



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

February 13, 2015

Mr. Jeremy Browning, Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 SR 333  
Russellville, AR 72802-0967

**SUBJECT: ARKANSAS NUCLEAR ONE – NRC INSPECTION REPORT 05000313/2014005  
and 05000368/2014005**

Dear Mr. Browning:

On December 31, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One facility, Units 1 and 2. On January 6, 2015, 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 four 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 NRC Enforcement Policy.

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

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV; and the NRC resident inspector at Arkansas Nuclear One.

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/**

Ryan E. Lantz, Chief  
Project Branch E  
Division of Reactor Projects

Docket Nos. 50-313, 50-368  
License Nos. DRP-51; NPF-6

Enclosure: Inspection Report 05000313/2014005 and  
05000368/2014005 w/ Attachments:

1. Supplemental Information
2. Temporary Instruction 2515/189 Request for Information
3. Detailed Risk Evaluation

cc w/ encl:  
Electronic Distribution for Arkansas Nuclear One

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Letter to Jeremy Browning from Ryan E. Lantz dated February 13, 2015

SUBJECT: ARKANSAS NUCLEAR ONE – NRC INSPECTION REPORT 05000313/2014005  
and 05000368/2014005

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000313; 05000368

License: DPR-51; NPF-6

Report: 05000313/2014005; 05000368/2014005

Licensee: Entergy Operations Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

Location: Junction of Hwy. 64 West and Hwy. 333 South  
Russellville, Arkansas

Dates: October 1 through December 31, 2014

Inspectors: B. Tindell, Senior Resident Inspector  
M. Young, Resident Inspector  
J. Drake, Senior Reactor Inspector  
P. Elkmann, Senior Emergency Preparedness Inspector  
G. Guerra, CHP, Emergency Preparedness Inspector  
S. Hedger, Operations Engineer  
J. Melfi, Project Engineer  
J. Rollins, Physical Security Inspector

Approved By: R. Lantz, Chief  
Project Branch E  
Division of Reactor Projects

## SUMMARY

IR 05000313/2014005; 05000368/2014005; 10/01/2014 - 12/31/2014; Arkansas Nuclear One, Units 1 and 2, Integrated Inspection Report; Equipment Alignment, Maintenance Rule, Exercise Evaluation, Problem Identification and Resolution.

The inspection activities described in this report were performed between October 1 and December 31, 2014, by the resident inspectors at Arkansas Nuclear One and inspectors from the NRC's Region IV office. Four findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

### Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of 10 CFR 50.54(hh)(2) for the failure to develop mitigating strategy guidance that would successfully maintain or restore Unit 2 core cooling after the loss of large areas of the plant. Specifically, the guidance did not ensure the capability of the mitigating strategy because an unisolated flow diversion could have prevented water from reaching the steam generators and cooling the core. The issue was documented in Condition Report CR-ANO-2-2014-03277, and the procedure was revised to correct the condition.

The licensee's failure to develop mitigating strategy guidance that would successfully maintain or restore Unit 2 core cooling after loss of large areas of the plant, as required by 10 CFR 50.54(hh)(2), was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was 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. Specifically, the guidance did not ensure the capability of the mitigating strategy because an unisolated flow diversion could have prevented water from reaching the steam generators and cooling the core. Using NRC Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, and NRC Manual Chapter 0609, Appendix L, "B.5.b Significance Determination Process," dated December 24, 2009, Table 1, "SDP Screening Worksheet for B.5.b," the finding was determined to be of very low safety significance because the performance deficiency represented the unrecoverable unavailability of an individual mitigating strategy; other core cooling mitigating strategies were available. This finding has a human performance crosscutting aspect associated with avoid complacency, in that the licensee failed to recognize and plan for the possibility of latent issues, even while expecting successful outcomes [H.12]. (Section 1R04)

- Green. Inspectors identified a noncited violation of Unit 1 Technical Specification 5.4, "Procedures," for the licensee's failure to establish adequate emergency operating procedures. Specifically, the licensee's emergency operating procedures failed to establish minimum flow protection for the Unit 1 auxiliary feedwater pump, which could result in

catastrophic failure of the pump. The issue was documented in Condition Report CR-ANO-1-2014-00286 and the procedures were revised to correct the condition.

The failure to establish minimum flow protection for the Unit 1 auxiliary feedwater pump in emergency and abnormal operating procedures in accordance with the emergency operating procedure writer's guide was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was 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. Specifically, inadequate emergency and abnormal operating procedures could have resulted in failure of the auxiliary feedwater pump, a mitigating system for a loss of main and emergency feedwater. Using Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings at Power," June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined that the finding required a detailed risk evaluation because the finding represented a loss of system function. A Region IV senior reactor analyst performed the detailed risk evaluation and determined that the change to the core damage frequency was less than  $4.2E-7$ /year (Green). The dominant core damage sequences included losses of one of the safety related 4160 volt electrical buses, steam generator tube ruptures, and plant transients. The equipment that helped mitigate the risk included the high pressure injection system (for feed and bleed) and the main and emergency feedwater systems. This finding did not have a cross-cutting aspect because the most significant contributing cause was not indicative of current performance. Specifically, the emergency and abnormal operating procedures for operating auxiliary feedwater had not changed for at least 20 years. (Section 1R12)

- Green. Inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to maintain design control of the Unit 2 vital switchgear ventilation system. Specifically, in 2002, the licensee failed to ensure that the ventilation system was capable of cooling the switchgear under design basis conditions. The licensee documented the issue in Condition Report CR-ANO-2-2014-00352 and conducted an evaluation to verify the capability of the ventilation system.

Failure to ensure that the ventilation system was capable of cooling the switchgear under design basis conditions was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings at Power," June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined that the finding was of very low safety significance (Green) because the finding was a deficiency affecting the design of a mitigating system, and the system maintained its functionality. The inspectors determined that there was no cross-cutting aspect associated with this finding because the cause of the performance deficiency occurred more than three years ago, and was not representative of current licensee performance. (Section 4OA2.3)

## Cornerstone: Emergency Preparedness

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50.47(b)(14) for the failure to correct a deficiency identified in a 2013 simulator drill. Specifically, control room operators did not implement the procedure that describes how the site will maintain continuous communication with threat notification sources during a drill conducted August 7, 2013, and also during the September 16, 2014, biennial exercise. The inspectors determined that the licensee's corrective actions for this issue were incomplete and did not address the extent of condition. The licensee has entered the issue into the corrective action program in corrective action documents WT-WTANO-2014-00189 and Condition Report CR-ANO-C-2014-02478.

The failure to correct weaknesses occurring in drills and exercises is a performance deficiency within the licensee's ability to foresee and correct. The performance deficiency is more than minor because it is associated with the emergency response organization performance attribute of the Emergency Preparedness Cornerstone and it adversely impacted the cornerstone objective. The licensee's ability to implement adequate measures to protect the health and safety of the public in the event of hostile action and a radiological emergency is degraded when it fails to correct performance that precludes the effective implementation of the emergency plan. This finding was evaluated using Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process (SDP)," Attachment 2, dated February 24, 2012, and was determined to be of very low safety significance (Green) because it was a failure to comply with NRC requirements, was not associated with a risk-significant planning standard, and was not a loss of planning standard function. The finding was not a loss of function because the deficiency that was identified was not associated with classification, notifications to state and local agencies, or the development of protective action recommendations.

The finding was assigned a cross-cutting aspect in the area of problem identification and resolution, associated with the resolution of issues because the licensee failed to evaluate the initial performance issues to ensure that resolutions adequately addressed the extent of condition commensurate with their safety significance. The licensee failed to recognize in August 2013 that continuous communications with threat notification sources is required by regulation and that performance issues with the implementing procedure should be communicated to the entire control room staff population [P.2]. (Section 1EP7.1)

## PLANT STATUS

Unit 1 began the period at 100 percent power. On December 9, 2014, Unit 1 commenced a rapid plant downpower at the order of the transmission grid operator due to a switchyard breaker issue. The unit stabilized at 55 percent power. On December 9, 2014, the breaker was removed from service and the unit increased power to 100 percent. On December 21, 2014, Unit 1 commenced a rapid plant downpower at the order of the transmission grid operator due to a switchyard breaker issue. The unit stabilized at 75 percent power. On December 22, 2014, the breaker was repaired and the unit increased power to 100 percent and remained at 100 percent power the rest of the inspection period.

Unit 2 began the period at 100 percent power. On December 9, 2014, Unit 2 commenced a rapid plant downpower at the order of the transmission grid operator due to a switchyard breaker issue. The unit stabilized at 45 percent power. On December 9, 2014, the breaker was removed from service and the unit increased power, reaching 100 percent power on December 10, 2014. On December 21, 2014, Unit 2 commenced a rapid plant downpower at the order of the transmission grid operator due to a switchyard breaker issue. The unit stabilized at 55 percent power. On December 22, 2014, the breaker was repaired and the unit increased power, reaching 100 percent power on December 23, 2014, and remained at 100 percent power the rest of the inspection period.

