



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

October 30, 2014

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 INSPECTION REPORT  
05000482/2014004**

Dear Mr. Heflin:

On September 26, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Wolf Creek Generating Station. On October 1, 2014, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

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

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

A. Heflin

- 2 -

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Neil O'Keefe, Chief  
Project Branch B  
Division of Reactor Projects

Docket Nos.: 50-482  
License Nos: NPF-42

Enclosure: Inspection Report 05000482/2014004  
w/ Attachment: Supplemental  
Information

cc w/ encl: Electronic Distribution

Electronic distribution by RIV:

Regional Administrator (Marc.Dapas@nrc.gov)  
 Deputy Regional Administrator (Kriss.Kennedy@nrc.gov)  
 Acting DRP Director (Troy.Pruett@nrc.gov)  
 Acting DRP Deputy Director (Jason.Kozal@nrc.gov)  
 DRS Director (Anton.Vegel@nrc.gov)  
 DRS Deputy Director (Jeff.Clark@nrc.gov)  
 Senior Resident Inspector (Charles.Peabody@nrc.gov)  
 Resident Inspector (Raja.Stroble@nrc.gov)  
 WC Administrative Assistant (Carey.Spoon@nrc.gov)  
 Branch Chief, DRP/B (Neil.OKeefe@nrc.gov)  
 Senior Project Engineer, DRP/B (David.Proulx@nrc.gov)  
 Project Engineer, DRP/B (Fabian.Thomas@nrc.gov)  
 Public Affairs Officer (Victor.Dricks@nrc.gov)  
 Public Affairs Officer (Lara.Uselding@nrc.gov)  
 Project Manager (Fred.Lyon@nrc.gov)  
 Branch Chief, DRS/TSB (Geoffrey.Miller@nrc.gov)  
 RITS Coordinator (Marisa.Herrera@nrc.gov)  
 ACES (R4Enforcement.Resource@nrc.gov)  
 Regional Counsel (Karla.Fuller@nrc.gov)  
 Technical Support Assistant (Loretta.Williams@nrc.gov)  
 Congressional Affairs Officer (Jenny.Weil@nrc.gov)  
 RIV Congressional Affairs Officer (Angel.Moreno@nrc.gov)  
 RIV/ETA: OEDO (John.Jandovitz@nrc.gov)

ADAMS ACCESSION NUMBER: ML14303A686

X SUNSI Review By: NFO		ADAMS X Yes <input type="checkbox"/> No <input type="checkbox"/>		X Publicly Available <input type="checkbox"/> Non-Publicly Available		X Non-Sensitive <input type="checkbox"/> Sensitive		Keyword:
OFFICE	SRI:DRP/B	RI:DRP/B	C:DRS/EB1	C:DRS/EB2	C:DRS/OB	C:DRS/PSB1	C:DRS/PSB2	
NAME	CPeabody	RStroble	TFarnholtz	GWerner	VGaddy	MHaire	HGepford	
SIGNATURE	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/	
DATE	10/30/14	10/30/14	10/28/14	10/28/14	10/28/14	10/27/14	10/27/14	
OFFICE	C:DRS/TSB	BC:DRP/B						
NAME	GMiller	NOKeefe						
SIGNATURE	/RA/	/RA/						
DATE	10/27/14	10/30/14						

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000482  
License: NPF-42  
Report: 05000482/2014004  
Licensee: Wolf Creek Nuclear Operating Corporation  
Facility: Wolf Creek Generating Station  
Location: 1550 Oxen Lane NE  
Burlington, Kansas  
Dates: June 28 through September 26, 2014  
Inspectors: C. Peabody, Senior Resident Inspector  
R. Stroble, Resident Inspector  
T. Hartman, Senior Resident Inspector, Callaway  
C. Hunt, Acting Resident Inspector  
Approved By: Neil O'Keefe  
Chief, Project Branch B  
Division of Reactor Projects

## SUMMARY

IR 05000482/2014004; 06/28/2014 – 09/26/2014; WOLF CREEK GENERATING STATION; Integrated Resident and Regional Report; Maintenance Risk Assessments and Emergent Work Control.

