk Management	4A
CKL FP-100	Temporary Fire Pump Daily Checklist	0
OFN AF-025	Unit Limitations	51
STN EF-201	ESW System Valve Test	5
SYS BG-202	Operation of the CVCS Cation Bed Demin	32
SYS SY-120	Sharpe Diesel Operation and Alignment to Site	13

Drawings

Number	Title	Revision
KD-7496	One Line Diagram	62
KD-7756	Wolf Creek Substation 345kV Electrical Plan, Elev. And Sections	28B
M-12EF02	Piping & Instrumentation Diagram Essential Service Water System	42

Condition Reports

111205	114893	114933	115204

Work Orders

15-409967-000	15-409968-000	17-429833-000

Miscellaneous

Number	Title	Date
	Annunciator (RK) Ground Fault E&A Matrix	
2017-217	Breach Authorization Permit	August 8, 2017
2017-218	Breach Authorization Permit	August 8, 2017
APF 02-003-01-01	Chemistry/Operations Action Form	Completed July 31, 2017
APF 15C-002-01	Procedure Cover Sheet – Operation of the CVCS Cation Bed Demin	Completed July 31, 2017
APF 21-001-02	Control Room Turnover Checklist – On-Coming CRS/WC SRO/RO/BOP Review	July 25, 2017
APF 21-001-02	Control Room Turnover Checklist – On-Coming CRS/WC SRO/RO/BOP Review	July 26, 2017
APF 21-001-02	Control Room Turnover Checklist – On-Coming CRS/WC SRO/RO/BOP Review	July 28, 2017
APF 21-001-02	Control Room Turnover Checklist – On-Coming CRS/WC SRO/RO/BOP Review	August 8, 2017
APF 21-001-02	Control Room Turnover Checklist – On-Coming CRS/WC SRO/RO/BOP Review	September 12, 2017
APF 21C-001-01	Wolf Creek Substation Work Authorization – 2017-040, 13-48 Cable Test	July 23, 2017
APF 22C-003-01	On-Line Nuclear Safety and Generation risk Assessment: 2017-303	June 20, 2017

Miscellaneous

Number	Title	Date
APF 22C-003-01	On-Line Nuclear Safety and Generation Risk Assessment: 2017-0304	July 11, 2017
APF 22C-003-01	On-Line Nuclear Safety and Generation Risk Assessment: 2017-0305	June 14, 2017
APF 22C-003-01	On-Line Nuclear Safety and Generation Risk Assessment: 2017-0306	June 13, 2017
APF 22C-003-01	On-Line Nuclear Safety and Generation Risk Assessment: 2017-0307	July 18, 2017
APF 22C-003-01	On-Line Nuclear Safety and Generation risk Assessment: 2017-0310	July 17, 2017
APF 22C-003-01	On-Line Nuclear Safety and Generation Risk Assessment: 2017-0312	September 7, 2017
Clearance Order D-EF-N-001	EFHV0040	August 7, 2017

Section 1R15: Operability Evaluations

Procedures

Number	Title	Revision
AI 14-006	Severe Weather	17
AP 22C-002	Work Controls	24
AP 26C-004	Operability Determination and Functionality Assessment	33
AP 26C-004	Operability Determination and Functionality Assessment	34
AP 26C-004	Operability Determination and Functionality Assessment	34A
AP 28-001	Operability Evaluations	24
MPE NE-004	Alternator Inspection	14
OFN SG-003	Natural Events	32
STS IC-260	Channel Operational Test Auxiliary Feedwater Pump Suction Pressure Low Transfer to ESW	16
STS KJ-015B	Manual/Auto Fast Start, Sync & Loading of EDG [Emergency Diesel Generator] NE02	44
SYS KJ-124	Post Maintenance Run of Emergency Diesel Generator B	69

Drawings

Number	Title	Revision
M-12AB01	Piping & Instrumentation Diagram Main Steam System	16
M-12AB02	Piping & Instrumentation Diagram Main Steam System	15
M-12AL01	Piping & Instrumentation Diagram Auxiliary Feedwater System	28
M-13AB02	Piping Isometric Main Steam System reactor Bldg. & Aux. Bldg. – Area 5	0

Condition Reports

97161	105771	111808	113304	113883
114947	115248	115266	115284	115323
115439	115475	115590	115642	115667
115590				