## REPORT DETAILS

### 1. REACTOR SAFETY

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

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

##### Readiness for Seasonal Extreme Weather Conditions

##### a. Inspection Scope

On October, 24, 2013, 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 cold temperatures 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 weather season.

The inspectors selected four risk-significant systems that were required to be protected from cold temperatures:

- Unit 1, borated water storage tank
- Unit 1, boric acid addition tank
- Units 1 and 2, alternate ac diesel generator
- Unit 2, refueling water storage tank

The inspectors reviewed the licensee's procedures and design information to ensure the systems and components would remain functional when challenged by 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 the 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.

**1R04 Equipment Alignment (71111.04)**

a. Inspection Scope

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

- October 1, 2014, Unit 2, emergency diesel generator train A while train B was out of service for preventative maintenance during an extended allowed outage time
- October 16, 2014, Unit 1, BW-1, borated water storage tank outlet valve for both trains of emergency core cooling systems and reactor building spray
- November 18, 2014, Units 1 and 2, core cooling strategies for potential loss of large areas of the plant
- December 29, 2014, Units 1 and 2, alternate ac diesel generator while protected for switchyard work

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

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

b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR 50.54(hh)(2) for the failure to develop mitigating strategy guidance that would successfully maintain or restore Unit 2 core cooling after the loss of large areas of the plant. Specifically, the guidance did not ensure the capability of the mitigating strategy because an unisolated flow diversion could have prevented water from reaching the steam generators and cooling the core.

Description. The inspectors performed a walkdown of Procedure OP-1203.048 "Security Event," Revision 29, Attachment J, Section J, Part 6.0. The inspectors found that valves in the startup and blowdown system critical to the Unit 2 core cooling mitigating strategy were not addressed in the guidance. Specifically, 2CV-1074-1, a pressure controlling valve, may fail open on loss of instrument air so that water from the portable pump intended for the steam generators would be diverted to the hotwell. The licensee

documented the issue in Condition Report CR-ANO-2-2014-03277 and modified the guidance so that potential diversion flowpaths would be isolated.

The inspectors determined that, due to the inadequate guidance, the Unit 2 core cooling mitigating strategy using the startup and blowdown system was unavailable and unrecoverable due to the significant diagnosis and action time that would be necessary to recover the strategy. However, the inspectors determined that a Unit 2 core cooling mitigating strategy using the turbine driven emergency feedwater pump was unaffected and available, so that the function could be met.

The inspectors reviewed the change history for the guidance and interviewed operations personnel that had recently performed a walkdown of the guidance in order to determine the cause of the performance deficiency. The inspectors concluded that the licensee had failed to consider the possibility of valves changing position and diverting flow away from the mitigating strategy during the postulated event.

Analysis. The licensee's failure to develop mitigating strategy guidance that would successfully maintain or restore Unit 2 core cooling after loss of large areas of the plant, as required by 10 CFR 50.54(hh)(2), was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was 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. Specifically, the guidance did not ensure the mitigating strategy could cool the core because an unisolated flow diversion could have prevented water from the portable pump reaching the steam generators. Using NRC Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, and NRC Manual Chapter 0609, Appendix L, "B.5.b Significance Determination Process," dated December 24, 2009, Table 1, "SDP Screening Worksheet for B.5.b," the finding was determined to be of very low safety significance because the performance deficiency represented the unrecoverable unavailability of an individual mitigating strategy and other core cooling mitigating strategies were available. This finding has a human performance crosscutting aspect associated with avoid complacency, in that the licensee failed to recognize and plan for the possibility of latent issues, even while expecting successful outcomes [H.12].

Enforcement. Title 10 CFR 50.54(hh)(2), requires, in part, that each licensee shall develop guidance intended to maintain or restore core cooling under the circumstances associated with loss of large areas of the plant due to explosions or fire. Contrary to the above, as of November 17, 2014, the licensee had failed to develop guidance intended to maintain or restore core cooling under the circumstances associated with loss of large areas of the plant due to explosions or fire. Specifically, the licensee failed to ensure that the Unit 2 core cooling guidance directed isolation of potential flow diversion flowpaths so that the cooling water would flow to the steam generators. The licensee corrected the condition by revising the guidance to isolate the potential flow diversion flowpaths. This violation is being treated as a noncited violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2014-03277. (NCV 05000368/2014005-01; Failure to Develop Adequate Guidance for Extreme Damage Mitigation)

## **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:

- October 1, 2014, Unit 2, Fire Area SS, south switchgear room, east DC equipment room, and east battery room
- October 9, 2014, Unit 2, Fire Area AA, east pump area and gallery
- October 9, 2014, Unit 1, Fire Area C, radwaste processing area, lower north piping penetration area, and penetration ventilation area
- November 21, 2014, Unit 1, Fire Area B-1, controlled access area

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 23, 2014, 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 Unit 2 emergency diesel generator rooms which contain 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 constitute completion of one flood protection measures 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 October 8, 2014, the inspectors observed an evaluated simulator scenario performed by an operating crew on Unit 2. On November 13, 2014, the inspectors observed simulator training for an operating crew on Unit 1. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

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

b. Findings

No findings were identified.

.2 Review of Licensed Operator Performance

a. Inspection Scope

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. The inspectors observed the operators' performance of the following activities:

- October 2, 2014, Unit 1, turbine driven emergency feedwater valve post-maintenance test and surveillance
- October 2, 2014, Unit 2, control element assembly surveillance test
- November 12, 2014, Unit 1, high pressure injection pump post-maintenance and surveillance test

In addition, the inspectors assessed the operators' adherence to plant procedures, including conduct of operations procedure 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 two instances of degraded performance or condition of safety-related structures, systems, and components (SSCs):

- December 17, 2014, Unit 1, high pressure injection pump, P-36B, outboard seal failure and inboard seal leakage
- December 30, 2014, Unit 1, auxiliary feedwater pump

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

These activities constituted completion of two maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

### b. Findings

Introduction. Inspectors identified a Green noncited violation of Unit 1 Technical Specification 5.4, "Procedures," for the licensee's failure to establish adequate emergency operating procedures. Specifically, the licensee's emergency operating procedures failed to establish minimum flow protection for the Unit 1 auxiliary feedwater pump, which could result in failure of the pump.

Description. The inspectors performed a walkdown of the Unit 1 auxiliary feedwater system, a nonsafety-related system that is a backup to main feedwater and the safety-related emergency feedwater system. The inspectors noted that the minimum flow valve for the auxiliary feedwater system was a normally closed and manually operated valve. The normal procedure for using the auxiliary feedwater pump, Procedure OP-1106.016, "Condensate, Feedwater, and Steam System Operation," Revision 68, directed the minimum flow valve to be open when the pump was running. The inspectors reviewed the emergency and abnormal operating procedures and discovered that the procedures directed operators to start the pump without opening the minimum flow valve or establishing a forward flow path within any specific time. The inspectors concluded that the licensee's emergency and abnormal operating procedures did not establish minimum flow protection for the pump, which could result in pump failure. The licensee documented the issue as Condition Report CR-ANO-1-2014-00286 and corrected the affected procedures.

The affected procedures included:

- OP-1202.002, "Loss of Subcooling Margin," Revision 8
- OP-1202.004, "Overheating," Revision 7
- OP-1202.006, "Tube Rupture," Revision 15

- OP-1202.012, "Repetitive Tasks," Revision 12
- OP-1203.013, "Natural Circulation Cooldown," Revision 19
- OP-1203.029, "Remote Shutdown," Revision 11
- OP-1203.040, "Forced Flow Cooldown," Revision 7

The affected procedure sections had not been modified in over 20 years, and the inspectors determined that there were no other opportunities to identify the issue.

Analysis. The failure to provide minimum flow protection for the Unit 1 auxiliary feedwater pump in emergency and abnormal operating procedures in accordance with the emergency operating procedure writer's guide was a performance deficiency. The performance deficiency was more than minor because it was 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, and was therefore a finding. Specifically, inadequate emergency and abnormal operating procedures could have resulted in failure of the auxiliary feedwater pump, a mitigating system for a loss of main and emergency feedwater. Using Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings at Power," June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined that the finding required a detailed risk evaluation because the finding represented a loss of system function. A Region IV senior reactor analyst performed the detailed risk evaluation and determined that the change to the core damage frequency was less than  $4.2E-7$ /year (Green). The dominant core damage sequences included losses of one of the safety related 4160 volt electrical buses, steam generator tube ruptures, and plant transients. The equipment that helped mitigate the risk included the high pressure injection system (for feed and bleed) and the main and emergency feedwater systems. The detailed analysis is contained in Attachment 3. This finding did not have a cross-cutting aspect associated with it because the most significant contributing cause was not indicative of present performance. Specifically, the emergency and abnormal operating procedures for operating auxiliary feedwater had not changed for at least 20 years.