The inspection activities described in this report were performed between June 28 and September 26, 2014, by the resident inspectors at Wolf Creek Generating Station and inspectors from the NRC's Region IV office. Two findings of very low safety significance (Green) are documented in this report. One of these findings involved a violation of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Components Within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

### Cornerstone: Initiating Events

- Green. A self-revealing finding was identified for failure to recognize the potential effects on supported plant equipment while manipulating electrical power distribution components. The finding resulted in an unplanned reactor pressure transient during solid plant operations because the charging flow control valve failed open. Plant pressure increased from 84 to 345 psig before operators were able to control charging flow and lower pressure. The inspectors also concluded that the Licensed Operator Watchstation Expectations in station procedure AP 21-001, "Conduct of Operations," was not met. Specifically step 6.3.2 states that Control Room personnel are responsible for in-plant activities and maintain control and cognizance of any activities which have the potential to impact plant conditions. This issue was entered into the corrective action program as Condition Report 80870.

Failure to maintain control and cognizance of activities which have the potential to impact plant conditions was a performance deficiency. Specifically, operators failed to recognize the potential effects on primary plant pressure while manipulating electrical power distribution system. The performance deficiency was more than minor because it affected the configuration control attribute of the Initiating Events Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. A regional senior reactor analyst performed a simplified risk evaluation and additionally considered guidance from Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," dated May 5, 2014, and determined that since this deficiency did not involve: 1) exceeding the pressure rating of low pressure piping; or 2) maintaining the low temperature over-pressure protection itself, this finding was of very low safety significance (Green). This was used to inform the assessment using Inspection Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 15, 2005. The analyst determined that the risk deficit was much less than 1E-6/year. The inspectors determined that the finding had a cross-cutting aspect of teamwork in the area of human performance in that individuals and work groups did not communicate and coordinate

their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the licensee failed to coordinate the planned bus realignment with a replacement of a redundant power supply such that the momentary loss of power would not have occurred [H.4]. (Section 1R13.b.1)

- Green. A Green self-revealing non-cited violation of Technical Specification 5.4.1.a and Regulatory Guide 1.33, Section 9.e was identified for the failure to implement procedures for the control of maintenance involving motor operated valve testing to ensure that it did not affect safety-related equipment while the plant was aligned to support alternate decay heat removal. The activity resulted in unplanned reactor pressure transients during solid plant operations. The inspectors reviewed the clearance order paperwork and found that the precautions for dealing with potential fluid and energy sources, specifically 'out of service equipment' were not clearly defined. The result was that the procedure assumed a normal refueling alignment of the residual heat removal system, when in fact the licensee had altered the system alignment to support an alternative reactor decay heat removal flow path using the spent fuel pool. This issue was entered into the corrective action program as Condition Report 81981.

Failure to ensure that outage work could be safely performed during the existing plant conditions was a performance deficiency. Specifically, when the licensee revised the outage plan shortly before the start of the Mid-cycle Outage 20, they did not re-perform the risk evaluation for the potential fluid and energy sources to account for the unusual configuration established to allow for alternate decay heat removal. The performance deficiency is more than minor because it affected the configuration control attribute of the Initiating Events Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. A region based senior reactor analyst performed a simplified risk evaluation and additionally considered guidance from Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process." This was used to inform the assessment using Inspection Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 15, 2005. The analyst determined that the finding had very low safety significance (Green) because the risk deficit was less than  $1E-6$ . The inspectors determined that the finding had a cross-cutting aspect of teamwork in the area of human performance in that individuals and work groups failed communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the licensee developed the alternate decay heat removal alignment shortly before the outage, however the effects of the implementation were not communicated to the schedulers and operators who had already made risk assumptions based on different anticipated plant conditions [H.4]. (Section 1R13.b.2)

## PLANT STATUS

Wolf Creek began the inspection period at 100 percent power and maintained 100 percent power for the remainder of the inspection period.

