



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

February 12, 2018

EA-16-018

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 05000482/2017004

Dear Mr. Heflin:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Wolf Creek Generating Station. On January 10, 2018, the NRC inspectors discussed the results of this inspection with Mr. C. Reasoner, Site Vice President, 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. All of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

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

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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.

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 10 CFR 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 05000482/2017004  
w/ Attachments:  
1. Supplemental Information  
2. Request for Information

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000482

License: NPF-42

Report: 05000482/2017004

Licensee: Wolf Creek Nuclear Operating Corporation

Facility: Wolf Creek Generating Station

Location: 1550 Oxen Lane NE  
Burlington, KS 66839

Dates: October 1 through December 31, 2017

Inspectors: D. Dodson, Senior Resident Inspector  
F. Thomas, Resident Inspector  
D. Proulx, Senior Project Engineer  
P. Elkmann, Senior Emergency Preparedness Inspector  
J. Drake, Senior Reactor Inspector  
R. Kopriva, Senior Reactor Inspector  
S. Hedger, Emergency Preparedness Inspector

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

Enclosure

## SUMMARY

IR 05000482/2017004; 10/01/2017 – 12/31/2017; Wolf Creek Generating Station; Operability Determinations and Functionality Assessments, Exercise Evaluation, and Problem Identification and Resolution

The inspection activities described in this report were performed between October 1 and December 31, 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. All 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: Initiating Events

- Green. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to implement the operability and functionality assessment procedure. Specifically, as of October 12, 2016, the licensee identified boric acid coating on several control rod drive mechanisms, but failed to initiate a condition report to evaluate the effect of the condition on control rod drive mechanism operability. Immediate corrective actions included initiating Condition Report 115120 and documenting a detailed operability assessment to demonstrate operability of the control rod drive mechanisms.

The performance deficiency is more than minor, and therefore a finding, because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, continued failure to write condition reports and evaluate boric acid contamination could have a worse outcome under different circumstances. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings At-Power," and the transient initiator screening questions of Exhibit 1, "Initiating Events Screening Questions," and determined that this finding did not cause a reactor trip and loss of mitigation equipment; therefore, this finding screened to very low safety significance (Green). The inspectors determined that the finding has a safety conscious work environment cross-cutting aspect in the area of safety conscious work environment policy, in that an individual did not feel free to raise nuclear safety concerns without fear of retribution, with confidence that his/her concerns will be addressed. Specifically, an individual was reluctant to write a condition report to document boric acid residue on control rod drive mechanisms because the individual believed leaders were not concerned, and the individual did not want to diminish the relationship the individual had with the leaders [S.1]. (Section 4OA2)

### Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to provide adequate work instructions for preventive

maintenance on safety-related equipment. Specifically, preventive maintenance work instructions to inspect and clean the mechanical interlock on the D containment cooler fan motor control lacked specific guidance for adequate lubrication and did not adequately consider equipment history and operating experience. This resulted in the failure of the 42T starter relay coil in the motor control circuit for the D containment cooler fan, and subsequent unavailability on January 31, 2017. The licensee's immediate actions included troubleshooting the motor control circuit, replacing the blown control power fuse for the motor control circuit, performing bench testing, installing a replacement 42T contactor to replace the damaged 42T contractor, and performing post maintenance testing of the D containment cooler fan. The licensee entered this issue into the corrective action program as Condition Reports 110725 and 111360.

The performance deficiency is more than minor, and therefore a finding, because it is associated with the procedure quality 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 is not a deficiency affecting the design or qualification of a mitigating structure, system, or component 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. Therefore, the inspectors determined the finding was of very low safety significance (Green). Inspectors did not assign a cross-cutting aspect and determined the performance deficiency is not indicative of current performance because the performance deficiency did not occur within the last three years, and the inspectors did not identify a reasonable opportunity within the last three years for the licensee to have identified the performance deficiency. (Section 1R15)

### **Cornerstone: Emergency Preparedness**

- Green. The inspectors identified that the licensee failed to correct a deficiency in emergency response organization performance identified as a result of an exercise in accordance with the requirements of 10 CFR 50.47(b)(14). The failure to identify and correct a weakness occurring during an exercise is a performance deficiency within the licensee's ability to foresee and correct. The licensee failed to identify that the Technical Support Center and Operations Support Center did not fully understand plant conditions and did not properly utilize in-plant mitigation and repair teams to investigate the causes of equipment failures. The issue is not an immediate safety concern because the deficient performance occurred during an exercise. This issue was documented in licensee Condition Report 117567, dated November 17, 2017.

The finding is more than minor because it was associated with the emergency response organization performance cornerstone attribute and adversely affected the cornerstone objective. The licensee's ability to ensure that adequate measures will be taken to protect the health and safety of the public is degraded when weak emergency response organization performance is not corrected. The finding was evaluated using Inspection Manual Chapter 0609, Appendix B, dated September 22, 2015, and was determined to be of

very low safety significance because the finding was a failure to comply with NRC requirements, was not a lost or degraded risk significant planning standard, and was not a loss of planning standard function. The performance deficiency was not a loss of planning standard function because the licensee appropriately critiqued some weaknesses. The finding was determined to have a cross-cutting aspect of evaluation in the area of problem identification and resolution because the licensee did not evaluate the deficient understanding of plant conditions and failure to utilize in-plant mitigation and repair teams as a performance weakness [P.2]. (Section 1EP1)

## PLANT STATUS

Wolf Creek Generating Station operated at or near full power for the entire inspection period.

## REPORT DETAILS

### 1. REACTOR SAFETY

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

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

##### .1 Readiness for Seasonal Extreme Weather Conditions

###### a. Inspection Scope

On December 22, 2017, the inspectors completed an inspection of the station's readiness for seasonal extreme weather conditions. The inspectors reviewed the licensee's adverse weather procedures for extreme cold weather and evaluated the licensee's implementation of these procedures. The inspectors verified that prior to the onset of cold weather, the licensee had corrected weather-related equipment deficiencies identified during the previous winter season.

The inspectors selected three risk-significant systems that were required to be protected from extreme cold weather:

- Essential service water system
- Refueling water storage tank
- Station blackout diesel generators

The inspectors reviewed the licensee's procedures and design information to ensure the systems or components would remain functional when challenged by extreme cold weather. The inspectors verified that operator actions described in the licensee's procedures were adequate to maintain readiness of these systems. The inspectors walked down portions of these systems to verify the physical condition of insulation, heat tracing, space heaters, and other cold weather protection features.

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

###### b. Findings

No findings were identified.

##### .2 Readiness to Cope with External Flooding

###### a. Inspection Scope

On November 22, 2017, the inspectors completed an inspection of the station's readiness to cope with external flooding. After reviewing the licensee's flooding analysis, the inspectors chose two plant areas that were susceptible to flooding:

- Control building 1,974 foot elevation
- Auxiliary building 1,974 foot elevation

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

These activities constituted one sample of readiness to cope with external flooding, 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:

- December 12 and 13, 2017, safety injection train A
- December 18, 2017, essential service water 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 trains were correctly aligned for the existing plant configuration.

These activities constituted two 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:

- December 14, 2017, fire area ESW-1, essential service water pump house train A, elevation 2,000 feet



- December 14, 2017, fire area ESW-2, essential service water pump house train B, elevation 2,000 feet
- December 19, 2017, fire area ESWC, essential service water vertical loop chase, elevations 1,974 through 2,087 feet
- December 22, 2017, fire area C-1, essential service water pipe space and tank area, southeast stairway to auxiliary building and duct chase, elevation 1,974 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.

**1R06 Flood Protection Measures (71111.06)**

a. Inspection Scope

On December 22, 2017, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis, the inspectors chose the 2,026 foot elevation of the auxiliary building as an area containing risk-significant structures, systems, and components that were susceptible to flooding.

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

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

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 November 15, 2017, the inspectors observed 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 October 26 and 27, 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 power ascension activities following main turbine valve testing.

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.

## **1R12 Maintenance Effectiveness (71111.12)**

### **.1 Routine Maintenance Effectiveness**

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

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

- February 11, 2016, train B essential service water vertical loop vacuum breaker valve failed to smoothly stroke full open or closed
- December 15, 2016, unexpected pressurizer master controller response

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

No findings were identified.

.2 Quality Control

a. Inspection Scope

On December 21, 2017, the inspectors reviewed the licensee's quality control activities through a review of parts installed in the 480 and 4160 volt safety-related NG and NB switchgears, respectively, that were purchased as commercial-grade parts but were dedicated prior to installation in a quality-grade application.

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

b. Findings

No findings were identified.

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

a. Inspection Scope

On October 24 and 25, 2017, the inspectors reviewed one risk assessment associated with planned train A control room air conditioning unit maintenance performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk. The inspectors also reviewed risk assessment updates related to abnormal reactor coolant system unidentified leakage results.