Enforcement. Technical Specification 5.4.1.b requires, in part, that the licensee establish written emergency operating procedures required to implement the requirements of NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements: Requirements for Emergency Response Capability," January 1983. NUREG-0737, Supplement 1, Section 7.1, Item c, requires, in part, emergency operating procedures to be consistent with an appropriate procedure Writer's Guide. Procedure OP-1015.029, "Unit One Emergency Operating Procedure Writer's Guide," Revision 003-03-0, Step 6.1.5, states, in part, that the procedure is to be written so that the safety of the equipment is not compromised. Contrary to the above, as of July 16, 2014, the licensee failed to establish written emergency operating procedures, consistent with an appropriate procedure writer's guide, so that the safety of the equipment was not compromised. Specifically, the licensee's Unit 1 emergency operating procedures compromised the safety of the auxiliary feedwater pump by not establishing minimum flow protection. The licensee subsequently revised the procedures to establish a flow path before starting the pump. This violation is being treated as a noncited violation (NCV), consistent with Section 2.3.2 of the Enforcement

Policy. The violation was entered into the licensee's corrective action program as Condition Report CR-ANO-1-2014-00286. (NCV 05000313/2014005-02, Failure to Provide Flow Protection for Auxiliary Feedwater Pump in Emergency Operating Procedures)

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

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

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

- October 2, 2014, Unit 2, high risk due to a planned emergency diesel generator train B outage and a severe weather warning
- December 1, 2014, Unit 1, acceptable risk due to switchyard work
- December 19, 2014, Units 1 and 2, acceptable risk due to 500 kV cross-tie breaker B-5106 removal in the switchyard

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

Additionally, on October 2, 2014, the inspectors observed portions of an emergent work activity on Unit 2 involving an unplanned control element assembly surveillance which had the potential to cause an initiating event during an emergency diesel generator outage. The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected SSCs.

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

#### **b. Findings**

No findings were identified.

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

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

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

- November 14, 2014, Unit 1, operability determination for a gas void in the decay heat system

- October 30, 2014, Unit 2, operability determination of service water leak
- December 4, 2014, Unit 1, operability determination of fuel thermal conductivity model error
- December 24, 2014, Unit 2, operability determination for low pressure safety injection pump breaker excessive plunger gap

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 four operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

**1R18 Plant Modifications (71111.18)**

a. Inspection Scope

The inspectors reviewed two temporary plant modifications that affected risk-significant SSCs:

- October 2, 2014, Unit 2, temporary hose installed to support recirculation and cleanup of emergency diesel fuel oil storage tank
- December 4, 2014, Unit 1, temporary seismic support for service water piping while section of pipe removed for replacement

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

These activities constitute completion of two samples of temporary 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 eight post-maintenance testing activities that affected risk-significant SSCs:

- October 2, 2014, Unit 1, turbine driven emergency feedwater pump steam admission valve, CV-2613, Agastya time delay relay calibration and valve test
- October 9, 2014, Unit 2, high pressure safety injection pump, 2P-89B, overcurrent relay calibrations and pump test
- October 10, 2014, Unit 2, turbine driven emergency feedwater steam admission valve, 2CV-0340-2, relay calibration and valve test
- October 29, 2014, Unit 2, emergency control room chiller service water inlet valve test
- November 12, 2014, Unit 1, high pressure injection pump, P-36B, inboard seal replacement due to excessive leakage and pump test
- November 20, 2014, Unit 2, high pressure safety injection pump 2P-89A, pump seal and bearing leak repairs and pump test
- November 21, 2014, Unit 1, service water pump, P-4A, pump replacement and pump test
- December 5, 2014, Unit 1, reactor building cooling service water return containment isolation valve 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 eight post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

### b. Findings

No findings were identified.

## Cornerstone: Emergency Preparedness

### 1EP6 Drill Evaluation (71114.06)

#### a. Inspection Scope

On October 8, 2014, the inspectors observed Unit 2 simulator-based licensed operator requalification training that included implementation of the licensee's emergency plan. 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 evaluators and entered into the corrective action program for resolution.

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

#### b. Findings

No findings were identified.

### 1EP7 Exercise Evaluation – Hostile Action Event (71114.07)

#### a. Inspection Scope

The inspectors observed the September 16, 2014, biennial emergency plan exercise to verify the exercise acceptably tested the major elements of the emergency plan, provided opportunities for the emergency response organization (ERO) to demonstrate key skills and functions, and demonstrated the licensee's ability to coordinate with offsite emergency responders. The scenario simulated the following to demonstrate the licensee's capability to implement its emergency plan under conditions of uncertain physical security:

- An airborne threat to the plant which ended in a plane crash before reaching the station
- A subsequent land-based attack in the site switchyard that destroyed switchyard equipment and made offsite power unavailable to both units
- An armed attack on a licensee building in the owner-controlled area which resulted in taking plant employees hostage
- An armed adversary inside the protected area who engaged the site security force
- A lube-oil system problem on diesel generator 1
- An air pressure problem on the alternate ac diesel generator

During the exercise the inspectors observed activities in the control room simulator and the following emergency response facilities:

- Alternate Technical Support Center
- Alternate Operations Support Center
- Emergency Operations Facility
- Central and/or Secondary Alarm Station(s)
- Incident Command Post

The inspectors focused their evaluation of the licensee's performance on event classification, offsite notification, recognition of offsite dose consequences, development of protective action recommendations, staffing of alternate emergency response facilities, and the coordination between the licensee and offsite agencies to ensure reactor safety under conditions of uncertain physical security.

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, onsite and offsite communications, protection of plant employees and emergency workers in an uncertain physical security environment, 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 primary and alternate emergency response facilities, and procedures for the performance of associated emergency and security functions.

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 the licensee's subsequent formal presentation of critique items to plant management conducted September 29, 2014. The specific documents reviewed during this inspection are listed in the attachment.

The inspectors reviewed the scenario of previous biennial exercises and licensee drills conducted between January 2013 and August 2014 to determine whether the September 16, 2014, exercise was independent and avoided participant preconditioning, in accordance with the requirements of 10 CFR 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 2013 and August 2014 to determine whether identified weaknesses had been corrected in accordance with the requirements of 10 CFR 50.47(b)(14), and 10 CFR 50, Appendix E, IV.F.

These activities constituted completion of one exercise evaluation sample as defined in Inspection Procedure 71114.07.

b. Findings

.1 Failure to Correct Weaknesses During an Evaluated Exercise

Introduction. The inspectors identified a non-cited violation of 10 CFR Part 50.47(b)(14), for the failure to correct deficiencies identified in an August 7, 2013, drill. Specifically, the licensee did not implement Procedure 1203.048, "Security Event," Change 022, during a drill conducted August 7, 2013, and also did not implement Procedure 1203.048, Change 28, during the September 17, 2014, biennial exercise.

The licensee's corrective actions for the August 7, 2013, drill were ineffective because the licensee did not recognize that operators were not proficient with Procedure 1203.048 and, therefore, did not train all control room crews.

Description. The inspectors observed the September 16, 2014, biennial exercise and determined that control room operators failed to maintain continuous communication with threat notification sources during a simulated potential aircraft threat. Specifically, communicators in the simulator control room did not establish open-line communication with exercise controllers acting as the NRC headquarters operation officer following two threat communications as directed by Procedure 1203.048, "Security Event," Change 022, and discontinued communications. During a hostile action-based drill conducted on August 7, 2013, the simulator control room communicators also discontinued communications with the drill controller representing the NRC following each threat communication. This was identified by the licensee in their critique process and documented in Condition Report CR-ANO-C-2013-02107.

When a licensee is notified of a potential aircraft threat, they are required by 10 CFR Part 50.54(hh)(1)(ii) to implement procedures that describe how they will maintain continuous communications with threat notification sources. Continuous communication during a potential aircraft threat provides the licensee with up-to-date information on the threat. Failing to maintain continuous information may delay the recognition of changes in threat status and delay the licensee's implementation of protective actions for on-site personnel, and potentially affect the safe shutdown of the reactor and implementation of the site emergency plan. The licensee's requirement is Procedure 1203.048, "Security Event," Change 022, Section 2.0, Sub-Sections 1.C), 2.C), and 3.B), which state, "Ensure that continuous communications are maintained with the notifying agency and the NRC Headquarters Operation Center for the duration of the event."