## REPORT DETAILS

### 1. REACTOR SAFETY

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

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

##### .1 Readiness for Impending Adverse Weather Conditions

###### a. Inspection Scope

On September 4, 2014, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to lake vegetation impingement on circulating water screen house, and the licensee's implementation of these procedures during a period when wind and lake conditions caused marine vegetation to build up on the debris screens for cooling water systems. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

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

###### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment (71111.04)

##### .1 Partial Walkdown

###### a. Inspection Scope

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

- July 7, 2014, train A Class 1E 4kV switchgear
- July 8, 2014, train B motor driven auxiliary feedwater
- August 19, 2014, train B component cooling water

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 three partial system walk-down samples as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

**1R05 Fire Protection (71111.05)**

.1 Quarterly Inspection

a. Inspection Scope

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

- July 2, 2014, temporary modifications to emergency lighting on 2000' and 2016' control building needed to support operator actions for certain fires
- July 9, 2014, control, diesel, and communication switchgear, fire area C-9
- July 9, 2014, control, diesel, and communication switchgear, fire area C-10
- September 26, 2014 auxiliary building fire area A-13, A-14, A-15, and A-33

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 August 19, 2014, the inspectors completed an inspection of underground bunkers susceptible to flooding. The inspectors selected one underground bunker that contained risk-significant cables whose failure could disable risk-significant equipment:

- bunker for underground electrical cables SL150, SL151, SL 152

The inspectors observed the material condition of the cables and splices contained in the bunkers and looked for evidence of cable degradation due to water intrusion. The inspectors verified that the cables and vaults met design requirements.

These activities constitute completion of one bunker/manhole sample, as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

**1R07 Heat Sink Performance (71111.07)**

a. Inspection Scope

On July 7, 2014, the inspectors completed an inspection of the readiness and availability of risk-significant heat exchangers. The inspectors observed performance tests for the SGK05B Class 1E chiller unit and the SGF02B motor-driven auxiliary feedwater pump B room cooler and reviewed the data from the completed tests.

These activities constitute completion of two heat sink performance annual review samples, as defined in Inspection Procedure 71111.07.

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 July 28, 2014, 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.

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

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance

a. Inspection Scope

On July 14, 2014, 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 awareness due to testing of safety related systems.

On July 22, 2014, 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 due to restoration of train B essential service water inservice pump test and inspection and essential service water check valve test from planned maintenance. The inspectors observed the operators' performance of the following activities:

In addition, the inspectors assessed the operators' adherence to plant procedures, including AP 21-001, Conduct of Operations and other operations department policies.

These activities constitute completion of two quarterly licensed operator performance samples, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

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

- July 23, 2014, process radiation monitors, control room indication SP-12
- August 15, 2014, main steam system, atmospheric relief valves AB-03
- August 16, 2014, main feedwater system, AE-01
- August 17, 2014, main steam system, steam dumps AB-02
- September 4, 2014, stator water cooling system, CE01

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 five maintenance effectiveness samples, 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 July 29, 2014, the inspectors reviewed a weekly risk assessment 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 verified that 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.

The inspectors also observed portions of two emergent work activities that had the potential to cause an initiating event or to affect the functional capability of mitigating systems:

- September 9, 2014, 345kV-120 breaker SF6 recharge
- September 9, 2014, 13-48 breaker inspection, troubleshoot and vent

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

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

### b. Findings

#### 1. Failure to maintain control and cognizance of activities which have the potential to impact plant conditions

Introduction. A Green self-revealing finding was identified for failure to recognize the potential effects on supported plant equipment while manipulating electrical power distribution components. The finding resulted in an unplanned reactor pressure transient during solid plant operations.

Description. On March 14, 2014, with the plant in Mode 5 and with primary plant in a water-solid condition, operators were maintaining reactor coolant system pressure at 84 psig using charging and letdown. Control room operators cross-tied non-safety 480 V electrical buses PG19 and PG20 to support maintenance under Work Order 12-359936, using station procedure SYS PG-204, "Energizing PG19 or PG20 Alternate Power Source." Because the flow control valve's backup power supply was also out of service, this action inadvertently caused a momentary loss of power to the normal charging pump flow control valve. The valve failed open, causing charging flow to increase from 82.5gpm to 202.4gpm. The mismatch between charging and letdown flow caused reactor coolant system pressure to rise from 84 psig to 345.1 psig. After approximately 1 minute, operators recognized the discrepancy and took manual action to prevent challenging the low temperature over-pressure protection system from opening a

pressurizer power-operated relief valve. The operators returned the plant to steady state initial conditions by decreasing charging flow and increasing letdown over the next 15 minutes. The licensee documented the transient event in their corrective action program as Condition Report 80870.