The inspectors verified this risk assessment was 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 assessment and verified that the licensee implemented appropriate risk management actions based on the result of the assessment.

These activities constituted completion of one maintenance risk assessment and emergent work control inspection sample, as defined in Inspection Procedure 71111.13.

b. Findings

No findings were identified.

**1R15 Operability Determinations and Functionality Assessments (71111.15)**

a. Inspection Scope

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

- October 13, 2017, operability determination of containment cooler fan A following failure to shift from slow speed to fast speed
- October 19 and 20, 2017, operability determination of reactor trip breaker/solid-state protection system following a train A solid state protection system general warning alarm
- November 1, 2017, operability determination of essential service water piping with degraded wall thickness

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

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

b. Findings

Introduction. The inspectors identified a Green non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to provide adequate work instructions for preventive maintenance on safety-related equipment. Specifically, work instructions to inspect and clean the mechanical interlock on the D containment cooler fan motor control lacked adequate guidance to ensure appropriate lubrication. This resulted in the failure of the 42T starter relay coil in the motor control circuit for the D containment cooler fan, and subsequent unavailability on January 31, 2017.

Description. On January 31, 2017, the licensee made an unplanned entry into action statements associated with Technical Specification 3.6.6, "Containment Spray and Cooling Systems," Condition C, and Technical Requirements Manual (TRM) 3.8.11, "Containment Penetration Conductor Overcurrent Protective Devices," Condition A, after the D containment cooler fan lost indication and tripped during a transfer from slow to fast speed. An acrid smell was noted in the location of the associated motor control circuit cubicle. Initial troubleshooting efforts using a thermography camera revealed a hot spot in the motor control circuitry and a blown control circuit fuse.

The containment cooler fan motor starters have three contactors, one for slow speed (42S), one for fast speed (42F), and a transfer contactor (42T). The 42T contactor shorts out the slow speed windings of the motor and allows the transfer to fast speed. When personnel select the fast mode on the fans, the fans are expected to start in slow speed and shift to fast speed after approximately 60 seconds.

When the failure occurred on January 31, 2017, the station was performing the pre-test alignment steps for STS IC-616B, "Slave Relay Test K616 Train B Safety Injection." While shifting the fan from slow to fast speed the unit failed to shift as expected from slow to fast speed after 60 seconds had elapsed. The red lamp for slow speed de-energized, and the red lamp for fast did not illuminate. The D containment cooler fan unit then tripped and operators took the hand-switch to pull-to-lock. Subsequent investigation revealed that the 42T starter coil, part of the transfer circuit, had overheated and deformed, causing the control power fuse to blow.

The inspectors reviewed the licensee's basic cause evaluation for this event. The probable cause identified in the licensee's basic cause evaluation (Revision 1) was, "binding of the mechanical interlock, which resulted in the overheating of the coil for the 42T contactor." The inspectors noted that the applicable lubrication preventive maintenance activity instructions in Core Work Instructions ELE-0007, "NG001T-NG004T Motor Control Center Inspection, Cleaning and Testing," Revision 0, were interpretive. They instructed maintenance personnel to perform the following step: "IF necessary THEN lubricate the pivot points with a dry lubricant." Hence, lubrication was not necessarily ensured.

Following inspector inquiry regarding inconsistencies between the causes and corrective actions identified in Revision 0 of the basic cause evaluation and the maintenance rule functional failure determination, which determined that the failure was preventable, the licensee completed revisions to the basic cause evaluation. Revision 1 of the basic cause evaluation considered additional information. Specifically, the licensee had experienced three very similar failures between 1985 and 1990, as documented in Work Orders 90034-85, 91657-85, and 01314-89. Additional corrective actions were also added in Revision 1. Specifically, a new action was created to revise preventive maintenance work instructions. Core Work Instructions ELE-0007, which guide the applicable lubrication preventive maintenance activities, were revised to "make lubricating in Step 8.12.5.3 mandatory and to lubricate after Step 8.12.2 in the Core Work Instructions. Areas to lubricate include the springs and the phenolic sliders at either end of the vertical moving shafts."

The inspectors noted that Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," Revision 2A, provides direction for implementing the preventive maintenance program. Section 6.2, "Establishing [Preventive Maintenance] Activities," states, "Develop [preventive maintenance] activities by considering the following...Equipment History...Operating Experience (OE) (Industry and Station)." Section 6.2.2, states, "[Preventive maintenance] frequencies are established and adjusted in accordance with...the following considerations...The age of the installed equipment."

The preventive maintenance activity instructions were originally incorporated into Revision 5 of MGE EOOP-07, "Motor Control Centers, and Control Panels, Cleaning, Inspecting, and Testing," which was issued in 1990. These instructions included

directions to include inspecting and lubricating the mechanical interlock during containment cooler preventive maintenance activities. The instructions in MGE EOOP-07 were later moved to Core Work Instructions ELE-007 in April 2009. This procedure did not receive any revisions prior to the failure in January 2017.

The licensee's immediate actions included troubleshooting the motor control circuit, replacing the blown control power fuse for motor control circuit, bench testing and installing a replacement 42T contactor to replace the damaged 42T contractor, and performing post maintenance testing of the D containment cooler fan. The D containment cooler fan was returned to service at 12:44 p.m. on February 2, 2017. The issue was entered into the licensee's corrective action program as Condition Reports 110725 and 111360.

Analysis. The inspectors determined that the licensee's failure to meet the requirements of Technical Specification 5.4.1.a and provide adequate work instructions for preventive maintenance on safety-related equipment was a performance deficiency. The performance deficiency is more than minor, and therefore a finding, because it is associated with the procedure quality 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, work instructions for preventive maintenance on the D containment cooler fan motor control center lacked adequate guidance to ensure lubrication of the mechanical interlock in the motor control circuit, which resulted in the failure of the D containment cooler fan 42T starter relay coil in the motor control circuit on January 31, 2017, and unavailability of the D containment cooler fan.

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. Therefore, the inspectors determined the finding was of very low safety significance (Green).

Inspectors did not assign a cross-cutting aspect and determined the performance deficiency is not indicative of current performance. The inspectors determined that the performance deficiency did not occur within the last three years, and the inspectors did not identify a reasonable opportunity within the last three years for the licensee to have identified the performance deficiency.

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 16B-003, "Planning and Scheduling Preventive Maintenance," Revision 2A, which provides direction for implementing the preventive maintenance program to meet the Regulatory Guide 1.33 requirement. Section 6.2 of Procedure AP 16B-003 requires, in part, that preventive maintenance activities be developed by considering equipment history and operating experience. Contrary to the above, until November 7, 2017, preventive maintenance activities were not developed by adequately considering equipment history and operating experience. Specifically, the D containment cooler fan motor control preventive maintenance instructions in Core Work Instruction ELE-007 were not developed for the D containment cooler fan motor control center by adequately considering station operating experience documented in Work Orders 90034-85, 91657-85, and 01314-89. The licensee took the immediate corrective action to test and install a replacement 42T contactor in D containment cooler fan motor control circuit, and conducted post maintenance testing after replacement. The licensee also inspected, cleaned, and lubricated the mechanical linkage on the D containment cooler fan motor control circuit. The preventive maintenance activity instructions were also later revised. The licensee entered this issue into the corrective action program as Condition Reports 110725 and 111360. This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000482/2017004-01, "Failure to Provide Adequate Work Instructions for Preventive Maintenance."

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

### **.1 Temporary Modifications**

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

On December 20 and 21, 2017, the inspectors reviewed a temporary modification to temporarily secure cavity cooling fans to support nuclear instrument 31 degraded cooling follow-up activities.

The inspectors verified that the licensee would implement this temporary modification in accordance with technically adequate design documents. The inspectors verified that this modification did not adversely impact the operability or availability of affected SSCs. The inspectors reviewed design documentation and plant procedures affected by the modification to verify the licensee maintained configuration control.

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

#### **b. Findings**

No findings were identified.

### **.2 Permanent Modifications**

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

On November 27, 2017, the inspectors reviewed a permanent plant modification to the auxiliary feedwater system to address recirculation line tornado missile vulnerabilities.

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

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

b. Findings

No findings were identified.