Procedure 1203.048, Change 022, was the current revision during the August 7, 2013, drill; the inspectors determined that Change 022 contained directions to maintain continuous communications with threat notification sources in accordance with 10 CFR Part 50.54(hh)(1)(ii). The inspectors determined that the licensee's corrective action following the August 7, 2013, drill consisted of a communication (email) to the simulator control room drill crew participating that day to sensitize them to the need to follow procedures with respect to ensuring continuous communications and initiation of Condition Report CR-ANO-C-2013-02107. However, the deficiency identified in the condition report was primarily characterized as an emergency preparedness drill controller issue rather than a drill performance issue. This was because the licensee determined that the failure of the simulator control room communicators to establish continuous communications resulted from the drill controller acting as the NRC not requesting continuous communications. The licensee completed these corrective actions by August 19, 2013.

During the September 16, 2014, exercise the controller, acting as the NRC Headquarters Operation Center, called the control room at 7:38 a.m., speaking to the shift manager. After receiving credible information about an aircraft threat, the shift manager discontinued phone communications with the simulated NRC Headquarters Operations Officer. The controller called the control room again at 7:45 a.m. with additional information about the threat; this call was also discontinued. When the Unit 1 shift manager called the simulated NRC at 7:53 a.m., continuous communication was

established. According to Exercise Guide Message No. 2, the licensee controller acting as the NRC was directed as part of the initial (7:38 a.m.) message to the control room to say, "The NRC requests that you maintain an open line of communication from this time." The licensee identified failures to establish continuous communications with the NRC during their management critique conducted September 28, 2014, and entered the issues into the corrective action program in corrective action documents WT-WTANO-2014-00189 and Condition Report CR-ANO-C-2014-02478.

The inspectors determined that licensee staff is responsible for implementing Procedure 1203.048 regardless of whether the (simulated) NRC communicator requests continuous communication. The failure to provide continuous communications could have affected the licensee's ability to effectively implement the site emergency plan by delaying necessary actions to protect the reactor core and implement protective actions for plant personnel. Therefore, the failure to implement continuous communication with the threat source is a weakness that must be corrected in accordance with the requirements of 10 CFR 50.47(b)(14).

Analysis. A weakness is defined in Section 2.0(l) of Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process (SDP)," dated February 24, 2012, as performance during an exercise that would have precluded the effective implementation of the emergency plan had the circumstances occurred. The failure to correct weaknesses occurring in drills and exercises is a performance deficiency within the licensee's ability to foresee and correct. The performance deficiency is more than minor because it is associated with the ERO performance attribute of the Emergency Preparedness Cornerstone and it adversely impacted the cornerstone objective. The licensee's ability to implement adequate measures to protect the health and safety of the public in the event of hostile action and a radiological emergency is degraded when it fails to correct performance that precludes the effective implementation of the emergency plan. This finding was evaluated using Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process (SDP)," Attachment 2, dated February 24, 2012, and was determined to be of very low safety significance (Green) because it was a failure to comply with NRC requirements, was not associated with a risk-significant planning standard, and was not a loss of planning standard function. The finding was not a loss of function because the deficiency that was identified was not associated with classification, notifications to state and local agencies, or the development of protective action recommendations.

The finding was assigned a cross-cutting aspect in the area of problem identification and resolution, associated with the resolution of issues because the licensee failed to evaluate the initial performance issues to ensure that resolutions adequately addressed the causes and extent of condition commensurate with their safety significance. When the deficiency was first identified in August 2013, the licensee failed to recognize that continuous communications with threat notification sources is required by regulation and that performance issues with the implementing procedure should be communicated to the entire control room staff population (e.g., inadequate extent of condition) [P.2].

Enforcement. Title 10 of the Code of Federal Regulations, Part 50.47(b)(14) requires, in part, that "deficiencies identified as a result of exercises or drills are (will be) corrected." Part 50.54(hh)(1)(ii) requires, that if a licensee is notified of a potential aircraft threat, a licensee shall develop, implement and maintain procedures that describe how they will address "maintenance of continuous communication with threat notification sources."

Contrary to the above, on September 17, 2014, the licensee failed to correct weaknesses in ERO performance associated with their implementation of 10 CFR 50.54(hh)(1)(ii). Specifically, the licensee did not correct failures to maintain continuous communications with threat notification sources when notified of a potential aircraft threat. This violation is being treated as a noncited violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program under corrective action documents WT-WTANO-2014-00189 and Condition Report CR-ANO-C-2014-02478. (NCV 05000313; 368/2014005-03, Failure to Correct Weaknesses During Drills and Exercises)

.2 Failure to Identify Weaknesses During an Evaluated Exercise

The inspectors identified a Green non-cited violation of 10 CFR 50.47(b)(14) during an exercise conducted September 16, 2014. Title 10 of the Code of Federal Regulations, Part 50.47(b)(14) requires, in part, that deficiencies identified as a result of exercises be corrected. Because the performance deficiency includes information about the licensee's physical security program the details are not publicly available. The performance deficiency is documented in NRC Inspection Report 05000313/2014403, 05000368/2014403.

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

a. Inspection Scope

The licensee submitted the preliminary exercise scenario for the September 16, 2014, biennial exercise to the NRC on July 14, 2014, in accordance with the requirements of 10 CFR 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 ERO to demonstrate key skills and functions.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

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

**4OA1 Performance Indicator Verification (71151)**

.1 Mitigating Systems Performance Index: 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, 2013, through September 30, 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 residual heat removal systems for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 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 October 1, 2013, through September 30, 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 for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspectors reviewed the licensee’s evaluated exercises, emergency plan implementations, and selected drill and training evolutions that occurred between April 2013 and June 2014 to verify the accuracy of the licensee’s data for classification, notification, and protective action recommendation (PAR) opportunities. The inspectors reviewed a sample of the licensee’s completed classifications, notifications, and PARs to verify their timeliness and accuracy. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, to determine the accuracy of the data reported. 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.

.4 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors reviewed the licensee's records for participation in drill and training evolutions between April 2013 and June 2014 to verify the accuracy of the licensee's data for drill participation opportunities. The inspectors verified that all members of the licensee's 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 definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported. The specific documents reviewed are described in the attachment to this report.

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

b. Findings

No findings were identified.

.5 Alert and Notification System Reliability (EP03)

a. Inspection Scope

The inspectors reviewed the licensee's records of Alert and Notification System tests conducted between April 2013 and June 2014 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 definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported. 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.

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

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the

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

b. Findings

No findings were identified.

.2 Semiannual Trend Review

a. Inspection Scope

On October 7, 2014, the inspectors reviewed condition reports associated with entry conditions for abnormal operating procedures. The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, operator logs, 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 adverse trends.

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

b. Observations and Assessments

The inspectors noted that several condition reports discussed issues that met the Unit 2 abnormal operating procedure (AOP) entry criteria, however the licensee only referenced the procedures. Procedure, OP-1015.021, "ANO-2 EOP/AOP User Guide," Revision 012, that states, "If any Entry Conditions Not discussed in the brief are met, then the AOP should be entered." The licensee initiated condition reports ANO-CR-C-2014-02049 and ANO-CR-2-2014-02448 to document the concern and provided training to operators on entry conditions for abnormal operating procedures. The inspectors verified that all procedurally required actions were taken during the abnormal condition.

c. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

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

- On December 16, 2014, inspectors reviewed operator workarounds for Units 1 and 2.

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.

- On December 30, 2014, inspectors reviewed an operating experience evaluation for manual actions credited for operability for Units 1 and 2.

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

b. Findings

Introduction. Inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to maintain design control of the Unit 2 vital switchgear ventilation system. Specifically, the licensee failed to ensure that the ventilation system was capable of cooling the switchgear under design basis conditions.

Description. The inspectors reviewed Unit 2 Procedure OP-2107.002, "ESF Electrical System Operation," Change 30, and noted that Section 10, "ESF Switchgear 2A3 and 2A4 Room Cooling Requirements" specified manual actions to start exhaust fans 2VEF-56A and 2VEF-56B in order to cool vital switchgear 2A3 and 2A4. The inspectors then noted that Engineering Report ER-ANO-2002-0141-000, "Remove Autostart Capability of 2VEF-56A/B While Maintaining Control Room Alarms on 2A3/2A4 Switchgear Room," Revision 0, removed the automatic start function for the exhaust fans in 2002 and credited manual operator actions without adequate evaluation of the design basis room cooling requirements for the vital switchgear. Specifically, the licensee failed to evaluate the design basis for automatic room cooling and the remaining room coolers to verify they could automatically cool the vital switchgear. As a result of the inspectors' observations, the licensee initiated Condition Report CR-ANO-2-2014-00352 and submitted Licensee Event Report 05000368/2014-001-00, "Operation of Switchgear Rooms' Ventilation Prohibited by Technical Specifications." The licensee also completed an evaluation of the vital switchgear room coolers to verify that they could adequately cool the Unit 2 vital switchgear under design basis conditions. The analysis showed that a single room cooler with service water supplied by the emergency cooling pond could cool the switchgear with approximately one degree Fahrenheit margin. Under design basis conditions, the exhaust fan could cool the room with approximately 20 degrees Fahrenheit margin. The inspectors concluded that this was a significant reduction in margin.