The inspectors reviewed the licensee's apparent cause evaluation, as well as the procedure revisions specified by the corrective action plan and determined that they were appropriate. The apparent cause evaluation team observed that a similar procedure SYS PG-334, "De-energizing PG14, PG18, PG20, and PG24," contains attachments listing circuits that will lose power when the motor control centers are de-energized. Such an affected equipment list was not provided in SYS PG-204, and no note or precaution was given to reference the attachment elsewhere. No specific precautionary information was included in the work order documentation either. The cause evaluation noted that the normal charging pump and flow path were listed as protected equipment at the time; however, a review of the station procedure AI 22C-013, "Protected Equipment Program," Revision 11, did not contain adequate guidance for determining control power sources. The apparent cause evaluation team concluded that this was a procedural deficiency because for protected equipment to be available, its required support equipment must also be available. The apparent cause team concluded that the performance of SYS PG-204 should not have been approved during the existing plant conditions per station procedure AI 22C-013 steps 6.4.4 and 6.5.2 respectively. The apparent cause team also concluded the station outage risk assessment program, AP 22B-001, "Outage Risk Management," Revision 17, did not provide the necessary guidance for determining plant impact of scheduled activities, and that certain exceptions and notes may need to be reconsidered. The team also found that the work controls process failed to identify that the scheduled work activity was not compatible with current plant conditions and establish appropriate scheduling ties.

The inspectors considered this last conclusion the most pertinent to the performance deficiency. Upon review of AP 22B-001, "Outage Risk Management," Revision 17, the inspectors noted that the guidance of Steps 6.1.1-2 and 6.1.1-3 were not adequately implemented. Step 6.1.1-2 specified that assessments for shutdown maintenance activities need to take into account plant conditions and systems, structures, and components taken out of service that impact the shutdown safety function. In this case, the licensee did not recognize that the inventory control function was potentially affected. Step 6.1.1-3 notes that maintenance activities do not necessarily have to remove a structure, system, and component from service to impact plant conditions and safety functions, and goes on to list a very similar example, of an unplanned increase in letdown.

The inspectors also concluded that the Licensed Operator Watchstation Expectations in station procedure AP 21-001, "Conduct of Operations," was not met. Specifically step 6.3.2 states that Control Room personnel are responsible for in-plant activities and maintain control and cognizance of any activities which have the potential to impact plant conditions.

Analysis. Failure to maintain control and cognizance of activities which have the potential to impact plant conditions was a performance deficiency. Specifically, operators failed to recognize the potential effects on primary plant pressure while manipulating electrical power distribution system. The performance deficiency was more than minor because it affected the configuration control attribute of the Initiating Events

Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. A regional senior reactor analyst performed a simplified risk evaluation and additionally considered guidance from Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," dated May 5, 2014, and determined that since this deficiency did not involve: 1) exceeding the pressure rating of low pressure piping; or 2) maintaining the low temperature over-pressure protection itself, this finding was of very low safety significance (Green). This was used to inform the assessment using Inspection Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 15, 2005. The analyst determined that the risk deficit was much less than 1E-6/year. The inspectors determined that the finding had a cross-cutting aspect of teamwork in the area of human performance in that individuals and work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the licensee failed to coordinate the planned bus realignment with a replacement of a redundant power supply such that the momentary loss of power would not have occurred [H.4].

Enforcement. No violation of regulatory requirements occurred. FIN 05000482/2014004-01, "Failure to Maintain Control and Cognizance of Activities With the Potential to Impact Plant Conditions."

2. Failure to Ensure That Outage Work Could Be Performed Safely During the Existing Plant Conditions

Introduction. A Green self-revealing non-cited violation of Technical Specification 5.4.1.a was identified for the failure to analyze the effects of performing motor operated valve testing on the plant being aligned to support alternate decay heat removal. The activity resulted in unplanned reactor pressure transients during solid plant operations.