**1R19 Post-Maintenance Testing (71111.19)**

a. Inspection Scope

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

- October 25, 2017, train A control room air-conditioning system
- December 19, 2017, essential service water forebay level transmitter

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 two 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 two 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:

Reactor coolant system leak detection tests:

- October 24, 2017, STS BB-006, RCS [Reactor Coolant System] Water Inventory Balance Using the NPIS [Nuclear Plant Information System] Computer



Other surveillance tests:

- November 1, 2017, STS EF-100B, ESW [Essential Service Water] System Inservice Pump B and ESW [Essential Service Water] B Check Valve Test

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

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

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP1 Exercise Evaluation (71114.01)**

a. Inspection Scope

The inspectors observed the November 14, 2017, biennial emergency preparedness exercise to verify the exercise acceptably tested the major elements of the emergency plan and provided opportunities for the emergency response organization to demonstrate key skills and functions. The licensee demonstrated its ability to implement its emergency plan through a scenario that simulated:

- Loss of the condensate header leading to a red path on core cooling
- Fault on transformer XNB01
- Failure of diesel generator NE01
- Failure of the non-safety auxiliary feedwater pump
- Radiological release to the environment from ruptured and faulted steam generator A; the release was partially monitored and filtered

The scenario rapidly escalated with a site area emergency as the initial emergency classification. During the exercise the inspectors observed activities in the control room simulator and the following dedicated emergency response facilities:

- Technical Support Center
- Operations Support Center
- Emergency Operations Facility

The inspectors focused their evaluation of the licensee's performance on the risk-significant activities of event classification, offsite notification, recognition of offsite dose consequences, and development of protective action recommendations.

The inspectors also assessed recognition of, and response to, abnormal and emergency plant conditions, the transfer of decision-making authority and emergency function responsibilities between facilities, on-site and offsite communications, protection of emergency workers, emergency repair evaluation and capability, and the overall implementation of the emergency plan to protect public health and safety and the environment. The inspectors reviewed the current revision of the facility emergency plan, emergency plan implementing procedures associated with operation of the licensee's emergency response facilities, procedures for the performance of associated emergency functions, and other documents as listed in the attachment to this report.

The inspectors attended the post-exercise critiques in each emergency response facility to evaluate the initial licensee self-assessment of exercise performance. The inspectors also attended a formal presentation of critique items to plant management conducted November 17, 2017.

The inspectors reviewed the scenarios of previous biennial exercises and licensee drills conducted between January 2016 and October 2017 to determine whether the November 14, 2017, exercise was independent and avoided participant preconditioning, in accordance with the requirements of 10 CFR Part 50, Appendix E, IV.F(2)(g). The inspectors also compared observed exercise performance with corrective action program entries and after-action reports for drills and exercises conducted between January 2016 and October 2017 to determine whether identified weaknesses had been corrected in accordance with the requirements of 10 CFR 50.47(b)(14), and 10 CFR Part 50, Appendix E, IV.F.

The inspectors discussed the scenario with staff from Federal Emergency Management Agency Region VII to determine whether the scenario supported the Federal Emergency Management Agency evaluation objectives.

These activities constituted one exercise evaluation sample as defined in Inspection Procedure 71114.01.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of 10 CFR 50.47(b)(14) for the licensee's failure to identify and correct a weakness in emergency response organization performance during a biennial emergency preparedness exercise conducted on November 14, 2017.

Description. The inspectors observed an emergency preparedness exercise conducted November 14, 2017, and observed the licensee's formal exercise critique conducted November 17, 2017. The inspectors determined that the licensee failed to identify emergency response organization weaknesses in Technical Support Center and Operations Support Center performance and as a result did not ensure the weaknesses would be corrected.

The exercise simulated, in part, faults on an electrical transformer, electrical busses, a diesel generator failure and steam released into the turbine building. The inspectors observed that only one repair team was dispatched into the plant, while three other teams were briefed, but not dispatched. The licensee team that went into the plant was

sent to evaluate equipment that was out of service at the start of the exercise, not to repair emergent equipment problems. Non-licensed operators were sent to equipment that failed during the exercise, but were not capable of diagnosing the causes of equipment problems. The inspectors observed that no diagnostic activities were performed at bus NB01 or bus PB05, the diesel generators or blackout diesel generators, or at the feed pumps. The emergency response organization also did not determine how steam was getting into the turbine building.

Because they did not diagnose the fault in bus PB05, operators caused two blackout diesels to fail and would have failed the third (and last) diesel. Specifically, operators did not evaluate the cause of the first blackout diesel failure before putting the second diesel into service. When the second diesel failed, they were working toward putting the third diesel into service without understanding either failure. There was a lack of recognition that bus PB05 could have been faulted, thereby causing the blackout diesel generator failures.

The inspectors concluded that the emergency response organization did not understand plant conditions and did not properly utilize in-plant teams to investigate and correct the causes of equipment failures. The inspectors determined that the inadequate use of in-plant repair teams and lack of understanding of plant conditions could have prevented the licensee from ensuring that adequate measures could be taken to protect the health and safety of the public because it caused the emergency response organization to degrade the plant electrical system and affected their ability to terminate the radioactive release.

The inspectors observed the licensee's formal critique of exercise performance conducted November 17, 2017, and noted that the licensee did not discuss the lack of understanding of plant conditions exhibited in the control room and Technical Support Center, the inadequate use of in-plant repair and mitigation teams, or the degrading of the plant electrical system by sequentially failing station blackout diesel generators. The licensee did identify a significant delay in dispatching repair team #4 into the plant as a weakness requiring correction.

The inspectors evaluated the discussion between the exercise evaluators and site management and concluded that the licensee did not recognize a broader failure to effectively use repair teams to diagnose plant equipment problems. This failure was a significant contributor to the lack of understanding of plant conditions and the degrading of the plant electrical system. The inspectors concluded that the licensee failed to critique weaknesses in emergency response organization performance based on the results of the licensee's formal critique.

Analysis. The licensee's failure to correct a weakness that occurred during an exercise is a performance deficiency within the licensee's ability to foresee and correct. A weakness is defined in Inspection Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process," dated September 22, 2015, as emergency response organization performance that would have prevented the effective implementation of the licensee's emergency plan had the circumstances occurred. The emergency response organization's lack of understanding of plant conditions and failure to utilize in-plant teams to investigate and correct the causes of equipment failures was a weakness requiring correction. The finding is more than minor because it was associated with the emergency response organization performance cornerstone attribute

(training, exercises) and adversely affected the cornerstone objective. The licensee's ability to ensure that adequate measures will be taken to protect the health and safety of the public is degraded when weak emergency response organization performance is not corrected. The finding was evaluated using Attachment 2, "Failure to Comply Logic Flowchart," to Inspection Manual Chapter 0609, Appendix B, and was determined to be of very low safety significance (Green) because the finding was a failure to comply with NRC requirements, was not a lost or degraded risk-significant planning standard, and was not a loss of planning standard function. The finding was not a loss of planning standard function because the licensee appropriately critiqued some weaknesses associated with risk-significant activities and the 10 CFR 50.47(b) planning standards. The finding was determined to have a cross-cutting aspect of evaluation in the area of problem identification and resolution because the licensee did not evaluate the deficient understanding of plant conditions and failure to utilize in-plant mitigation and repair teams as a performance weakness. Licensee evaluators were focused on the established exercise objectives, which did not include understanding the causes of equipment failures or implementing an effective repair strategy [P.2].

Enforcement. Title 10 CFR 50.54(q)(2), requires, in part, that a power reactor licensee follow and maintain the effectiveness of an emergency plan which meets the requirements of Appendix E to 10 CFR Part 50 and the standards of 10 CFR 50.47(b). Title 10 CFR 50.47(b)(14) requires, in part, that deficiencies identified as a result of exercises or drills are (will be) corrected. Contrary to the above, on November 17, 2017, the licensee failed to correct a deficiency identified as a result of exercises or drills. Specifically, the licensee failed to identify an emergency response organization performance deficiency (weakness) occurring during the November 14, 2017, biennial exercise and did not ensure correction of the weakness. There was no actual or potential safety significance because the weak performance occurred during an exercise. This issue was documented in licensee Condition Report 117567, dated November 17, 2017. This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000482/2017004-02, "Failure to Critique TSC and OSC Performance during a Biennial Exercise."

## **1EP8 Exercise Evaluation – Scenario Review (71114.08)**

### **a. Inspection Scope**

The licensee submitted the preliminary exercise scenario for the November 14, 2017, biennial exercise to the NRC on August 29, 2017, in accordance with the requirements of 10 CFR Part 50, Appendix E, IV.F(2)(b). The inspectors performed an in-office review of the proposed scenario to determine whether it would acceptably test the major elements of the licensee's emergency plan, and provide opportunities for the emergency response organization to demonstrate key skills and functions. The inspectors discussed the preliminary scenario with staff at FEMA, Region VII, to determine whether the proposed scenario supported the FEMA evaluation objectives.

### **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 Safety System Functional Failures (MS05)

###### a. Inspection Scope

For the period of October 1, 2016, through September 30, 2017, the inspectors reviewed licensee event reports (LERs), maintenance rule evaluations, and other records that could indicate whether safety system functional failures had occurred. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73," Revision 3, to determine the accuracy of the data reported.