Analysis. The licensee's failure to ensure that the ventilation system was capable of cooling the Unit 2 vital switchgear under design basis conditions was a performance deficiency. The performance deficiency was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of

systems that respond to initiating events to prevent undesirable consequences, and was therefore a finding. Specifically, the licensee failed to ensure that the Unit 2 vital electrical equipment ventilation system could automatically cool the switchgear. Using Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings at Power," June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined that the finding was of very low safety significance (Green) because the finding was a deficiency affecting the design of a mitigating system, and the system maintained its functionality. The inspectors determined that there was no cross-cutting aspect associated with this finding because the cause of the performance deficiency occurred more than three years ago, and was not representative of current licensee performance.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by the use of alternate or simplified calculational methods, and that design changes shall be subject to design control measures commensurate with those applied to the original design. Contrary to the above, between March 13, 2002, and February 13, 2014, the licensee failed to verify or check the adequacy of design during a design change. Specifically, the licensee failed to verify adequacy of the design of the Unit 2 vital switchgear ventilation to cool the vital switchgear during a design change that removed an automatic start of the exhaust fans. The licensee performed design calculations that showed the remaining automated ventilation equipment could support function of the vital switchgear. This violation is being treated as a noncited violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2014-00352. (NCV 05000368/2014005-04, Failure to Verify Ventilation Design for Vital Switchgear)

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

(Closed) Licensee Event Report 05000368/2014-001-00, Operation of Switchgear Rooms' Ventilation Prohibited by Technical Specifications

a. Inspection Scope

The licensee replaced an automatic start for the Unit 2 vital switchgear room exhaust fans with manual action in 2002 without adequate justification. The licensee determined that the substituted manual action was inadequate, by itself, to maintain operability of the switchgear. In addition, the licensee discovered that the switchgear room coolers had been removed from service on February 13, 2014, leaving the switchgear without required room cooling, and therefore inoperable for longer than the technical specification allowed outage time. See Section 4OA2.3 of this report for a finding related to this licensee event report. This licensee event report is closed.

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

b. Findings

No findings were identified.

## 40A5 Other Activities

.1 (Closed) Unresolved Item 05000368/2014003-09, "Reporting of Unit 2 Events as Unplanned Scrams with Complications."

The inspectors reviewed additional information provided by the licensee and confirmed that the Unit 2 main feedwater pumps could be restarted successfully within thirty minutes following a reactor trip or scram assuming the loss of emergency feedwater. This meets the guidance in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guidance." Therefore, the events were uncomplicated and do not need to be reported under this performance indicator. This unresolved item is closed.

.2 (Closed) Temporary Instruction 2515/189: Inspection to Determine Compliance of Dynamic Restraint (Snubber) Program with 10 CFR 50.55a Regulatory Requirements for Inservice Examination and Testing of Snubbers

a. Inspection Scope

The inspector reviewed the licensee's snubber program against the requirements for the inservice examination and testing of snubbers under 10 CFR 50.55a, "Codes and Standards," and paragraph 03.02 of the Temporary Instruction.

The inspector reviewed licensee documents detailing the snubber program, including licensee-controlled documents/procedures and any relief requests approved by the NRC for the snubber program. The inspector reviewed corrective action documents involving snubbers for the current 10-year interval, including any actions taken to address Regulatory Issue Summary 2010-06. In addition, the inspector observed snubber testing and conducted independent inspections of various snubber types.

b. Observations

The inspector determined that the licensee's snubber program complies with 10 CFR 50.55a regulatory requirements for inservice examination and testing of snubbers. In accordance with the Temporary Instruction, responses to specific questions were submitted to the NRC headquarters staff. Based upon the scope of the review described above, TI-2515/189 was completed.

c. Findings

No findings were identified.

.3 (Opened) Unit 2 Unplanned Scrams Performance Indicator

Introduction. The inspectors identified an unresolved item associated with the Unit 2 unplanned scrams per 7,000 critical hours performance indicator related to a reactor trip.

Description. On April 27, 2014, Unit 2 experienced an Axial Shape Index (ASI) trip when performing a rapid downpower at the request of the transmission grid operator due to severe weather affecting the grid. This unplanned reactor trip was caused by exceeding

the Core Protection Calculator ASI limits. As noted in Licensee Event Report 05000368/2014-003-00, and NRC Inspection Report 2014004, the ASI limits were exceeded, due in part to plant operators not following the downpower reactivity plan. The automatic trip occurred at approximately 50 percent power and was uncomplicated.

The unplanned scrams per 7000 critical hours performance indicator measures the rate of scrams per year of operation at power and provides an indication of initiating event frequency. The licensee did not include this scram as an input into the unplanned scram performance indicator and submitted a frequently asked question to the NRC Reactor Oversight Process Working Group. The frequently asked question is currently under review to decide whether the above event should be captured as an unplanned scram.

The licensee noted that anticipatory plant shutdowns to reduce the impact of external events are excluded from this performance indicator. The licensee believed the intent of the exclusion was met because the shutdown being performed at the time the reactor trip occurred had been requested by the transmission grid operator due to the impacts of weather conditions.

The inspectors noted that Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, guidance states that an unplanned scram is a scram that is not an intentional part of a planned evolution or test as directed by a normal operating or test procedure. This includes scrams that occurred during the execution of procedures or evolutions in which there was a high chance of a scram occurring but the scram was neither planned nor intended. The inspectors noted that the April 27, 2014 reactor trip was an automatic trip, which was not intended as part of the rapid downpower evolution that was being performed. The inspectors also noted that had the licensee's reactivity plan been followed, the severity of the ASI transient would likely have been managed and a trip avoided.

The inspectors concluded that additional inspection was required to assess whether the scram should have been reported in the unplanned scrams per 7,000 critical hours performance indicator for Unit 2. This issue was identified as Unresolved Item URI 05000368/2014005-05, "Unit 2 Unplanned Scrams Performance Indicator."

#### **40A6 Meetings, Including Exit**

##### Exit Meeting Summary

On August 13, 2014, the inspectors discussed the in-office review of the preliminary scenario for the 2014 biennial exercise, submitted July 14, 2014, with Mr. R. Harris, Emergency Preparedness Manager, and other members of the licensee staff. The licensee acknowledged the issues presented.

On October 1, 2014, the inspectors presented the results of the onsite inspection of the biennial emergency preparedness exercise conducted September 16, 2014, to Mr. J. Browning, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On October 20, 2014, the inspectors conducted a telephonic exit meeting with Mr. J. Browning, Site Vice President, and other members of the licensee staff to discuss an additional issue

associated with the September 16, 2014, biennial exercise. The licensee acknowledged the issues presented.

On December 22, 2014, the inspectors presented the TI-2515/189 inspection results to Mr. D. Edgell, System and Components Engineering Manager, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that any proprietary information provided had been returned or destroyed.

On January 6, 2014, the inspectors presented the inspection results to Mr. J. Browning, 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**

J. Browning, Site Vice President  
D. Edgell, Manager, System and Components Engineering  
R. Harris, Manager, Emergency Preparedness  
D. James, Director, Regulatory Recovery  
N. Mosher, Licensing Specialist, Regulatory Assurance  
S. Pyle, Manager, Regulatory Assurance  
J. Tobin, Manager, Security  
P. Williams, Director, Regulatory and Performance Improvement

#### **NRC Personnel**

R. Kahler, Branch Chief, NSIR/DPR/IRIB

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

#### **Opened**

05000368/2014005-05 URI Unit 2 Unplanned Scrams Performance Indicator (Section 4OA5.3)

#### **Opened and Closed**

05000368/2014005-01 NCV Failure to Develop Adequate Guidance for Extreme Damage Mitigation (Section 1R04)

05000313/2014005-02 NCV Failure to Provide Flow Protection For Auxiliary Feedwater Pump in Emergency Operating Procedures (Section 1R12)

05000313/2014005-03 NCV Failure to Correct Weaknesses During Drills and Exercises (Section 1EP7.1)  
05000368/2014005-03

05000368/2014005-04 NCV Failure to Verify Ventilation Design for Vital Switchgear (Section 4OA2.3)

#### **Closed**

05000368/2014-01-00 LER Operation of Switchgear Rooms' Ventilation Prohibited by Technical Specifications (Section 4OA3)