Description. On April 1, 2014, with the plant in Mode 5, operators were maintaining the primary plant in a water-solid condition at 93 psig. Maintenance personnel commenced Work Order 12-359637 to perform actuator maintenance and stroke test motor operated valve EJHV8804A (residual heat removal pump A to chemical and volume control system centrifugal charging pumps isolation valve). When maintenance personnel reached the step in the procedure to manually open EJHV8804A, they contacted the control room for permission and to inform them of expected alarms. The reactor operator checked the control panels for the train A residual heat removal system and observed both the valve being tested and the residual heat removal hot leg suction valve EJHV8701A were de-energized and had caution tags posted. The operator assumed the caution tags were for the purposes of the test; however the caution tags were hung to allow an alternate method of reactor decay heat removal. The operator also incorrectly assumed that being de-energized, valve EJHV8701A was closed; the valve was actually de-energized open to support the alternate decay heat removal alignment. Even though he had no positive indication of the EJHV8701A's position, he did not to request a field operator locally verify the position of the EJHV8701A before manipulating EJHV8804A, and granted permission to manually cycle EJHV8804A open then closed. When the valve was opened, the craft personnel heard a noise that sounded like pressure relieving across the valve for one or two seconds, however they did not consider that to be uncommon so they did not report it to the control room.

In the existing plant alignment, opening this valve caused a flow path from the reactor coolant system hot leg through the A residual heat removal pump to the centrifugal charging pump header and volume control tank. This created to an additional letdown path that exceeded the charging flow rate, resulting in the reactor pressure dropped instantly below 0 psig. The unusual system alignment was created to establish an alternate decay heat removal path in the event that the train of residual heat removal and/or essential service water (ESW) became non-functional; since the outage work included replacing ESW piping, this risk management action was considered prudent due to the inability to quickly recover the train that was out of service.

The control room operators immediately noticed the reactor pressure decrease below 0 psig. Operator review of the computer data determined that the negative pressure indication was largely a function of the wide range reactor coolant system pressure instrument uncertainty. By comparing this reading with the volume control tank parameters throughout the event, operators concluded the reactor coolant system pressure equalized with the volume control tank at 24 psig. Control room operators reduced normal letdown flow. Two minutes later, the valve was closed by the maintenance personnel in the field. Reactor pressure rapidly increased to approximately 112 psig. Control room operators restored normal letdown flow rate and brought the plant back to the steady state target pressure band. The control room operators then realized that the valve testing had been the cause of the pressure transients because it was not properly isolated from the reactor coolant system. A subsequent check of the plant computer data confirmed the last known position of EJHV8701A was open. The licensee initiated Condition Report 81981 and performed an apparent cause evaluation.

The apparent cause evaluation team reviewed station procedure AP 21D-002, "Evaluation for Potential Energy/Fluid Transfer Paths," Revision 11A since the event was an apparent breakdown of that process. This procedure prioritizes the strategies for safely managing potential fluid and energy sources by controlling risk through the schedule, the clearance order, or the procedure. The method chosen for this activity was schedule control. Step 6.2.2 describes the objecting of this method as "The component will be manipulated in a schedule window in which the system is out of service and no potential exists for fluid/energy transfer. The appropriate work group scheduler will be directed to place the activity within a schedule window as determined." Step 6.3 states "If the component will be manipulated in a schedule window in which the system is out of service and no potential exists for fluid/energy transfer, then ensure the schedule provides control of the activity. The proper logic ties must be established for control of the activity in the work schedule. No additional flow path evaluation is required." The apparent cause team determined that the error was that the maintenance activity was not scheduled at a time where the transfer of fluid energy would not occur, and noted that the apparent cause of this was that the procedure itself does not provide adequate definition or guidance as to what constitutes out of service conditions.