These activities constituted verification of the safety system functional failures performance indicator, as defined in Inspection Procedure 71151.

###### b. Findings

No findings were identified.

###### .2 Mitigating Systems Performance Index: Heat Removal Systems (MS08)

###### a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of October 1, 2016, through September 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 heat removal systems, as defined in Inspection Procedure 71151.

###### b. Findings

No findings were identified.

###### .3 Mitigating Systems Performance Index: Residual Heat Removal Systems (MS09)

###### a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of October 1, 2016, through September 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 residual heat removal systems, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.4 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspectors reviewed the licensee's evaluated exercises and selected drill and training evolutions that occurred between July 2016 and September 2017 to verify the accuracy of the licensee's data for classification, notification, and protective action recommendation opportunities. The inspectors reviewed a sample of the licensee's completed classifications, notifications, and protective action recommendations to verify their timeliness and accuracy. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

These activities constituted verification of the drill/exercise performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.5 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors reviewed the licensee's records for participation in drill and training evolutions between July 2016 and September 2017 to verify the accuracy of the licensee's data for drill participation opportunities. The inspectors verified that all members of the licensee's emergency response organization (ERO) in the identified key positions had been counted in the reported performance indicator data. The inspectors reviewed the licensee's basis for reporting the percentage of ERO members who participated in a drill. The inspectors reviewed drill attendance records and verified a sample of those reported as participating. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

These activities constituted verification of the emergency response organization drill participation performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.6 Alert and Notification System Reliability (EP03)

a. Inspection Scope

The inspectors reviewed the licensee's records of alert and notification system tests conducted between July 2016 and September 2017 to verify the accuracy of the licensee's data for siren system testing opportunities. The inspectors reviewed procedural guidance on assessing alert and notification system opportunities and the results of periodic alert and notification system operability tests. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

These activities constituted verification of the alert and notification system reliability performance indicator 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 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, quality assessments, issues that challenge operators in performing duties, and other documentation to identify trends that might indicate the existence of a more

significant safety issue. The inspectors verified that the licensee was taking corrective actions to address identified and possible adverse trends:

- Licensee response to a noted increase in the number of inadequate preventive maintenance issues
- Increased number of non-plant item control issues
- Recent Technical Specification Bases issues and licensee use of design basis information

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

b. Observations and Assessments

The inspectors evaluated a sample of recent issues and events that occurred to determine whether issues were appropriately considered as emerging or adverse trends. The inspectors verified that these issues were addressed within the scope of the corrective action program.

The inspectors' review of the trends and issues identified above produced the following observations and assessments:

- Inspectors reviewed the licensee's response to an inspector identified possible emerging trend associated with recent preventive maintenance related issues. This possible emerging trend was discussed in Section 4OA2.2, "Semiannual Trend Review," of NRC inspection report 05000482/2017002 (ML17223A285). The licensee documented the inspectors' concerns with the possible emerging trend in Condition Report 114437. The licensee completed a basic cause evaluation to evaluate the concerns and the possible adverse trend. The evaluation concluded that three referenced issues related to preventive maintenance program effectiveness indicate specific weaknesses in the implementation of the preventive maintenance activities. The evaluation described the probable cause of the examples of weakness in the preventive maintenance program as, "a lack of a bias towards conservative decision making in the development of preventive maintenance program instructions." The licensee planned to conduct training for engineers and leaders to reduce the reliance on subjective preventive maintenance acceptance criteria while considering the functional importance of the impacted equipment.

Although planned actions had not all been completed, the inspectors noted that the corrective actions to address the lack of a bias towards conservative decision making in the development of preventive maintenance program instructions were narrowly focused and did not appear to reach the entire subset of station personnel that may be involved in the development of preventive maintenance program instructions. Specifically, Section 5.0, "Responsibilities," of Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," Revision 8A, notes that the Manager Maintenance; superintendents of mechanical, electrical, and instrumentation and control maintenance; maintenance planners; and station personnel external to the maintenance department may be involved in the



documentation, oversight, or planning of preventive maintenance activities. The balance of station personnel that have responsibilities related to the development of preventive maintenance program instructions would not have been expected to receive the same level of training that was planned for engineers and leaders. As a result, it is not clear to the inspectors that the licensee's corrective actions to address the identified cause, "a lack of a bias towards conservative decision making in the development of preventive maintenance program instructions," would have eliminated the vulnerability across the station.

The inspectors shared these concerns with the licensee.

- Inspectors reviewed the licensee's response to a quality assurance finding identified in quality assurance assessment QA-2017-0365. The licensee's basic cause evaluation noted over 30 condition reports related to control of non-plant items defined by Procedure AP 21B-003, "Control of Non-Plant Items Inside or Near Plant Systems, Structures, and Components," Revisions 11A and 12, as ancillary items that are not a part of plant SSCs. Included among these condition reports were Condition Report 115174, which documented an NRC-identified concern associated with a storage cabinet that was located near safety-related essential service water piping and fire protection piping in the auxiliary building. The cabinet did not meet the definition of "stable plant equipment," as defined in Procedure AP 21B-003, Revision 11A. On August 21, 2017, Condition Report 115198 documented an NRC-identified issue associated with a storage cart with unchocked wheels near auxiliary feedwater piping in the auxiliary building. The cart was not immobilized in accordance with Procedure AP 21B-003, Revision 11A. A few days later on August 25, 2017, Condition Report 115320 documented unstable items like a coat rack, platform ladder, and equipment storage cabinet that were located in the control room near plant SSCs, which was not in compliance with Procedure AP 21B-003, Revision 11A.

The licensee's basic cause evaluation also documented a history of challenges maintaining control of temporary equipment. Specifically, the evaluation noted a root cause evaluation in 2001 that stated that procedure clarity could be improved, but issues were resulting from, "A failure to implement and enforce the process requirements." Similar issues in 2004, 2006, and 2015 were also noted. The evaluation concluded, "Based on the repetitive programmatic compliance nature of the issues, there is a common weakness in the implementation enforcement of management expectations. These issues have remained of low consequence but do not meet the criteria within AP21B-003." The probable cause of non-plant items not being controlled in accordance with the requirements of AP 21B-003 was determined to be, "Non-plant items requirements are not being met due to insufficient commitment with the procedure requirements."

The inspectors noted that remedial actions to address the cause included revisions to Procedure AP 21B-003, which removed redundancy throughout the procedure and provided clarification of criteria for stable, non-stable, and non-plant items, and communication to station personnel on the non-plant process. The inspectors reviewed the communication and revisions to Procedure AP 21B-003, and the inspectors determined that the corrective actions did not address the identified cause. Specifically, neither the communications, nor

Procedure AP 21B-003 revisions, nor any other actions appeared to address insufficient commitment to procedure requirements.

The inspectors shared these concerns with the licensee.

- The inspectors considered recent Technical Specification Bases issues that were associated with licensee use of design basis information. Specifically, NRC inspection report 05000482/2017003 (ML17311B223) documented an NRC-identified Green non-cited violation associated with the licensee's failure to ensure the auxiliary feedwater system design basis was adequately represented in the Technical Specification Bases, which resulted in the Technical Specification Bases and other station procedures allowing 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. NRC Inspection Report 05000482/2017002 (ML17223A285) documented an NRC-identified Green non-cited violation associated with the licensee's failure to declare the essential service water emergency make-up to component cooling water train A valve inoperable when it was out of service, which resulted in train A component cooling water being out of service for longer than its Technical Specification allowed outage time. In both cases the Technical Specification Bases, which was inaccurate or incomplete, respectively, was referenced and utilized for work planning and implementation, while other design basis information like the Updated Safety Analysis Report was not being similarly referenced.

The inspectors considered whether an adverse trend existed related to the Technical Specification Bases or how design basis information was being used and referenced. The inspectors did not determine that these two data points alone were sufficient to identify a possible emerging adverse trend. However, the inspectors shared their observations with the licensee related to the extent of condition and current performance aspects of these issues.

c. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected one issue for an in-depth follow-up. On August 17, 2017, the licensee initiated Condition Report 115120 to document that boric acid residue had remained on several control rod drive mechanisms (CRDMs) during Refueling Outage 21, but the condition had not been evaluated for operability or functionality.

The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to correct the condition.

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

b. Findings

Introduction. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to implement the operability determination and functionality assessment procedure. Specifically, as of October 12, 2016, the licensee identified boric acid coating on several CRDMs, but failed to initiate a condition report to evaluate the effect of the condition on CRDM operability.