Work Orders

16-420222-000	16-420222-001	16-420589-000	16-420589-001	17-431765-003

Miscellaneous

Number	Title	Revision/Date
APF 05C-004-01	Basic Engineering Disposition – Review of Regulatory and License Basis Documents to Evaluate the Requirements of Operability Determination when Safety Related or Technical Specification Equipment is Exposed to a Hazard	July 20, 2017
APF 26C-004-02	Guidance for Implementation of Compensatory Actions to Support Notice of Enforcement Discretion (NOED)	0
APF 28-001-01	Operability Evaluation	12
Essential Reading 17-0034	OE NE-17-002 NE002 B-EDG Stator	September 14, 2017
Essential Reading 17-0035	OE GM-17-001 “B” EDG Tornado Damper Sticking	September 14, 2017
Licensee Event Report 2017-001-00	Condition Prohibited by Technical Specifications Due to One Train of Component Cooling Water Inoperable	May 17, 2014
OE GM-17-001	GMD0006 Diesel Generator Room 1B Outside Air Supply Tornado	0

Section 1R19: Post-Maintenance Testing

Procedures

Number	Title	Revision
AI 16-003	Temporary Grounding	6
MPE E051Q-01	Semi-Annual Cleaning and Testing of Internal Components in Battery Chargers	19
MPE ML-001	Motor Sampling and Lubrication PM Activity on Various Equipment	14
MPE NE-004	Alternator Inspection	14
MPM LT-001	Limitorque Operator Minor Maintenance, Lubrication, and Inspection	15
STN AL-201	Auxiliary Feedwater System Valve Test	7
STN FP-209	Fire Pump Performance and Sequential Start Test	29
STN FP-211	Diesel Fire Pump 1FP01PB Monthly Operation and Fuel Level Check	39
STN FP-411	Fire Pump (Diesel) Battery Inspection	8B
STN TCA-001	Manual Time Critical Action Timing	5
STS AB-201D	Atmospheric Relief Valve Inservice Valve Test	28
STS AL-201C	Turbine Driven Auxiliary Feedwater System Inservice Valve Test	9A
STS EF-100B	ESW System Inservice Pump B & ESW B Check Valve Test	48B
STS EM-100A	Safety Injection Pump “A” Inservice Pump Test	40
STS EN-100A	Containment Spray Pump A Inservice Pump Test	27
STS KJ-015B	Manual/Auto Fast Start, Sync & Loading of EDG [Emergency Diesel Generator] NE02	44
STS MT-020	125 Volt DC Battery Charger Operational Test	26
SYS KJ-124	Post Maintenance Run of Emergency Diesel Generator B	69
SYS FP-293	Fire Pump Operations	27
SYS NK-131	Energizing NK Buses	22

Drawings

Number	Title	Revision
E-051-0085-01	Wiring Diagram	1
E-11NG01	Low Voltage System Class 1E 480v Single Line Meter & Relay Diagram	13

Drawings

Number	Title	Revision
M-12AB01	Piping & Instrumentation Diagram Main Steam System	16
M-12AL01	Piping & Instrumentation Diagram Auxiliary Feedwater System	28
M-12EF01	Piping & Instrumentation Diagram Essential SVC [Service] Water System	29
M-12EF01	Piping & Instrumentation Diagram Essential Service Water Sys. [System]	66
M-12EF02	Piping & Instrumentation Diagram Essential Service Water System	40
M-12EM01	Piping & Instrumentation Diagram High Pressure Coolant Injection System	44
M-12EN01	Piping and Instrumentation Diagram Containment Spray System	13
M-12KA04	Piping & Instrumentation Diagram Instrument Air System	21
M-12KA05	Piping & Instrumentation Diagram Compressed Air System	7
M-12KJ04	Piping & Instrumentation Diagram Standby Diesel Generator “B” Cooling Water System	18
M-12KJ05	Piping & Instrumentation Diagram Standby Diesel Generator “B” Intake Exhaust, F.O. & Start Air Sys. [System]	17
M-12KJ06	Piping & Instrumentation Diagram Standby Diesel Generator “B” Lube Oil System	21