The inspectors reviewed the clearance order paperwork and found that the precautions for dealing with potential fluid and energy sources were not clear. The clearance order only specified that residual heat removal pump A and safety injection pump A system were out of service. This valve testing is usually performed during refueling outages when the systems are isolated and drained. For the mid-cycle 20 outage, which was not a refueling outage, the systems were not drained, and the residual heat removal pump A was to remain available for alternate decay heat removal through the spent fuel pool. Since the outage work was planned and the clearance orders were written well in

advance of the outage, they did not take into account that the new alternate decay heat removal cooling strategy, which was devised shortly before the outage. Even though this strategy changed the standby alignment of the residual heat removal system, the licensee did not re-evaluate the risk impacts of the changes on scheduled outage maintenance activities. The lack of outage planning meant that the only opportunity to identify that the work could not be safely performed under the plant conditions was operator review, and this also failed to identify the conflict because the operator was unaware of the system alignment and failed to verify his assumptions.

The inspectors reviewed the apparent cause evaluation and the corrective action plan and determined that the conclusions were appropriate and that actions taken were appropriate. Furthermore, the inspectors determined that the implementation of the alternate decay heat removal alignment invalidated the previous assessments of risk for performing the valve testing under conditions expected during a typical refueling outage.

In response to these events, the licensee increased the level of oversight of maintenance risk assessment prior to work authorization while solid plant operations existed, and procedure changes were planned for procedure AP 21D-002, "Evaluation for Potential Energy-Fluid Transfers."

Analysis. Failure to ensure that outage work could be safely performed during the existing plant conditions was a performance deficiency. Specifically, when the licensee revised the outage plan shortly before the start of the Mid-cycle Outage 20, they did not re-perform the risk evaluation for the potential fluid and energy sources to account for the unusual configuration established to allow for alternate decay heat removal. The performance deficiency is more than minor because it affected the configuration control attribute of the Initiating Events Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. A region based senior reactor analyst performed a simplified risk evaluation and additionally considered guidance from Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process." This was used to inform the assessment using Inspection Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 15, 2005. The analyst determined that the finding had very low safety significance (Green) because the risk deficit was less than 1E-6. The inspectors determined that the finding had a cross-cutting aspect of teamwork in the area of human performance in that individuals and work groups failed communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the licensee developed the alternate decay heat removal alignment shortly before the outage, however the effects of the implementation were not communicated to the schedulers and operators who had already made risk assumptions based on different anticipated plant conditions [H.4].

Enforcement. Technical Specification 5.4.a requires that procedures required by Regulatory Guide 1.33, Revision 2, Appendix A, including section 9.e for control of maintenance, be established, implemented, and maintained. One procedure for control of maintenance at Wolf Creek is AP 21D-002 "Evaluation of Potential Fluid/Energy Transfer Paths." Contrary to the above, on April 1, 2014, the licensee failed to implement a required procedure for the control of maintenance. Specifically, Wolf Creek performed residual heat removal system valve testing without proper equipment isolation. The cause was determined to involve the failure to re-perform the required

evaluation of potential fluid/energy transfer paths when the outage plan was altered to include a new residual heat removal system alignment. Because the violation was of very low safety significance and was entered into the licensee's corrective action program as Condition Report 81981, it is being treated as a non-cited violation in accordance with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000482/2014004-02, "Failure to Ensure That Outage Work Could Be Safely Performed During the Existing Plant Conditions."

## **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:

- July 9, 2014, operability determination of solid state protection system automatic test interface
- September 2, 2014, operability determination of unreliable instrument tunnel sump level indication
- September 24, 2014, operability determination of damaged diesel control panel D/C instrument power fuses

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 constitute completion of three operability and functionality review samples, as defined in Inspection Procedure 71111.15.

### b. Findings

No findings were identified.

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

### .1 Temporary Modifications

#### a. Inspection Scope

On July 22, 2014, the inspectors reviewed one temporary plant modification of a lighting modification to support the new loss of Class 1E A/C GOTHIC room heat up analysis for cooling both trains with a single chiller.

The inspectors verified that the licensee had installed and removed 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 constitute 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 July 16, 2014, the inspectors reviewed a permanent plant modification to the thermocouple/core cooling monitor.