Description. On September 2, 2016, reactor head penetration number 77 experienced a leak through a canopy seal weld of approximately 1.4 gpm, which led to a unit shut down. This leak resulted in spraying reactor coolant on the head, its penetrations, and other nearby equipment. Included in this equipment were several CRDMs. The licensee photographed and documented the condition in the boric acid corrosion control program in accordance with Procedure AI 16F-001, "Boric Acid Leakage Evaluation," Revision 8, on October 12, 2017. In this evaluation the licensee documented, "The number of CRDMs removed for cleaning was limited due to the difficulty of removal. For this reason residue was not cleaned from multiple CRDMs. The primary concern is limited cooling capability of these components with increased potential of failure; a situation that could lead to a dropped rod." Despite this statement in the boric acid leakage evaluation, no further evaluation was documented to accept the condition.

Licensee procedure, AP 26C-004, "Operability Determination and Functionality Assessment," Revision 34B, a quality related procedure, provides instructions for initiating condition reports to enter the operability determination process. Procedure AP 26C-004, Step 5.2.1, states in part, that all personnel shall initiate a condition report for any adverse SSC condition. Because the licensee did not initiate a condition report for the boric acid residue, the licensee did not implement Procedure AP 26C-004, and no operability evaluation was performed.

On August 22, 2017, following the inspectors requesting information concerning the condition of the CRDMs, the licensee initiated Condition Report 115120 to document that an evaluation for the CRDMs in which boric acid residue remained was required. The licensee produced a seven-page white paper to evaluate the heat transfer capabilities of CRDMs with 0.25 inches of dry boric acid coating on the housing, to support the operability evaluation of the CRDMs. The licensee determined that although the internal CRDM temperatures could increase up to 8 °F, this temperature increase would have a negligible effect on the CRDM service life and would not lead to a rod drop accident.

The licensee's "Performance Assessment Worksheet" associated with Condition Report 115120, which was completed by the individual's supervisor, determined that the cognizant engineer was reluctant to write a condition report because the "individual did not feel [he or she] should generate [a condition report] at the time because leaders were not concerned and [the individual] did not want to diminish the relationship [the individual] had with the leaders." In response to this performance deficiency, the licensee discussed with the individual the need to approach leaders differently, such as stating that one has a concern and that it needs to be evaluated in the corrective action

program; thus, a condition report will need to be initiated.

Based on NRC interviews, review of previous documentation, and other inspection activities the inspectors determined that this finding was caused by the individual not feeling free to raise nuclear safety concerns without fear of retribution, with confidence that his/her concerns will be addressed.

Analysis. The failure to initiate a condition report to evaluate boric acid on CRDMs is a performance deficiency. This finding is more than minor; and, therefore a finding, because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, continued failure to write condition reports and evaluate boric acid contamination could have a worse outcome under different circumstances. Additionally, the inspectors determined that the performance deficiency affected the Initiating Events cornerstone. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and the transient initiator screening questions of Exhibit 1, "Initiating Events Screening Questions," and determined that this finding did not cause a reactor trip and loss of mitigation equipment; and therefore, this finding screened to very low safety significance (Green). The inspectors determined that the finding has a SCWE cross-cutting aspect in the area of SCWE policy, in that an individual did not feel free to raise nuclear safety concerns without fear of retribution, with confidence that his/her concerns will be addressed. Specifically, an individual was reluctant to write a condition report to document boric acid residue on CRDMs because the individual believed leaders were not concerned, and the individual did not want to diminish the relationship the individual had with the leaders [S.1].

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be accomplished in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances. Licensee Procedure, AP 26C-004, "Operability Determination and Functionality Assessment," Revision 34B, an Appendix B quality related procedure, provides instructions for initiating condition reports to enter the operability determination process. Procedure AP 26C-004, Step 5.2.1, states in part, that all personnel shall initiate a condition report for any adverse component condition. Contrary to the above, between October 12, 2016, and August 17, 2017, licensee personnel failed to initiate a condition report for adverse component conditions. Specifically, licensee personnel failed to initiate a condition report to document and evaluate that visible amounts of boric acid coated several CRDMs, which called into question their operability. Immediate corrective actions included initiating Condition Report 115120 and documenting a detailed operability assessment to demonstrate operability of the CRDMs. This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 050000482/2017004-03, "Failure to Initiate a Condition Report for Boric Acid Evaluations."

#### 4OA5 Other Activities

.1 World Association of Nuclear Operators (WANO)/Institute of Nuclear Power Operation (INPO) Report Review

a. Inspection Scope

The inspectors reviewed the final report for the WANO assessment conducted in April and May 2017. The inspectors evaluated this report to ensure that NRC perspectives of Wolf Creek Nuclear Operating Corporation performance were consistent with any issues identified during the assessments. The inspectors also reviewed this report to determine whether any significant safety issues were identified that required further NRC follow-up.

b. Findings

No findings were identified.

.2 (Closed) Notice of Violation (VIO) 05000482/2015004-01: Inadequate Measures to Assure SGK05A Issues Were Promptly Corrected

As documented in NRC Inspection Report 05000482/2015004, the inspectors identified a Green cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's inadequate measures to assure that corrective action was taken to preclude repetition of a significant condition adverse to quality. Specifically, measures to correct train A Class 1E electrical equipment air-conditioning system (SGK05A) issues following two trips of the unit on October 18, 2013, were inadequate. This resulted in the SGK05A unit tripping twice on May 15, 2015; the train A safety-related batteries, inverters, and alternating and direct current buses being declared inoperable due to the loss of area cooling; two separate Technical Specification 3.0.3 entries; and resulting technical specification required reactor power reductions to 93 and 94.7 percent. This violation had previously been identified by the NRC as non-cited violation 05000482/2013005-04, after which the licensee failed to restore compliance.

The licensee responded to the Notice of Violation in a letter dated March 10, 2016 (Agencywide Document Access and Management System (ADAMS) ML16076A358).

The Inspection Report 2015004 issue was entered into the licensee's corrective action program as Condition Report 102322. A root cause evaluation was subsequently completed identifying the direct cause as, "Action not taken to correct contamination found within the SGK05A compressor, by replacement of the compressor, in a reasonable period of time."

To address the direct cause the licensee completed installation of a replacement compressor on the SGK05A Class 1E electrical equipment air-conditioning unit prior to plant start-up following Refueling Outage 21 in November 2016.

The inspectors walked down the physical SGK05A modification, reviewed corrective action program, work order, and modification documentation, and conducted interviews with responsible personnel. The inspectors noted that the actions to address the direct cause, which installed a new compressor design that has a new type of oil and a new

diaphragm type of lube oil pressure switch (these are expected to be less susceptible to moisture intrusion and contaminant buildup), were reasonable corrective actions to address the direct cause of the violation. The inspectors also noted that extent of condition actions to issue design change packages for similar design modifications for the control room air conditioning units (SGK04A and SGK04B) were also reasonable assuming the design changes are appropriately implemented. The station completed replacement of the SGK04B unit with the new style compressor and plans to complete replacement of the SGK05B unit in the spring of 2018 and the SGK04A unit in the spring of 2019.

The licensee's root cause evaluation also determined the root cause was:

Engineering leadership did not properly allocate personnel to the design change for the SGK05A compressor replacement, did not communicate the design change status effectively, and failed to realize that progress was not adequate to ensure successful completion in [Refueling Outage] 20. As a result, measures to correct SGK05A issues were inadequate and a repetitive failure occurred.

To address the identified root cause, the licensee's corrective actions to preclude repetition included obtaining supplemental engineering resources to assist with preparation of the design change packages for the SGK05A and SGK05B replacements. Although not classified as corrective actions to preclude repetition, the licensee also took interim actions to conduct bi-weekly maintenance readiness meetings, conducted by maintenance, to review any issues with readiness for installation of the replacement compressor.

The inspectors acknowledge that the identified root cause, if corrected, would be expected to preclude repetition of the significant condition adverse to quality related to repetitive failures of the SGK05A unit. Additional resources were applied by the station and the compressor replacement was completed in November 2016. Therefore, the inspectors determined that the licensee has restored compliance and has taken appropriate corrective actions to address the cause of this violation.

With respect to extent of cause and an in-depth analysis of the effectiveness of management control systems, the licensee's root cause evaluation bound the extent of cause to the "Top 10 Issues" list and determined that the extent of cause included design engineering resources being challenged and impacting initiatives to complete design modifications associated with completing maintenance on the SGK05 units. An extent of cause action was created and implemented to, "Establish appropriate engineering resources to support [the] ongoing SGK05 project to allow an SGK05 unit to be shut down for maintenance while the plant is on-line." Additionally, the inspectors noted actions taken in response to apparent cause evaluation 100104 were implemented to address managers not ensuring effective action plans were developed, in place, and adhered to for some important equipment issues.

