



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 EAST LAMAR BLVD  
ARLINGTON, TEXAS 76011-4511

February 10, 2014

Louis P. Cortopassi, Site Vice President  
Omaha Public Power District  
Fort Calhoun Station FC-2-4  
P.O. Box 550  
Fort Calhoun, NE 68023-0550

Subject: FORT CALHOUN - NRC INTEGRATED INSPECTION REPORT  
NUMBER 05000285/2013019

Dear Mr. Cortopassi:

On December 31, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Fort Calhoun Station. On January 24, 2014, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements.

Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

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

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

L. Cortopassi

- 2 -

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

Sincerely,

*/RA/*

Michael C. Hay, Chief  
Project Branch F  
Division of Reactor Projects

Docket No: 50-285  
License No: DPR-40

Enclosure: NRC Inspection Report 05000285/2013019  
w/Attachment: Supplemental Information

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000285  
License: DPR-40  
Report: 05000285/2013019  
Licensee: Omaha Public Power District  
Facility: Fort Calhoun Station  
Location: 9610 Power Lane  
Blair, NE 68008  
Dates: November 16 through December 31, 2013  
Inspectors: J. Kirkland, Senior Resident Inspector  
J. Wingeback, Resident Inspector  
R. Deese, Senior Reactor Analyst  
B. Larson, Senior Operations Engineer  
P. Elkmann, Senior Emergency Preparedness Inspector  
S. Sanchez, Senior Emergency Preparedness Inspector, Region II  
B. Larson, Senior Operations Engineer  
G. Skaggs Ryan, Reactor Inspector  
C. Zoia, Operations Engineer (RIII/DRS/OB)  
G. Apper, Operations Engineer  
W. Sifre, Senior Reactor Inspector  
D. Kern, Senior Reactor Inspector (RI/DRS/EB2)  
J. Dean, Senior Reactor Engineer (NRR/DSS/SNPB)  
J. Drake, Branch Chief  
C. Norton, Project Manager (NRR/JLD/JPSB)  
D. Stearns, Health Physicist  
  
Approved By: Michael Hay, Chief  
Project Branch F  
Division of Reactor Projects

## SUMMARY

IR 05000285/2013019; 11/16/2013 – 12/31/2013; Fort Calhoun Station, Integrated Resident and Regional Report; Annual Inspection of Operator Requalification Program; Emergency Plan Biennial; and IMC 0350 Confirmatory Action Letter Inspections

The inspection activities described in this report were performed between November 16, 2013, and December 31, 2013, by the resident inspectors at the Fort Calhoun Station and five inspectors from the NRC's Region IV office and other NRC offices. One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. Additionally, NRC inspectors documented one licensee-identified violation of very low safety significance. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Components Within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC's 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: Emergency Preparedness**

- Green. A Green noncited violation was identified for the failure of the licensee to correct deficiencies identified as a result of four exercises conducted between March 27, 2012, and May 7, 2013, as required by 10 CFR 50.47(b)(14). Specifically, the licensee failed to correct deficiencies associated with team briefing and tracking in the Operations Support Center (OSC) identified as a result of exercises conducted March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013.

The inspectors determined that the licensee's failure to correct deficiencies identified by licensee evaluators is a performance deficiency within the licensee's control. This finding is more than minor because it affected the emergency preparedness cornerstone objective and the Emergency Response Organization Performance cornerstone attribute. This finding was evaluated using the Emergency Preparedness Significance Determination Process and was determined to be of very low safety significance because it was a failure to comply with NRC requirements, was not a risk significant planning standard function, and was not a loss of planning standard function. The finding was not a loss of planning standard function because the licensee adequately corrected some deficiencies identified in exercises conducted in 2012 and 2013. The finding was entered into the licensee's corrective action system as Condition Report 2013-22495. The finding was assigned a cross-cutting aspect of Problem Identification and Resolution because the finding was reflective of current performance and the licensee did not take appropriate corrective action to address safety issues and adverse trends [P.1(d)]. (Section 1EP1)

**Licensee-Identified Violations**

A violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and associated corrective action tracking numbers are listed in Section 4OA7 of this report.

## PLANT STATUS

The plant began the inspection period in mode 5, with all fuel in the reactor vessel. On December 18, 2013, the plant reached criticality, and the generator output breakers were closed on December 21, 2013. The plant reached 100% power on December 26, 2013, where it remained for the rest of the reporting period.

## REPORT DETAILS

### 1. REACTOR SAFETY

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

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

##### .1 Review of Licensed Operator Performance

###### a. Inspection Scope

On December 17 through December 24, 2013, the inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations the plant was in a period of heightened activity due to the plant startup. The inspectors provided continuous observation of the operators' performance of the plant startup and power ascension up to approximately 98% power. Additionally, the inspectors observed non-licensed operator performance in the turbine and auxiliary buildings, as well as the intake structure, during component startup to support the plant startup. Over 350 hours of continuous observations were conducted.