Condition Reports

20559	114769	114893	115248	115317
115318	115667	116019		

Work Orders

16-417812-001	16-417812-005	16-418300-000	16-420222-000	16-420222-001
16-420378-000	16-420589-000	16-420589-001	16-420808-000	16-420815-000
16-420815-001	17-421067-000	17-421411-000	17-421414-000	17-424987-002
17-431765-003				

Miscellaneous

Number	Title	Revision/Date
APF 05-013-01	E-11028 Relay Setting Tabulation Systems NK & NN	10
APF 22C-003-01	On-Line Nuclear Safety and Generation risk Assessment	July 17, 2017
APF 29B-003-01	Surveillance Test Routing Sheet – Containment Spray Pump A Inservice Pump Test	Completed July 20, 2017
APF 29B-003-01	Surveillance Test Routing Sheet – ESW System Inservice Pump B & ESW B Check Valve	Completed August 1, 2017
APF 29B-003-01	Surveillance Test Routing Sheet – Safety Injection Pump "A" Inservice Pump Test	Completed July 18, 2017
APF 29B-003-01	Turbine Driven Auxiliary Feedwater System Inservice	Completed August 31, 2017
CALA501-001	Calibration of Various Test Gauges	19
STN AL-201	Auxiliary Feedwater System Valve Test	Completed August 8, 2017

Section 1R22: Surveillance Testing

Procedures

Number	Title	Revision
AP 21-001	Conduct of Operations	79
OFN NB-042	Loss of Offsite Power to NB01 (NB02) With EDG Paralleled	12
STS EM-100B	Safety Injection Pump "B" Inservice Pump Test	34
STS IC-803A	4KV Undervoltage – Grid Degraded Voltage Channel Calibration NB01 Bus	6
STS KJ-013A	Hot Restart of EDG NE01	21
SYS EG-201	Transferring Supply of CCW Service Loop and CCW Train Shutdown	56A

Drawings

Number	Title	Revision
M-12KJ02	Piping & Instrumentation Diagram Standby Diesel Generator "A" Intake Exhaust. F.O. & Start. Air Sys.	22

Condition Reports

115206 115248 115271

Work Orders

17-424731-000

Miscellaneous

Number	Title	Revision/Date
STS EM-100B	Safety Injection Pump “B” Inservice Pump Test	Completed March 15, 2017
STS EM-100B	Safety Injection Pump “B” Inservice Pump Test	Completed June 13, 2017
STS EM-100B	Safety Injection Pump “B” Inservice Pump Test	Completed September 5, 2017
STS KJ-002A	Air Start System “A” Starting Air Tank Check Valve Test	16
STS KJ-013A	Hot Restart of Emergency D/G NE01	Completed August 23, 2017

Section 1EP6: Drill Evaluation

Procedures

Number	Title	Revision
CPIP 29	Coffey County Contingency Plan for Incidents Involving Commercial Nuclear Power: Coffey County Emergency Management Office Contingency Plan Implementing Procedure No. 29	13
EPP 06-009	Drill and Exercise Requirements	11

Miscellaneous

Number	Title	Revision/Date
17-PRE-01	Wolf Creek Generating Station Emergency Planning Drill – 17-PRE-01	September 19, 2017
17-SA-02	Wolf Creek Generating Station Emergency Planning Drill – 17-SA-02	July 18, 2017
APF 06-002-01	Emergency Action Levels	17A
EPF 06-007-01	Wolf Creek Generating Station Emergency Notification	13

Section 4OA1: Performance Indicator Verification

Procedures

Number	Title	Revision
AI 21-016	Operator Time Critical Actions Validation	13
AI 26A-006	Mitigating System Performance Index	7

Drawings

Number	Title	Revision
M-10EM	High Pressure Coolant Injection System	3
M-12EM01	Piping & Instrumentation Diagram High Pressure Coolant Injection System	44
M-12EM02	Piping & Instrumentation Diagram High Pressure Coolant Injection System	22

Miscellaneous

Number	Title	Revision/Date
	MSPI Unreliability Data – Cooling Water	August 2016 through August 2017
	MSPI Unreliability Data – Emergency AC Power System	August 2016 through August 2017
	MSPI Unreliability Data – High Pressure Safety Injection	August 2016 through August 2017
106163	Functional Failure Determination Checklist	August 31, 2016
106211	Functional Failure Determination Checklist	October 22, 2016
106883	Functional Failure Determination Checklist	October 22, 2016
107205	Functional Failure Determination Checklist	October 22, 2016
107207	Functional Failure Determination Checklist	October 9, 2016
107459	Functional Failure Determination Checklist	October 12, 2016