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

These activities constitute 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 six post-maintenance testing activities that affected risk-significant SSCs:

- July 22, 2014, refueling water storage tank suction valve to safety injection pump A
- July 30, 2014, pressurizer heater load center PG021 preventive maintenance
- August 6, 2014, train B essential service water inservice pump test and inspection and essential service water check valve test
- August 6, 2014, train B emergency diesel generator test run
- August 12, 2014, train B auxiliary feedwater pump testing
- August 19, 2014, component cooling water train A pump test

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 constitute completion of six post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

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

In-service tests:

- July 15, 2014, train B centrifugal charging pump inservice testing run

Other surveillance tests:

- July 17, 2014, essential service water to train B air compressor isolation valve test
- August 21, 2014, solid-state protection system actuation logic test

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

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

b. Findings

No findings were identified.

## **Cornerstone: Emergency Preparedness**

### **1EP6 Drill Evaluation (71114.06)**

#### **.1 Emergency Preparedness Drill Observation**

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

The inspectors observed an emergency preparedness drill on August 20, 2014, to verify the adequacy and capability of the licensee's assessment of drill performance. The inspectors reviewed the drill scenario, observed the drill from the technical support center, operational support center, simulator, and attended the post-drill critique. The inspectors verified that the licensee's emergency classifications, off-site notifications, and protective action recommendations were appropriate and timely. The inspectors verified that any emergency preparedness weaknesses were appropriately identified by the licensee in the post-drill critique and entered into the corrective action program for resolution.

These activities constitute completion of one emergency preparedness drill observation sample, as defined in Inspection Procedure 71114.06.

##### **b. Findings**

No findings were identified.

### **4. OTHER ACTIVITIES**

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

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

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

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

The inspectors reviewed the licensee's mitigating system performance index data for the period of September 27, 2013 through September 26, 2014 to verify the accuracy and completeness of the reported data. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

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

##### **b. Findings**

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of September 27, 2013 through September 26, 2014 to verify the accuracy and completeness of the reported data. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

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

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of September 27, 2013 through September 26, 2014 to verify the accuracy and completeness of the reported data. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

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

b. Findings

No findings were identified.

**40A2 Problem Identification and Resolution (71152)**

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

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

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

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

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

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

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

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

On September 26, 2014, the inspectors performed an in-depth review of operator burdens and workarounds. Wolf Creek has an operator burden affecting turbine driven auxiliary feed water steam drains. The inspectors reviewed the operator burden to verify that the licensee's quantification of the aggregate operator burden was accurate and that the total aggregate burden is not impacting safe operations of the facility.

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 provide compensatory actions until a long term solution can be implemented through plant modifications.

These activities constitute completion of one annual follow-up sample, which included one operator work-around sample, as defined in Inspection Procedure 71152.

b. Findings

No findings were identified.

**40A6 Meetings, Including Exit**

Exit Meeting Summary

On October 1, 2014, the inspectors presented the inspection results to Mr. A. Heflin, Chief Executive Officer, 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

D. Alford, Problem Risk Assessment  
D. Bowers, System Engineering  
B Brown, Superintendent, Security  
A. Broyles, Manager, Information Services  
J. Edwards, Manager, Operations  
D. Erbe, Manager, Security  
R. Gilliam, Health Physics  
A. Heflin, President and Chief Executive Officer  
S. Henry, Manager, Integrated Plant Scheduling  
R. Hobby, Licensing Engineer  
J. Keim, Programs Engineer  
S. Koenig, Manager, Regulatory Affairs  
D. Langston, Quality Assurance  
L. Ratzlaff, Manager, Maintenance  
L. Sawyer, Supervisor, Corrective Actions  
T. Slenker, Operations  
D. Sullivan, Manager, Supply Chain Services  
T. Young, Corporate Communications

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

Opened and Closed

05000482/2014004-01	FIN	Failure to Maintain Control and Cognizance of Activities With the Potential to Impact Plant Conditions (Section 1R13.b.1)
05000482/2014004-02	NCV	Failure to Ensure That Outage Work Could Be Safely Performed During the Existing Plant Conditions (Section 1R13.b.2)

**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather**

Condition Reports (CR)

87721                      87757                      87681

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

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STS EG-001	Component Cooling Water Valve Check	11