The inspectors reviewed Procedure AI 28A-100, "Condition Report Resolution," Revision 12, which describes how boundaries are established around the population of plant processes, procedures, components, or human performance jobs or tasks with the potential to exhibit the same or similar root causes. Specifically, Procedure AI 28A-100

states, "The level of effort of the [extent of cause] should be commensurate with the nature and complexity of the problem. The risk significance conclusion should be utilized to determine the scope and depth of review to reasonably bound the [extent of cause] review." The procedure also describes examples of extent of cause:

Environment: Determine the affect the cause has on other environments. Equipment: Determine if the cause is related to other SSCs. People: Determine if the cause affects other site personnel. Organization: Determine if the cause is related to other departments or organizations. Process: Determine if there are identical or similar processes or procedures that may be susceptible to same or similar causes.

The inspectors noted that the subject cited violation involved repetitive failures to correct a significant condition adverse to quality. The inspectors also noted that Inspection Report 2012007 documented a similar failure to take corrective action to preclude repetition of essential service water leaks caused by internal corrosion and water hammer. Considering the repetitive nature of the problems, failure to take corrective action to preclude repetition, and considering the complexity of the SGK05A problem, which involved resource, communication, and oversight safety culture aspects, the inspectors concluded that the root cause evaluation had a weakness in the area of extent of cause level of effort as described by Procedure AI 28-100. Specifically, the extent of cause did not methodically expand its review and document other equipment, people, organizations, or processes that may be impacted by similar leadership, communication, or oversight causal aspects, which were considered by the review. Rather, the documented extent of cause narrowly focused on SGK05 (the same equipment), design engineering (the same people and organization), and modification documentation implementation (the same process).

The inspectors shared these observations with the licensee.

This review closes NOV 05000482/2015004-01, "Inadequate Measures to Assure SGK05A Issues Were Promptly Corrected," EA-16-018.

#### **4OA6 Meetings, Including Exit**

##### **Exit Meeting Summary**

On October 11, 2017, regional inspectors discussed the in-office review of the preliminary scenario for the 2017 biennial exercise, submitted August 29, 2017, with Mr. T. East, Superintendent, Emergency Planning, and other members of the licensee staff. The licensee acknowledged the issues presented.

On November 17, 2017, regional inspectors presented the results of the on-site inspection of the biennial emergency preparedness exercise conducted November 14, 2017, to Mr. S. Smith, Plant Manager, 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 December 13, 2017, regional inspectors presented the inspection results of the annual follow up of selected issues in Section 4OA2.3.b to Mr. S. Smith, Plant Manager, 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 January 10, 2018, the resident inspectors presented the integrated inspection results 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.



## **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  
D. Bowers, Manager, Maintenance  
W. Brandt, Shift Manager  
K. Clark, Technician, Fire Protection  
M. Corbin, Superintendent, Security Operations  
J. Cuffe, Supervisor, Radiation Protection  
D. Dees, Superintendent, Operations Support  
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  
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  
A. Patrzalek, Supervisor, Chemistry  
G. Pendergrass, Manager, Performance Improvement  
E. Peterson, Employee Concerns Program Coordinator  
C. Reasoner, Site Vice President  
J. Schepers, Supervisor, Radiation Protection  
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

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened and Closed

05000482/2017004-01	NCV	Failure to Provide Adequate Work Instructions for Preventive Maintenance (Section 1R15)
05000482/2017004-02	NCV	Failure to Critique TSC and OSC Performance During a Biennial Exercise (Section 1EP1)
05000482/2017004-03	NCV	Failure to Initiate a Condition Report for Boric Acid Evaluations (Section 4OA2)

### Closed

05000482/2015004-01	VIO	Inadequate Measures to Assure SGK05A Issues Were Promptly Corrected (Section 4OA5)
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## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CKL ZL-004	Turbine Building Reading Sheets	140
CKL ZL-004	Turbine Building Reading Sheets	157
OFN SG-048	Flash Flood Warning	5
SYS EF-205	ESW/Circ Water Cold Weather Operations	40
SYS OPS-008	Cold Weather Operations	5

#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12EF02	Piping & Instrumentation Diagram Essential Service Water System	42
M-12LF01	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	3
M-12LF03	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	6
M-12LF05	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	9
M-K2EF01	Piping & Instrumentation Diagram Essential Service Water System	70

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-K2EF03	Piping & Instrumentation Diagram Essential Service Water System	19

### Condition Reports

90879	100653	100654	100655	100656
101163	106165	107621	112436	112503
116319	116586	116667	116851	116922
116957	116958	116979	117026	118271
118283	118284	118288	118358	118451

### Work Orders

16-418069-000

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
DRR 15-2344	Turbine Building Reading Sheets	December 7, 2015
FL-08	Control Building Flooding	3
FL-13	Auxiliary Building Area 5 Flooding	2
PIR 96-0316		
PIR 2006-0006		
SYS OPS-008	Cold Weather Operations	Completed October 26, 2017

## **Section 1R04: Equipment Alignment**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CKL EF-120	Essential Service Water Valve, Breaker, and Switch Lineup	54
CKL EM-120	Safety Injection System Lineup Checklists	31

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12EF01	Piping & Instrumentation Diagram Essential Service Water System	29
M-12EF02	Piping & Instrumentation Diagram Essential Service Water System	42
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	3
M-K2EF01	Piping & Instrumentation Diagram Essential Service Water System	70
M-K2EF03	Piping & Instrumentation Diagram Essential Service Water System	19

### **Section 1R05: Fire Protection**

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AP 10-106	Fire Preplans	18
AP 10-106	Fire Preplans	18A

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-1F9905	Fire Hazard Analysis	8
E-1F9910	Post-Fire Safe Shutdown Area Analysis	14
M-12KC05	Piping and Instrumentation Diagram Fire Protection System	3
M-13KC29	Piping Isometric Fire Protection System ESW Vertical Loop Chase	1

#### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
XX-X-004	Combustible Fire Loading For Each Room In The Various Fire Areas at WCNO	4

## Section 1R06: Flood Protection Measures

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OFN SG-048	Flash Flood Warning	5

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-1P1421	Drainage Systems (LF & LE) Auxiliary Building EL [Elevation] 2026' – 0" AREA 2	1
M-12LF01	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	3
M-12LF03	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	6
M-12LF05	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	9

### Condition Reports

100653	100654	100655	100656	112588
116667				

### Work Orders

15-397860-000	16-416247-000	16-416247-001	16-416247-005	17-429068-000
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### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
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
FL-01	Flooding of the Auxiliary Building	2
FL-13	Auxiliary Building Area 5 Flooding	2
LF-01	Floor & Equipment Drains System	November 11, 2017
LF-02	Floor & Equipment Drains System	November 11, 2017
LF-03	Floor & Equipment Drains System	November 11, 2017

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
LF-04	Floor & Equipment Drains System	November 21, 2017
LF-05	Floor & Equipment Drains System	November 21, 2017
LF-07	Floor & Equipment Drains System	November 21, 2017

### **Section 1R11: Licensed Operator Requalification Program**

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ALR 00-099A	MSDT [Moisture Separator Drain Tank] A Lev [Level] HI	5B
ALR 00-103A	1 <sup>ST</sup> STG [Stage] RH [Reheater]/MSDT Dump	7
AP 21-001	Conduct of Operations	81
GEN 00-004	Power Operation	89
OFN RJ-023	NPIS [Nuclear Plant Information System] Malfunctions	26
STS AC-001	Main Turbine Valve Cycle Test	54A

#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12AC01	Piping & Instrumentation Diagram Main Turbine	30
M-12AC02	Piping & Instrumentation Diagram Main Turbine	22
M-12AF04	Piping & Instrumentation Diagram Feedwater Heater Extraction Drain & Vents	19

#### Condition Reports

117004	117010	117556
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### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Reactivity Maneuver Plan: 10/26/2017 Performance of STS AC-001, Rev. 0	October 26, 2017
APF 21-001-02	Control Room Turnover Checklist: 10/26/17	33
EPF 06-007-01	Wolf Creek Generating Station Emergency Notification CR-001 (Drill)	November 15, 2017

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
EPF 06-023-01	Emergency Response Facility Functionality Evaluation	3
LR4640001	Simulator Evaluation	1

**Section 1R12: Maintenance Effectiveness**Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AP 05-007	Determination of Safety Classification	13
AP 24G-001	Dedication of Commercial Grade Items	8
GEN 00-004	Power Operation	89
STS MT-005	Pressurizer Code Safety Valve Operability	20
SYS BB-203	Pressurizer Backup Heater Operations	4A