05000368/2014003-09 URI Reporting of Unit 2 Events as Unplanned Scrams with Complications (Section 4OA5.1)

05000313/2515-189 TI Inspection to Determine Compliance of Dynamic Restraint (Snubber) Program with 10 CFR 50.55a Regulatory Requirements for Inservice Examination and Testing of Snubbers (Section 4OA5.2)  
05000368/2515-189

## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
OP-1104.039	Plant Heating and Cold Weather Operations	27
OP-2106.032	Unit Two Freeze Protection Guide	26
OPS-B31	Unit 2 Outside AO Unit Two OPS Unit Two Rounds Data Sheet	October 30, 2014
OPS-B9	Unit 2 Waste Control Unit Two OPS Unit Two Rounds Data Sheet	October 30, 2014
OPS-A3	Unit 1 WCO Logsheet Unit One OPS Unit One Rounds Data Sheet	May 16, 2014

#### Work Orders (WOs)

388982	393829	368046	364052	364054
364055				

#### Condition Reports (CRs)

CR-ANO-1-2013-02722	CR-ANO-1-2014-00945	CR-ANO-1-2014-01176
CR-ANO-1-2013-03066	CR-ANO-1-2014-00945	CR-ANO-1-2014-01409
CR-ANO-1-2013-03066	CR-ANO-1-2014-01028	CR-ANO-1-2014-01622
CR-ANO-1-2014-00258	CR-ANO-1-2014-01059	CR-ANO-2-2013-01851
CR-ANO-1-2014-00260	CR-ANO-1-2014-01066	CR-ANO-C-2014-02810
CR-ANO-1-2014-00761	CR-ANO-1-2014-01117	

### Section 1R04: Equipment Alignment

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2305.018	Underground EDG F.O. Tank 2T-57A/B Recirculation and Cleanup, Attachment H	13
OP-1203.048	Security Event	11

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2104.037	Alternate AC Diesel Generator Operations	28

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
OP-2104.036B	Initial Checklist for Extended EDG Outage Form	September 29, 2014
OP-2104.036C	Periodic Checklist for Extended EDG Outage	September 29, 2014
OP-2104.036D	Daily Checklist for Extended EDG Outage	September 29, 2014

Condition Report (CR)

CR-ANO-2-2014-03277

**Section 1R05: Fire Protection**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2A-372-2097-X.doc	East DC Equipment Room	2
2A-372-2100-Z.doc	South Switchgear (2A4) Room	3
2A-372-2102-Y.doc	East Batter Room	2
2b-317-2007-LL.doc	East Pump Area and Gallery	4
1B-335-20-Y.doc	Radwaste Processing Area	3
1b-335-53-y.doc	Lower North Piping Penetration Room	2
1b-335-47-y.doc	Penetration Ventilation Area	2

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FZ-2055	Fire Zone Detail South Switchgear Room, East DC Equipment Room, and East Battery Room	2
FZ-2040	Fire Zone Detail Pump Areas/Gallery Access	2
FZ-1049	Fire Zone Detail Radwaste Processing Area, Stair No. 1, Lower North Piping Penetration Area, and Penetration Ventilation Area	4

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FHA	Unit 1 and Unit 2 Fire Hazards Analysis	16

Condition Report (CR)

CR-ANO-C-2014-02455

**Section 1R06: Flood Protection Measures**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2203.01	Internal Flooding	3
ULD-0-TOP-17	ANO Flooding Topical	0

Calculations

<u>Number</u>	<u>Title</u>	<u>Revision</u>
92-R-0024-01	Flooding Evaluation INPO SOER 85-5	0
92-R-0034-01	Flooding Evaluation INPO SOER 85-5 2 <sup>nd</sup> Iteration	0
89-E-0048-35	ANO-2 Internal Flood Analysis	0

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-2215, Sh. 4	Turbine Building Sumps Elevation 368'-0"	1
M-2115	Auxiliary Building Area No.26 Plan at El. 354'-0", 369'-0", & 374'-6"	15
M-2116	Auxiliary Building Area No.24 Plan at El. 369'-0", 372'-0", & 374'-6"	25

Work Order (WO)

52322788-01

Condition Report (CR)

CR-ANO-C-1998-0017

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2105.009	CEDM Control System Operation	32
OP-1106.006	Emergency Feedwater Pump Operation	94
A1SPGLOR150303	Plant Startup Activities	0

**Section 1R12: Maintenance Effectiveness**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-DC-204	Maintenance Rule Scope and Basis	3
EN-DC-205	Maintenance Rule Monitoring	5
96-R-0003-01	ANO Maintenance Rule Program	2

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	ANO Maintenance Rule Database	
	Unit 1 – High Pressure Injection and Makeup Performance Criteria Basis Document	

Condition Reports (CRs)

CR-ANO-1-2013-02798	CR-ANO-1-2014-01129	CR-ANO-1-2014-01149
CR-ANO-1-2014-01381	CR-ANO-1-2014-01582	

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
COPD-024	Risk Assessment Guidelines	053
OP-1015.033	ANO Switchyard and Transformer and Controls	025

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
COPD-024	Risk Assessment Guidelines, Attachment 2, EDG Outage & CEA Exercise	October 2, 2014

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
STM 2-23-1	System Training Manual - Switchyard Components and Operation	15

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-OP-104	Operability Determination Process	7
OP-2107.001	Electrical System Operations	111

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-2217, Sh. 1A	Spray Header Isolation Valve 2CV5613-2	3
E-2198, Sh. 2	Low Pressure Safety Injection Pump 2P60B	18

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-OP-111, Attachment 9.2	Operational Decision-Making Issue – Increasing Void Size Downstream of CV-1400 per PI-1400	0

Condition Reports (CRs)

CR-ANO-1-2014-01740	CR-ANO-1-2014-01588	CR-ANO-2-2014-02970
CR-ANO-2-2014-03066	CR-ANO-2-2014-02839	

**Section 1R18: Plant Modifications**

Procedure

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2305.018	Underground EDG F.O. Tank 2T-57A/B Recirculation and Cleanup	13

Drawing

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-2217	Emergency Diesel Generator Fuel Oil System	64

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EC-54231	Temporary Seismic Support for CV-3815 and Piping	0

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-1106.006	Emergency Feedwater Pump Operation	94
OP-1416.052	Unit 1 & 2 IAC66K Relay Test Instructions	4
OP-1104.002	Makeup & Purification System Operation	84
OP-1104.029	Service Water and Auxiliary Cooling System	107
OP-2106.006	Emergency Feedwater System Operations	86
OP-2104.039	HPSI System Operation	75
OP-1015.001	Conduct of Operations	108

Drawing

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-295, Sh. 4	Schematic Diagram Emergency Feedwater Turbine MOV's	9

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
OP-1416.052	Unit 1 & 2 IAC66K Relay Test Instructions, Attachment 2, A Phase Relay Data Sheet	October 9, 2014
OP-1416.052	Unit 1 & 2 IAC66K Relay Test Instructions, Attachment 2, B Phase Relay Data Sheet	October 9, 2014
OP-1416.052	Unit 1 & 2 IAC66K Relay Test Instructions, Attachment 2, C Phase Relay Data Sheet	October 9, 2014
OP-1416.064	Unit 1 & 2 HFC11B and HFC21B Relay Test Instructions, Attachment 3, Relay Data Sheet	October 9, 2014

Work Orders (WOs)

52369896-01	50239731-01	52484042	52521567	271053
292708	333475	00293445		

Condition Reports (CRs)

CR-ANO-1-2001-00143	CR-ANO-1-2014-01129
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**Section 1EP7: Exercise Evaluation – Hostile Action Based (71114.07)**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
OP-1903.033	Protective Action Guidelines for Rescue/Repair and Damage Control Teams	56
OP-1905.001	Emergency Radiological Controls	19
OP-1043.002	Access Control	82
OP-1043.034	Security at ANO and the EOF during an Emergency	23
OP-1903.064	Emergency Response Facility – Control Room	56
OP-1903.065	Emergency Response Facility – Technical Support Center	56
OP-1903.066	Emergency Response Facility – Operational Support Center	56
OP-1903.067	Emergency Response Facility – Emergency Operations Facility	56
EP-2013-0008	Standard ERO Tabletop Drill	March 14, 2013
EP-2013-0012	March 31, 2013, Notification of Unusual Event	April 4, 2013
EP-2013-0027	2013 MS-1 Drill with Pope County	June 5, 2013
EP-2013-0031	2103 Hostile Action Based Drill	September 28, 2013
EP-2013-0039	2013 Full Scale Drill conducted October 9, 2013	October 9, 2013
EP-2013-0033	2013 Post-Accident Sampling Drill	November 4, 2013
EP-2014-001	December 9, 2013, Notification of Unusual Event	January 8, 2014
EP-2014-0010	2014 Full Scale Drill conducted March 19, 2014	April 16, 2014
EP-2014-0011	2014 Annual Environmental Monitoring Drill	April 25, 2014
EP-2010-0050	2010 Radiological Emergency Preparedness Exercise (Scenario)	December 9, 2010