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
KD-7496	One Line Diagram	52
M-12 AL01	P&ID Auxiliary Feedwater System	23
M-12 EG01	P&ID Component Cooling Water System	24
M-12 EG02	P&ID Component Cooling Water System	23
M-12 EG03	P&ID Component Cooling Water System	12
E-13NB02	Lower Medium Voltage Sys. Class 1E 4.16 Kv Three Line Meter and Relay Diagram	3

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

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AP-10-106	Fire Pre-Plan	15

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-1F9905	Fire Hazard Analysis	5

## **Section 1R06: Flood Protection Measures**

### Work Orders (WOs)

13-379717-022

## **Section 1R07: Heat Sink Performance**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STN PE-037B	ESW Train B Heat Exchanger Flow and DP Trending	20A

**Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
LR4607014	Requalification Simulator Exam Scenario #70-14	1
AIF 30E-023-01	Remediation Plan	0
AP 21-001	Conduct of Operations	69

**Section 1R12: Maintenance Effectiveness**

Databases

<u>Title</u>	<u>Date</u>
Maintenance Rule Database	September 27, 2014
Work Management Database	September 27, 2014
Corrective Action Program Database	September 27, 2014

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APF 22C-003-01	On-line Nuclear Safety And Generation Risk Assessment” Schedule week 14-0302, 7/7/14 to 7/13/14	As Updated
APF 22C-003-01	On-line Nuclear Safety And Generation Risk Assessment” Schedule week 14-0304, 7/21/14 to 7/27/14	0

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STS BB-006	Reactor Coolant System Inventory Balance Using the NPIS Computer	13

Condition Reports (CRs)

85877	88258	88227	85690	88060
87623	87642			

Work Orders (WOs)

14-389317-00      14-389612-000

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Technical Specification Basis	
10466-J-104-0347-05	Load Shedding and Emergency Load Sequencer Vendor Technical Manual	C

**Section 1R18: Plant Modifications**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
DCP 12512	50.59 Evaluation for Thermocouple/Core Cooling Monitor Upgrade	2
WNA-AR-00396-SAP	WCNOC Thermocouple/Core Cooling Monitor (TC/CCM) System Equipment Qualification Evaluation	2
NAI-1720-001	Wolf Creek Control Building Loss of Class 1E A/C GOTHIC Room Heat Up Analysis	0
NAI-1720-001	Wolf Creek Control Building Loss of Class 1E A/C GOTHIC Room Heat Up Analysis	1
DCP 014503	Evaluation of Fans in Class 1E Equipment Rooms	9

Change Package

<u>Number</u>	<u>Title</u>	<u>Revision</u>
012512	TCCM Console Replacement	9
014503	Evaluation of Fans in Class 1E Equipment Rooms	2

**Section 1R19: Post-Maintenance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
MPE E009Q-03	Inspection and Testing of Siemens Vacuum Circuit Breakers	8
STN NB-106	Load Center PG021 Feeder Breaker Trip Circuit Verification	0
STS EG-100A	Component Cooling Water Pumps A/C Inservice Pump Test	30
STS AL-102	MDAFW B Inservice Pump Test	40

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STS EF-100B	ESW System Inservice Pump B and ESW B Discharge Check Valve Test	43
STS BN-201A	BN HCV-8800A RWST to Refuel Pool ISO Inservice Valve Test	5
STS KJ-005B	Manual/Auto Start Sync and Loading of EDG NE02	60

Work Order (WOs)

13-381691-000      14-382104-000

**Section 1R22: Surveillance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STS BG-100B	Centrifugal Charging System B Train Inservice Pump Test	48
STS EF-201B	EF HV-44 ESW B to Air Compressor Inservice Valve Test	11
STS IC-211A	Actuation Logic Test Train A Solid State Protection System	36A
STS CH-025	Reactor Coolant Dose Equivalent Iodine Determination	6A
STS CH-024	Reactor Coolant Dose Equivalent Xe-133 Determination	6A

**Section 40A1: Performance Indicator Verification**

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
WCNOC-163	Mitigating Systems Performance Index Basis Document	9

**Section 40A2: Problem Identification and Resolution**

Operator Burden

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
14-OB108	TDAFW Steam Drain Isolation	May 29, 2014
CCP13404	Design System Modification to Prevent Steam in AFW Rooms	0