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-13BB20	Schematic Diagram Pressurizer Heater Control Group C	3
E-13BB21	Schematic Diagram Pressurizer Heater Control Group C Heater Grouping	1
M-12EF01	Piping & Instrumentation Diagram Essential Service Water System	29
M-12EF02	Piping & Instrumentation Diagram Essential Service Water System	42
M-K2EF01	Piping & Instrumentation Diagram Essential Service Water System	70
M-K2EF03	Piping & Instrumentation Diagram Essential Service Water System	19
M-223F-00003	Crispin Model VR-41 Relief Check Valve Flanged Ends Size 4 Fig. 150-VR	W04
M-766-01040	Instruction Manual for AC Power Controllers	W02

Condition Reports

67683	80842	80845	80853	81790
81834	82672	82877	97335	101020
102728	104847	106163	106164	112167

Condition Reports

112752	112960	115422	115423	116477
117684				

Work Orders

13-375254-006	13-376820-007	17-433741-000
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
80842	Functional Failure Determination Checklist	April 24, 2014
80845	Functional Failure Determination Checklist	April 24, 2014
80853	Functional Failure Determination Checklist	April 24, 2014
80862	Functional Failure Determination Checklist	April 24, 2014
80863	Functional Failure Determination Checklist	April 24, 2014
81790	Functional Failure Determination Checklist	May 20, 2014
81834	Functional Failure Determination Checklist	May 13, 2014
82672	Functional Failure Determination Checklist	May 13, 2014
82877	Functional Failure Determination Checklist	July 17, 2014
97335	Functional Failure Determination Checklist	October 1, 2015
99561	Functional Failure Determination Checklist	October 29, 2015
101020	Functional Failure Determination Checklist	December 17, 2015
102728	Functional Failure Determination Checklist	March 2, 2016
104847	Functional Failure Determination Checklist	June 20, 2016
106163	Functional Failure Determination Checklist	August 31, 2016
106164	Functional Failure Determination Checklist	February 2, 2017
106867	Functional Failure Determination Checklist	September 26, 2016
107398	Functional Failure Determination Checklist	October 12, 2016
110078	Functional Failure Determination Checklist	February 1, 2017
AIF 28A-100-12	Basic Cause Evaluation – Pressurizer Safety Valve Out of Tolerance – Condition Report 00112960	Completed June 15, 2017
APF 05-002-05	Engineering Disposition – Evaluation of Continued Backup heater Operation Due to Degraded Pressurizer Pressure Control System – Work Order 13-375254-006	Completed August 23, 2013



Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
APF 05-013-01	M-766-01040 - Instruction Manual for AC Power Controllers	W02
APF 21-001-02	Control Room Turnover Checklist – On-Coming CRS/WC SRO/RO/BOP Review	November 28, 2017
BB-01	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-02	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-03	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-04	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-05	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-06	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-07	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-08	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-09	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-10	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-11	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-12	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
BB-13	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
BB-14	Maintenance Rule Final Scope Evaluation	Printed November 28, 2017
CGD 026-P0002	NB Switchgear Bus Boots & Nylon Bolts/Nuts	0
CGD 125-P0005	Koyo (Torrington) Roller Bearings	1
CGD 176-P0001	Essential Service Water Traveling Water Screens (FEF01A&B)	1
EF-01	Maintenance Rule Final Scope Evaluation	November 6, 2017
EF-02	Maintenance Rule Final Scope Evaluation	November 6, 2017
EF-03	Maintenance Rule Final Scope Evaluation	November 6, 2017
EF-04	Maintenance Rule Final Scope Evaluation	November 6, 2017
EF-07	Maintenance Rule Final Scope Evaluation	November 6, 2017
EF-08	Maintenance Rule Final Scope Evaluation	November 6, 2017
ODMI 2017-01 RIR 778056	Pressurizer Pressure Control Anomaly Response	February 1, 2017
SCA-05-0006	Torrington Roller Bearings	0
SCA-17-0006	A & B Train ESW Vertical Loop Vacuum Breaker Body to Bonnet Gasket	0

**Section 1R13: Maintenance Risk Assessment and Emergent Work Controls**Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12LF01	Piping and Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	3
M-12LF02	Piping & Instrumentation Diagram Auxiliary Building Floor and Equipment Drain System	3

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12LF05	Piping & Instrumentation Diagram Auxiliary Building Floor & Equip. Drain System	9
M-12SJ01	Piping and Instrumentation Diagram Nuclear Sampling System	15
M-12SJ04	Piping and Instrumentation Diagram Nuclear Sampling System	13

### Condition Reports

116823	116836
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### Work Orders

17-424589-007	17-432787-000	17-432787-001
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### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
APF 22C-003-01	On-Line Nuclear Safety and Generation Risk Assessment: 2017-0405	October 23, 2017
D-SJ-N-007	SJV0812	Printed October 24, 2017

## **Section 1R15: Operability Evaluations**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ALR 00-075A	SSPS A General Warning	9
MGE EOOP-15	Auxiliary Time Delay Relay (TDR) Testing	9
MGE TL-001	Wiring Termination and Lug/Connector Installation	24
RNM C-0563	Auxiliary Time Delay Relay	8
STS GN-001	Containment Cooling Fans Operability Test	11
STS IC-211A	Actuation Logic Test Train A Solid State Protection System	36A
STS IC-616A	Slave Relay Test K616 Train A Safety Injection	21
SYS GN-120	Containment Cooling System Operation	44

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-018-00141	SZ. 5 2SP-1WD Schematic	W21
E-018-00214	Wiring Diagram 2SP-IWD (Size 5)	W22
E-13GN02	Schematic Diagram Containment Cooler Fans A & C	17
E-13SB10	Schematic Diagram Reactor Trip Switchgear	00
J-12GN02A	Control Logic Diagram Containment Cooling System Containment Cooler Fan	3
J-200-00035	Main Control Board RL019 & RL020 Wiring Diagram	W27
M-12GN01	Piping and Instrumentation Diagram Containment Cooling System	24
M-12GN02	Piping & Instrumentation Diagram Containment Cooling System	3
M-K2EF01	Piping & Instrumentation Diagram Essential Service Water System	70

### Condition Reports

116477	116617	116796	116959	116992
116996	117161	118048		

### Work Orders

16-417760-000	17-432357-000	17-432357-001
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### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
APF 05C-004-01	Basic Engineering Disposition – Evaluation of Localized Defects in Line EF-003-HBC-30	November 28, 2017
APF 05C-004-01	Basic Engineering Disposition – Evaluation of Localized Defects in Line EF-007-HBC-30	November 28, 2017
APF 21-001-02	Control Room Turnover Checklist	October 19, 2017

## Section 1R18: Plant Modifications

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AI 15C-006	Management Oversight Requirements for Infrequently Performed & Potentially Degrading Evolutions	22
CKL AL-120	Auxiliary Feedwater Normal Lineup	42
GEN 00-005	Minimum Load to Hot Standby	90
TMP 16-004	SE NI-31B Source Range Count Nuclear Instrument Diagnostic	2

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12AL01	Piping & Instrumentation Diagram Auxiliary Feedwater System	10
M-12AL01	Piping & Instrumentation Diagram Auxiliary Feedwater System	14

### Condition Reports

115108	115193	116286	117217	117218
117777				

### Work Orders

10-331308-000	10-331308-003	10-331308-007
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### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
Design Change Package 13423	Potential AFW Pump Recirculation Line Vulnerability Remediation	0
Design Change Package 13423	Potential AFW Pump Recirculation Line Vulnerability Remediation	1
Design Change Package 13423	Potential AFW Pump Recirculation Line Vulnerability Remediation	2
Evaluation No. 59 2017-0003	Temporarily Secure Cavity Cooling Fans to Support NI-31 Degraded Cooling Issue	0

## Section 1R19: Post-Maintenance Testing

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
MPE GK-003	Control Room and Class 1E A/C Units Preventive Maintenance Activity	7
MPE GK-004	GK Unit Preparation For Work	10
STS GK-002A	Control Room A/C Unit Operability Test	2

### Condition Reports

118048                      118061

### Work Orders

17-434303-000

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
APF 29B-003-01	Surveillance Test Routing Sheet – Control Room A/C Unit Operability Test	Completed October 25, 2017

## Section 1R22: Surveillance Testing

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AP 26C-004	Operability Determination and Functionality Assessment	34B
STS BB-006	RCS Water Inventory Balance Using the NPIS Computer	17
STS EF-100B	ESW System Inservice Pump B & ESW B Check Valve Test	48B

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12EF01	Piping & Instrumentation Diagram Essential Service Water System	29
M-12EF02	Piping & Instrumentation Diagram Essential Service Water System	42
M-K2EF01	Piping & Instrumentation Diagram Essential Service Water System	70

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-K2EF03	Piping & Instrumentation Diagram Essential Service Water System	19