Miscellaneous

Number	Title	Revision/Date
108258	Functional Failure Determination Checklist	October 29, 2016
108343	Functional Failure Determination Checklist	November 16, 2016
108423	Functional Failure Determination Checklist	November 1, 2016
108783	Functional Failure Determination Checklist	November 1, 2016
109131	Functional Failure Determination Checklist	November 22, 2016
111311	Functional Failure Determination Checklist	March 8, 2017
112131	Functional Failure Determination Checklist	April 26, 2017
115725	Functional Failure Determination Checklist	October 2, 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Cooling Water System – Unavailability Index	August 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Cooling Water System – Unreliability Index	August 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Emergency AC Power System – Unavailability Index	August 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Emergency AC Power System – Unreliability Index	August 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI High Pressure Injection System – Unavailability Index	August 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI High Pressure Injection System – Unreliability Index	August 2017
EM	System Health Report	January 1, 2017, through June 30, 2017
NEI 99-02	Regulatory Assessment Performance Indicator Guideline	7
Train A	MSPI Unavailability for Chemical & Volume Control System BG-07	Printed September 12, 2017
Train A	MSPI Unavailability for Component Cooling Water System EG-01 A	Printed September 12, 2017

Miscellaneous

Number	Title	Revision/Date
Train A	MSPI Unavailability for Essential Service Water EF-01 A	Printed September 12, 2017
Train A	MSPI Unavailability for High Pressure Coolant Injection System EM-01	Printed September 12, 2017
Train B	MSPI Unavailability for Chemical & Volume Control System BG-07	Printed September 12, 2017
Train B	MSPI Unavailability for Component Cooling Water System EG-01 B	Printed September 12, 2017
Train B	MSPI Unavailability for Essential Service Water EF-01 B	Printed September 12, 2017
Train B	MSPI Unavailability for High Pressure Coolant Injection System EM-01	Printed September 12, 2017
WCNOC-163	Mitigating System Performance Index (MSPI) Basis Document	11
WCNOC-163	Mitigating System Performance Index (MSPI) Basis Document	12

Section 4OA3: Event Follow-Up

Procedures

Number	Title	Revision
AP 21C-001	Wolf Creek Substation	18
AP 21C-001	Wolf Creek Substation	20A
AP 22B-001	Outage Risk Management	18A

Drawings

Number	Title	Revision
KD-7496	One Line Diagram	63
SK7458	Wolf Creek Substation One-Line Diagram (Sheet 1 of 4)	6
SK7458	Wolf Creek Substation One-Line Diagram (Sheet 2 of 4)	6
SK7458	Wolf Creek Substation One-Line Diagram (Sheet 3 of 4)	6

Drawings

Number	Title	Revision
SK7458	Wolf Creek Substation One-Line Diagram (Sheet 4 of 4)	6
SK7458_AC05	Wolf Creek 345KV Substation No. [Number] 7 Transformer Diff. [Differential] Currents Diagram	0
SK7458_AC05	Wolf Creek 345KV Substation No. [Number] 7 Transformer Diff. [Differential] Currents Diagram	1
8025-E-1021	69-13.8KV Construction Power Distribution One Line	87

Condition Reports

108547	109467	109803	115013	115324

Work Orders

16-419750-001

Miscellaneous

Number	Title	Date
	Wolf Creek TX6 and TX7 Incidents – Root Cause Analysis Report	November 2016
2016-027	Wolf Creek Substation Work Authorization – Transformer 6 Repair	November 22, 2016
2016-029	Wolf Creek Substation Work Authorization – Transformer 6 Restoration	December 2, 2016
Essential Reading 17-0033	WCGS [Wolf Creek Generating Station] Standing Order 32	September 7, 2017
RF21-412	Wolf Creek Substation Work Authorization – Relocate Transformer 7 Connection	October 8, 2016
RF21-413	Wolf Creek Substation Work Authorization – TX7 and East Bus Control Changes	October 7, 2016
RF21-414	Wolf Creek Substation Work Authorization – TX7 and East Bus PMT	October 16, 2016
RF21-414A	Wolf Creek Substation Work Authorization – TX7 and East Bus Energization	