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
EP-2012-0015	2012 Radiological Emergency Preparedness Exercise (Scenario)	May 1, 2012

Condition Reports (CRs)

CR-ANO-1-2001-0143                      CR-ANO-1-2014-01129

Work Tracking System (WTANO-2014-)

189 CA 07      189 CA 09      189 CA 13      189 CA 17      189 CA 21      189 CA 31  
190 CA 01      190 CA 03      190 CA 08      190 CA 11      190 CA 14

**Section 40A1: Performance Indicator Verification**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ECH-NE-09-00041	ANO1 Mitigation System Performance Index Basis Document	2
ANO2-SA-06-0001	ANO-2 MSPI Basis Document Support Analysis	2
EN-DC-203	Maintenance Rule Program	2

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
EN-LI-114, Attachment 9.2	ANO Performance Indicator Technique/Data Sheet	3 <sup>rd</sup> Quarter 2013
EN-LI-114, Attachment 9.2	ANO Performance Indicator Technique/Data Sheet	4 <sup>th</sup> Quarter 2013
EN-LI-114, Attachment 9.2	ANO Performance Indicator Technique/Data Sheet	1 <sup>st</sup> Quarter 2014
EN-LI-114, Attachment 9.2	ANO Performance Indicator Technique/Data Sheet	2 <sup>nd</sup> Quarter 2014

Condition Report (CR)

CR-ANO-2-2013-01029

## Section 4OA2: Problem Identification and Resolution

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-1015.021	ANO-2 EOP/AOP User Guide	12
EN-FAP-OP-006	Operator Aggregate Impact Index Performance Indicator	2
COPD-020	ANO Operations Concerns Program	11

### Condition Reports (CRs)

CR-ANO-C-2014-02049	CR-ANO-C-2014-00574	CR-ANO-C-2014-00345
CR-ANO-1-2014-00892	CR-ANO-2-2014-03283	

## Section 4OA5: Other Activities

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CEP-SNB-0001	Dynamic Restraint (Snubber) Examination And Testing Program	3
EN-DC-333	Dynamic Restraint (Snubber) Inspection Program	3

### Condition Reports (CRs)

CR-ANO-C-2010-02391	CR-ANO-1-2011-00801	CR-ANO-1-2011-01839
CR-ANO-1-2011-01924	CR-ANO-1-2011-01992	CR-ANO-1-2011-02297
CR-ANO-1-2011-02472	CR-ANO-C-2012-02995	CR-ANO-C-2012-01603
CR-ANO-2-2012-02207	CR-ANO-C-2012-01591	CR-ANO-C-2012-01603
CR-ANO-2-2013-00282	CR ANO-2-2012-02207	CR-ANO-2-2012-02041
CR-ANO-2-2012-01911	CR-ANO-2-2012-01984	CR-ANO-2-2012-02193
CR-ANO-2-2012-02190	CR-ANO-2-2012- 02191	CR-ANO-2-2012-02189

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	ASME OMa Code-2005, SUBSECTION ISTD Preservice and Inservice Examination and Testing of Dynamic Restraints (Snubbers) in Light-Water Reactor Nuclear Power Plants	
	LT - Apparent Cause Evaluation Report Large Bore Mechanical Snubber Failures during 2R22	0

<u>Number</u>	<u>Title</u>	<u>Revision</u>
TRM 3.7.7	Shock Suppressors (Snubbers)	49
CODE CASE OMN-13	Requirements for Extending Snubber Inservice Visual Examination Interval at LWR Power Plants	1

## **PAPERWORK REDUCTION ACT STATEMENT**

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, Control Number 3150-0011. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid Office of Management and Budget control number.

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### **Information Request**

**March 18, 2014**

### **Notification of Inspection and Request for Information**

#### **Arkansas Nuclear One Units 1 and 2**

#### **NRC Inspection Report to be determined**

During the Unit 2 Inservice Inspection currently scheduled commence on May 19, 2014, reactor inspectors from the Nuclear Regulatory Commission's (NRC) Region IV office will perform Temporary Inspection 2515/189 at Arkansas Nuclear One, using NRC Temporary Inspection Procedure 2515/189, "Inspection To Determine Compliance Of Dynamic Restraint (Snubber) Program With 10 CFR 50.55a Regulatory Requirements For Inservice Examination And Testing Of Snubbers." This inspection is a resource intensive inspection both for the NRC inspectors and for your staff. In order to minimize the impact to your onsite resources and to ensure a productive inspection, we have enclosed a request for documents needed for this inspection. It is important that all of these documents are up-to-date and complete in order to minimize the number of additional documents requested during the preparation and/or the onsite portions of the inspection.

We have discussed the schedule for these inspection activities with your staff and understand that our regulatory contact for this inspection will be Ms. Natalie Mosher of your licensing organization. The tentative inspection schedule is as follows:

Preparation week: May 5, 2014

Onsite weeks: May 19 through May 30, 2014

In-office completion of record review to be determined.

Our inspection dates are subject to change based on your updated schedule of outage activities. If there are any questions about this inspection or the material requested, please contact the lead inspector Jim Drake at (817) 200-1558 (James.Drake@nrc.gov).

Request the following documents be provided to facilitate the inspection:

1. A copy of the document(s) which contain(s) the current snubber program.
2. The “Code of Record” for the current 10 year snubber program.
3. A copy of any alternatives or relief requests approved by the NRC for the snubber program.
4. Copies of any corrective action documents involving snubbers for the current 10 year interval, including any actions taken to address EGM 10-001 and RIS 2010-06.
5. A copy of the snubber program based on the Technical Specifications—if the program was relocated from the Technical Specifications to the Technical Requirements Manual or any other licensee-controlled documents during current 10-year interval.
6. A copy of the previous snubber program based on Section XI of the ASME BP&V Code—if the program was converted from Section XI of the ASME BP&V Code to Subsection ISTD of the ASME OM Code during the current 10 year interval.
7. A copy of Table ISTD 4252 1, “Visual Examination Table,” from Subsection ISTD of the ASME OM Code if the program is using the ASME OM Code for snubber examination and testing of snubbers. If not, provide an alternative table which is being used for extension of snubber visual examination.

**Arkansas Nuclear One, Unit 1**  
**Lack of Auxiliary Feed Water Pump Discharge Path**  
**Detailed Risk Evaluation**

**Performance Deficiency**

The licensee failed to provide minimum flow protection for the Unit 1 auxiliary feedwater (AFW) pump in emergency and abnormal operating procedures in accordance with the emergency operating procedure writer's guide.