### Condition Reports

116836	117165
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### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	RCS Leakage Summary Report – Wolf Creek Nuclear Generating Plant – NPIS	October 24, 2017
APF 21-001-02	Control Room Turnover Checklist – Day Shift	October 20, 2017
APF 21-001-02	Control Room Turnover Checklist – Day Shift	October 21, 2017
APF 21-001-02	Control Room Turnover Checklist – Day Shift	October 22, 2017
APF 21-001-02	Control Room Turnover Checklist – Night Shift	October 21, 2017
APF 21-001-02	Control Room Turnover Checklist – Night Shift	October 22, 2017
APF 21-001-02	Control Room Turnover Checklist – Night Shift	October 23, 2017

## **Section 1EP1: Exercise Evaluation**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Performance Evaluation Summary, Event Identifier LR4412801	001/ February 16, 2017
	Performance Evaluation Summary, Event Identifier LR4414101	000/ August 18, 2016
	Performance Evaluation Summary, Event Identifier LR4640001	000/ April 4, 2017
AI 28A-010	Screening Condition Reports	28
AI 28A-100	Condition Report Resolution	12
AP 28A-100	Corrective Action Program	23

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
EPP 06-001	Control Room Operations	25A
EPP 06-002	Technical Support Center Operations	40
EPP 06-003	Emergency Operations Facility Operations	25
EPP 06-005	Emergency Classification	8/ February 23, 2016
EPP 06-006	Protective Action Recommendations	9/ December 31, 2013
EPP 06-007	Emergency Notifications	25/ October 18, 2017
EPP 06-009	Drill and Exercise Requirements	11/ January 24, 2017
EPP 06-011	Emergency Team Formation and Control	10A/ December 8, 2016
EPP 06-012	Dose Assessment	14D/ August 15, 2016
EPP 06-015	Emergency Response Organization Callout	14/ September 30, 2015
EPP 06-016	Accident Assessment and Mitigation	6A/ March 1, 2016
LR4412801	17-3 Crew Performance Evaluation (CPE) Evaluated Scenario	1
LR4414101	SM Time for New Shift Manager Quals	0
Scenario # 16-09	Cycle 17-4 Requalification Exam Scenario	1

Condition Reports

102885	103025	103901	105385	105386
106432	108581	109889	111016	111536
111631	111633	117443	117444	117446
117453	117455	117456	117463	117468
117472	117479	117482	117484	117485
117492	117493	117504	117514	117535
117539	117540	117563	117567	



## Section 4OA1: Performance Indicator Verification

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
AP 26A-004	Emergency Planning Performance Indicators	8/ May 2, 2016
AP 26A-007	NRC Performance Indicators	11/ September 28, 2016
EPP 06-019	Alert and Notification System Sirens	9A/ October 2, 2016

### Condition Reports

106476	109161	110999	111571	111808
111956	113304	114379	114396	114398
116357	116466	116489	116832	116838
116852	117504	117699	117914	118500

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	2016 Reportability Evaluation Request Log	
	2017 Reportability Evaluation Request Log	
	MSPI Unavailability Data– Auxiliary Feedwater	October 2016 through September 2017
	MSPI Unreliability Data – Auxiliary Feedwater	October 2016 through September 2017
109161	Functional Failure Determination Checklist	November 22, 2016
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Heat Removal System – Performance Limit Exceeded Index	September 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Heat Removal System – Unavailability Index	September 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Heat Removal System – Unreliability Index	September 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Residual Heat Removal System – Performance Limit Exceeded Index	September 2017

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Residual Heat Removal System – Unavailability Index (UAI)	September 2017
Consolidated Data Entry 4.0	MSPI Derivation Report – MSPI Residual Heat Removal System – Unreliability Index (URI)	September 2017
NEI 99-02	Regulatory Assessment Performance Indicator Guideline	7
WCNOC-163	Mitigating System Performance Index (MSPI) Basis Document	11
WCNOC-163	Mitigating System Performance Index (MSPI) Basis Document	12

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

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AI 16F-001	Evaluation of Boric Acid Leakage	8
AI 16F-001	Evaluation of Boric Acid Leakage	10
AI 16F-002	Boric Acid Leakage Management	11
AI 22A-001	Operator Work Arounds/Operator Burdens/Control Room Deficiencies	12
AI 28A-010	Screening Condition Reports	28
AI 28A-100	Condition Report Resolution	12
AP 16B-003	Planning and Scheduling Preventive Maintenance	8A
AP 21B-003	Control of Non-Plant Items Inside or Near Plant Systems, Structures, and Components	11A
AP 21B-003	Control of Non-Plant Items Inside or Near Plant Systems, Structures, and Components	12
AP 26C-004	Operability Determination and Functionality Assessment	34B
SYS NB-320	Deenergizing and Energizing ESF Transformers	12

#### Condition Reports

112754	114176	114350	114437	115120
115174	115198	115320	115392	115717
117857	117858	117859	117860	117861

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Performance Assessment Worksheet CR 00115120	
APF 21-001-02	Control Room Turnover Checklist	December 1, 2017
APF 21-001-04	Auxiliary Building Operator Relief Checklist	December 2, 2017
APF 21-001-05	Turbine Building Operator Relief Checklist	December 2, 2017
APF 21-001-06	Site Operator Relief Checklist	December 2, 2017
APF 21-001-09	Fire Brigade Leader Relief Checklist	December 2, 2017
ES8318002	18Q1 Management Introduction	December 6, 2017
ODMI 2017-07	CR#117673	November 27, 2017
QA-2017-0365	QA Assessment of Non-Plant Items Issues	September 25, 2017
QA-2017-0368	Engineering Performance Oversight 03Q2017	December 21, 2017
QA-2017-0369	Operations 3 <sup>rd</sup> Quarter 2017 Quality Oversight Report	October 16, 2017
QA-2017-0370	17-Q3 QA CAP/PI Performance Report	December 18, 2017
Volume 4, Number 89	Wolf Creek News	November 16, 2017

**Section 4OA5: Other Activities**Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AI 28A-100	Condition Report Resolution	12
AP 24B-001	Control of Site Contractor Services	23A

Condition Reports

43233	47653	102322	110725	114788
114797				

Work Orders

13-380760-020    15-400194-008    15-400195-013    15-400196-007    17-428676-000  
17-428676-001

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
QA-2016-0206	QA Assessment of Performance Improvement Trending and CAPCO Program	May 16, 2016
SA-2017-0118	Corrective Action Program (CAP) Self Assessment	November 20, 2017
WM 16-0006	Docket No. 50-482: Reply to Notice of Violation EA-16-018	March 10, 2016

**Initial Request for Information  
Integrated Inspection  
Wolf Creek Nuclear Generating Station**

Inspection Report: 05000482/2017004

Inspection Dates: October 1 – December 31, 2017

Inspection Procedure: Integrated Inspection Procedures

Lead Inspector: Douglas Dodson, Senior Resident Inspector

**I. Information Requested Prior to September 22, 2017**

The following information should be provided in electronic format (Certrec IMS preferred), to the attention of Douglas Dodson by September 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 September 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 essential service water system components and associated calculations with low design margins.
2. A list of high risk essential service water system maintenance rule components and functions based on engineering or expert panel judgment.
3. A list of essential service water system related operating experience evaluations for the last 3 years.
4. A list of all essential service water system time-critical operator actions in procedures.
5. A list of permanent and temporary modifications related to essential service water system sorted by component.
6. A list of current essential service water system related "operator work arounds/burdens."
7. A list of the essential service water system design calculations, which provide the design margin information for components.
8. List of essential service water system root cause evaluations associated with component failures or design issues initiated/completed in the last 5 years.

9. A list of any essential service water system common-cause failures of components in the last 3 years.
10. An electronic copy of the essential service water 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 essential service water system health notebook.
12. A copy of essential service water system related audits completed in the last 2 years.
13. A list of essential service water system motor operated valves (MOVs) in the program, design margin and risk ranking.
14. A list of essential service water system air operated valves (AOVs) in the valve program, design margin and risk ranking.
15. Essential service water 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 essential service water system licensee contacts for the inspection team with pager or phone numbers.
17. An excel spreadsheet of essential service water 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 essential service water 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 essential service water 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.

WOLF CREEK GENERATING STATION – NRC INTEGRATED INSPECTION REPORT  
05000482/2017004 DATED FEBRUARY 12, 2018

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ADAMS ACCESSION NUMBER: ML18043A114

■ SUNSI Review: ADAMS: ☐ Non-Publicly Available ■ Non-Sensitive Keyword:  
 By: NHT/rd ☒ Yes ☐ No ■ Publicly Available ☐ Sensitive NRC-002

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SIGNATURE	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/
DATE	02/08/18	02/09/18	02/02/18	02/06/18	02/02/18	02/05/18
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