Initial Request for Information
Integrated Inspection
Wolf Creek Nuclear Generating Station

Inspection Report: 05000482/2017003

Inspection Dates: July 1 – September 30, 2017

Inspection Procedure: Integrated Inspection Procedures

Lead Inspector: Douglas Dodson, Senior Resident Inspector

I. Information Requested Prior to June 22, 2017

The following information should be provided in electronic format (Certrec IMS preferred), to the attention of Douglas Dodson by June 22, 2017, to facilitate the reduction in the items to be selected for a final list during inspection preparation. The inspection team will finalize its sample selections and will provide an additional information request with specific items. This information shall be made available by June 22, 2017. The specific items selected from the lists shall be available and ready for review on the day indicated in this request. *Please provide requested documentation electronically in "pdf" files, Excel, or other searchable formats, if possible. The information should contain descriptive names, and be indexed and hyperlinked to facilitate ease of use. Information in "lists" should contain enough information to be easily understood by someone who has knowledge of pressurized water reactor technology. If requested documents are large and/or only hard copy formats are available, please inform the inspector(s), and provide subject documentation.

1. Any pre-existing evaluation or list of high pressure coolant injection system components and associated calculations with low design margins.

2. A list of high risk high pressure coolant injection system maintenance rule systems/components and functions; based on engineering or expert panel judgment.

3. A list of high pressure coolant injection system related operating experience evaluations for the last 3 years.

4. A list of all high pressure coolant injection system time-critical operator actions in procedures.

5. A list of permanent and temporary modifications related to high pressure coolant injection system sorted by component.

6. A list of current high pressure coolant injection system related "operator work arounds/burdens."

7. A list of the high pressure coolant injection system design calculations, which provide the design margin information for components.

8. List of high pressure coolant injection system root cause evaluations associated with component failures or design issues initiated/completed in the last 5 years.

9. A list of any high pressure coolant injection system common-cause failures of components in the last 3 years.

10. An electronic copy of the high pressure coolant injection system Design Bases Documents and any open, pending, or recently completed changes. Although not an exhaustive list, please include any open, pending, or recently completed (last 3 years) changes to temporary modifications, permanent modifications, engineering change packages, and/or procedure change packages. Specifically, please include any open, pending, or recently completed changes to emergency operating, abnormal operating, normal operating, alarm response, system alignment, surveillance, or other procedure.

11. An electronic copy of the high pressure coolant injection system System Health notebook.

12. A copy of high pressure coolant injection system related audits completed in the last 2 years.

13. A list of high pressure coolant injection system motor operated valves (MOVs) in the program, design margin and risk ranking.

14. A list of high pressure coolant injection system air operated valves (AOVs) in the valve program, design margin and risk ranking.

15. High pressure coolant injection system structure, system, and components' maintenance rule category, scoping, unavailability data, unreliability data, functional failure evaluations, (a)(1) determinations, (a)(1) goals, and any supporting basis documentation.

16. A list of high pressure coolant injection system licensee contacts for the inspection team with pager or phone numbers.

17. An excel spreadsheet of high pressure coolant injection system related PRA human action basic events or risk ranking of operator actions from your site specific PSA sorted by RAW and FV. Provide copies of your human reliability worksheets for these items.

18. In so far as there are recent or pending changes, please provide an Excel spreadsheet of high pressure coolant injection system related equipment basic events (with definitions) including importance measures sorted by risk achievement worth (RAW) and Fussell- Vesely (FV) from your internal events probabilistic risk assessment (PRA). Include basic events with RAW value of 1.3 or greater.

19. In so far as there are recent or pending changes, please provide a list of the top 50 cut-sets from your PRA.

20. In so far as there are recent or pending changes, please provide copies of PRA "system notebooks," and the latest PRA summary document.

21. In so far as there are recent or pending changes, and if you have an external events or fire PSA model, provide the information requested in items 17-19 for external events and fire, as it relates to the high pressure coolant injection system.

22. In so far as there are recent or pending changes, please provide a copy of the Wolf Creek Nuclear Generating Station IPEEE changes, if available electronically.