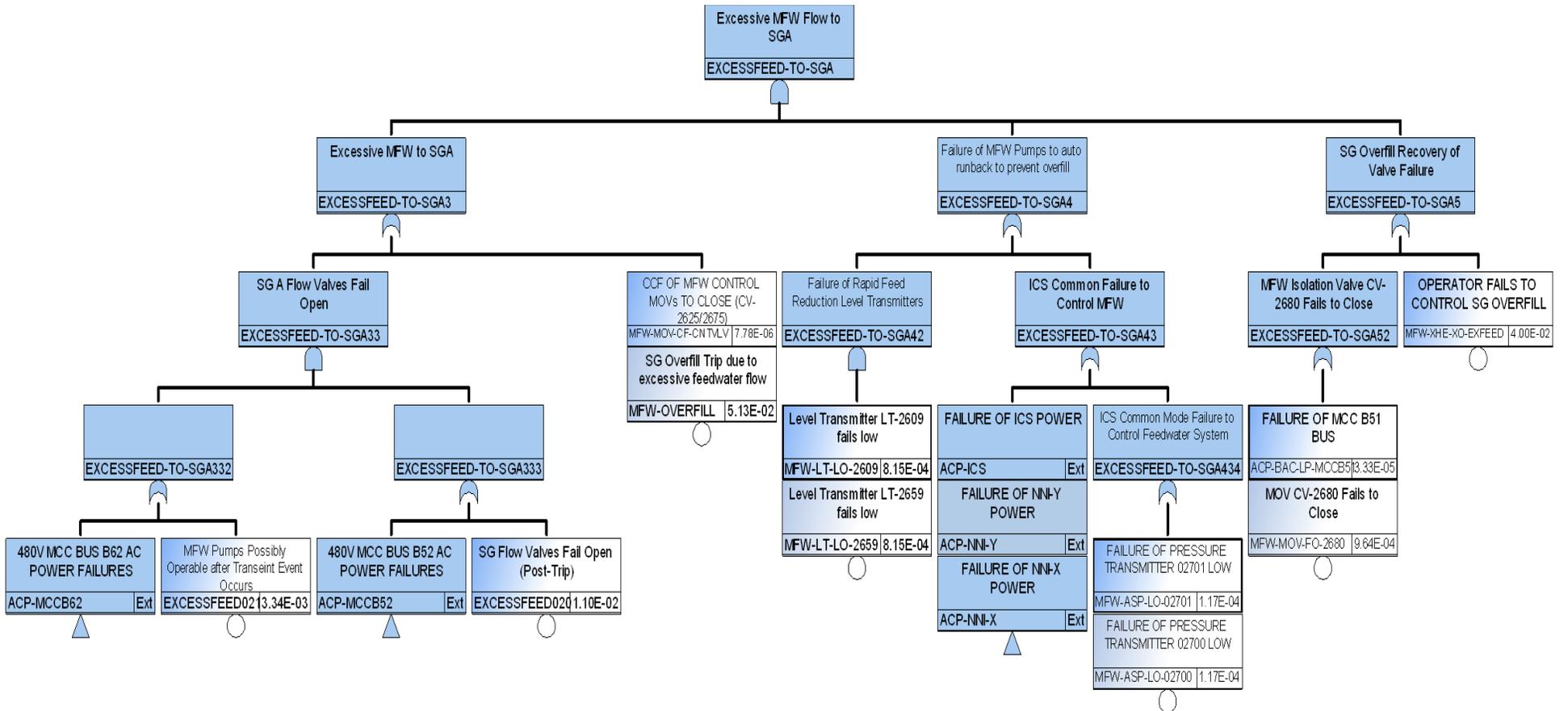
Valve FW-1, the AFW pump's minimum flow isolation, is normally closed for thermal efficiency. It is a manually operated valve. All affected emergency and abnormal operating procedures direct starting the pump without opening the valve. All affected procedures also start the pump without a forward flowpath, with varying times to establish a flowpath. All times are inadequate due to the short time to pump damage.

**Overall Conclusion**

The change in core damage frequency (CDF) from this performance deficiency is estimated to be 4.2E-7/year (Green).

**Assumptions**

1. The condition was modeled as a failure to start. Valve FW-1, the AFW pump's minimum flow isolation valve, is normally closed for thermal efficiency. It is a manually operated valve. All affected emergency and abnormal operating procedures direct starting the pump without opening the valve. All affected procedures also start the pump without a forward flowpath, with varying times to establish a flowpath. All times are inadequate due to the short time to pump damage (within 1 minute). The inspector assumed that the operators would not be able to take action to open FW-1 or establish a flowpath in enough time to prevent damage to the Auxiliary Feedwater Pump P-75. Therefore, the analyst used Basic Event AFW-MDP-FS-P75, "AFW Motor Driven Pump P-75 to Start," and set its failure probability to 1.0.
2. The exposure time used was one year. The deficient procedures to align a flow path had been changed in 1994 and existed for nearly 20 years. The analyst assumed the maximum exposure period of 1 year.
3. Adjustment of value for Excess Feed of the Steam Generators. Basic Events MFW-SYS-FC-EXFEEDA, "Main Feedwater System Excessively Feeds Steam Generator A," and MFW-SYS-FC-EXFEEDB, "Main Feedwater System Excessively Feeds Steam Generator B," were adjusted. After review of the design and operation of the ANO Unit 1 main feedwater system and its response during postulated events, the analyst determined that the existing SPAR model overestimated the probability of excessively feeding the steam generators. The analyst constructed new fault trees to better estimate the probability of excessive feeding the steam generators taking into account the system design and operation. The new fault tree used for Steam Generator A (which is functionally the same as the new fault tree for Steam Generator B) is depicted below.



4. The value for failure of Feed Pressure Transmitter was adjusted. The analyst noted from a cutset review that the failure probability for Basic Events MFW-ASP-LO-02700 and -2701, Failure of Pressure Transmitter(s) 02700 (and 02701) Low, was 7.65E-3 and was in a dominant cutset. After discussions, the Idaho National Laboratory (INL) discovered the SPAR model was in error because the value was too high based on their review of industry failure data and subsequently adjusted the value to 1.17E-4. The analyst used this updated value provided by INL.
5. Addition of uncredited initiators. Upon review of the SPAR model, the analyst noted that P-75 was not included in the SPAR model for some initiators in which it was called upon for use in procedures. Specifically, ANO-1 procedures call for using P-75 during Station Blackout, loss of condenser heat sink, excessive feedwater, small break loss of coolant accident (LOCA), steam break outside containment, loss of main feed, and Reactor Coolant Pump seal LOCA events. The analyst considered that P-75 was used for all of these events, even though for some of these events it would be unavailable, e.g., some cases of loss of main feed where suction pressure was lost. The model was modified to reflect use of P-75 during these initiators.

Limited Use/Test Model of the ANO, Unit 1 SPAR Model, "ANO1-P75-CREDIT-DURING-ALL-INITIATORS.zip," dated October 6, 2014 was used with SAPHIRE Version 8.1.0. Default truncation of 1E-11 was used.

### **Internal Events**

Using the above assumptions the analyst obtained an internal events risk result of 2.0E-7/yr. Dominant initiators were the loss of 4160 volt vital Bus A3, plant transients, and excessive feeding events.

### **External Events**

The analyst reviewed the IPEEE and concluded the only dominant external events that would contribute to overall risk were fires. The following is the result of the review of fire areas:

- Fire in A1. The analyst reviewed a loss of 4160 volt bus A1 in SAPHIRE resulting from a fire where P-75 did not start. This yielded a delta CDF of 3.03E-10 with a IEF of 3.34E-3 and a CCDP of 9.1E-8. The analyst substituted the fire ignition frequency of 7.03E-4/yr from the IPEEE for a turbine building fire with A1/A2 failed which yielded a change in core damage frequency of 6.4E-11/yr.
- Fire in Control Room. Procedure 1203.002, "Alternate Shutdown," addresses fire in the control room (Unit 1) and control room abandonment. Early on in the procedure, operators are instructed to open/check open the breaker for P-75. From this, the analyst assumed no increase in risk would be incurred from a loss of P-75.
- Fire in EFW room. The analyst performed an analysis using the failure of P-75 in the face of a fire in the EFW room which incapacitated both the motor and turbine driven emergency feedwater pumps. The result when solving for transients

yielded 5.8E-5. When replacing the transient initiating event frequency with the fire ignition frequency from the IPEEE (9.18E-4) yielded a change in core damage frequency of 7.0E-8 for a fire which affected EFW room.

- Fire in main feed pumps. The analyst performed an analysis using the failure of P-75 in the face of a fire in the MFW pumps area of the turbine building which incapacitated both the main feedwater pumps. The result when solving for transients yielded 6.1E-7. When replacing the initiating event frequency with the fire ignition frequency from the IPEEE (8.38E-3) yielded a change in core damage frequency of 6.6E-8 for a fire which affected the MFW area of the turbine building.
- Fire in A3 switchgear room. The analyst made a broad assumption that any fire in the A3 switchgear would trip and lock out the A3 bus. This would result in a loss of A3 and the same scenario as the loss of A3. Therefore the analyst replaced the initiating event frequency of a loss of A3 initiator with the fire ignition frequency for the south switchgear room (A3) of 2.28E-3/year derived from the NFPA 805 LAR. This yielded a change in core damage frequency of 4.5E-8/yr.
- Fire in A4 switchgear room. The analyst made a broad assumption that any fire in the A4 switchgear would trip and lock out the A4 bus. This would result in a loss of A4 and the same scenario as the loss of A4. Therefore the analyst replaced the initiating event frequency of a loss of A4 initiator with the fire ignition frequency for the north switchgear room (A4) of 2.28E-3/year. This yielded a change in core damage frequency of 4.1E-8/year.

Total of all fires (and external events) was 2.3E-7/year.

The analyst qualitatively estimated the change in core damage frequency from control room evacuations that were not caused by fires to be a non-significant contributor to risk.

Risk from high winds, flooding, and seismic were determined to be insignificant because on loss of offsite power the auxiliary feedwater pump would be lost.

### **Total Core Damage Frequency**

Internal Events	2.0E-7/year
External Events	2.2E-7/year
<u>Total</u>	<u>4.2E-7/year</u>

### **Large Early Release Frequency**

LERF is not a dominant risk source for this case. Risk from SGTR was 2.8E-8/year and risk from ISLOCAs was 1.4E-8. Both of these values produce Green results when applied to MC 0609, Appendix H, "Containment Integrity SDP."