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 one quarterly licensed operator performance sample(s), as defined in Inspection Procedure 71111.11.

###### b. Observations

During these observations, inspectors regularly communicated observed behaviors to management at Fort Calhoun Station and to the NRC. Positive behaviors observed included adequate pre-job briefings, shift turnovers, control room supervision by station management, reactivity control, surveillance testing, identification and control of new operators and conservative decision making.

Several areas for improvement were identified that in some instances involved unnecessary challenge to plant operators. These observations were discussed with OPPD management as they were identified and included:

- Inadequate vendor and station engineering support for turbine control system testing. Operations staff did not receive the level of support expected when the newly installed turbine control system operated erratically during power ascension. The licensee was eventually able to make system adjustments and stabilize turbine operation, but the delay in getting adequate technical support was an unnecessary challenge to the operators.
- The quality of the procedure used for testing of the new turbine control system was poor, which slowed down test sequence.
- Poor communications between the licensee's Outage Control Center and Control Room operators resulted in unnecessary delays in getting problems fixed (such as malfunctioning control room annunciators).
- The inspectors observed one example of a newly qualified operator misunderstanding the operation of large feedwater system valve.
- The inspectors observed one example of maintenance personnel not using procedurally-required placekeeping tools (i.e. circle/slash), which resulted in a missed procedural step and the need to re-perform the maintenance activity on a non-safety related system.
- Some inconsistencies were noted in documentation of control room and fire impairment logs.

c. Findings

No findings were identified.

.2 Annual Inspection

The licensed operator requalification program involves two training cycles that are conducted over a 2-year period. In the first cycle, the annual cycle, the operators are administered an operating test consisting of job performance measures and simulator scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a comprehensive written examination. For this annual inspection requirement, Fort Calhoun Station was in the first part of the training cycle.

a. Inspection Scope

The inspector reviewed the results of the operating tests for the station to satisfy the annual inspection requirements.

On December 20, 2013, the licensee informed the lead inspector of the results,

- 11 of 11 crews passed the simulator portion of the operating test



- 46 of 49 licensed operators passed the simulator portion of the operating test
- 48 of 49 licensed operators passed the job performance measure portion of the examination

The individuals that failed the simulator scenario portion of their operating test and the individual who failed the job performance measure portion of their operating test were successfully remediated, retested, and passed their retake operating test prior to returning to licensed operator duties.

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

b. Findings

No findings were identified.

**1R18 Plant Modifications (71111.18)**

a. Inspection Scope

On December 4, 2013, the inspectors reviewed a temporary plant modification to provide a furmanite repair of HCV-1108A, Steam Generator RC-2B Auxiliary Feedwater Inlet Valve.

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

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

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

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

- December 4 2013, OP-ST-ESF-0001, Diesel Auto Start Initiating Circuit Check

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

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

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP1 Exercise Evaluation (71114.01)**

a. Inspection Scope

The inspectors observed the biennial emergency preparedness exercise conducted December 3, 2013, to determine if the exercise acceptably tested major elements of the emergency plan and provided opportunities to demonstrate key emergency response organization skills. The scenario simulated:

- A vehicle crash affecting vital equipment in the intake structure;
- A loss of offsite power to the site;
- Failure of a diesel generator to start with a second diesel generator unavailable due to maintenance, resulting in a station blackout condition;
- A large-break loss of coolant accident inside containment;
- Uncovering of the fuel leading to fuel damage and a zirconium-water reaction producing an explosive atmosphere inside containment; and,
- A hydrogen gas burn damaging the containment purge system to create a release path to the environment, to demonstrate the licensee personnel's capability to implement their emergency plan.

The inspectors evaluated exercise performance by focusing on the risk-significant activities of event classification, offsite notification, recognition of offsite dose consequences, and development of protective action recommendations, in the Control Room Simulator and the following dedicated emergency response facilities:

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

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 emergency workers, emergency repair evaluation and capability, and the overall implementation of the emergency plan to protect public health and safety and the environment. The inspectors reviewed the current revision of the facility emergency plan, emergency plan implementing procedures associated with operation of the licensee's emergency response facilities, procedures for the performance of associated emergency functions, and other documents as listed in the attachment to this report.

The inspectors compared the observed exercise performance with the requirements in the facility emergency plan, 10 CFR 50.47(b), 10 CFR Part 50, Appendix E, and with the guidance in the emergency plan implementing procedures and other federal guidance.

The inspectors attended the post-exercise critiques in each emergency response facility to evaluate the initial licensee self-assessment of exercise performance. The inspectors also attended a subsequent formal presentation of critique items to plant management to understand the performance issues observed by licensee evaluators.

The inspectors also reviewed nine licensee event after-action reports and exercise evaluation reports to identify weaknesses and deficiencies previously evaluated by the licensee.

The specific documents reviewed during this inspection are listed in the attachment. These activities constitute completion of one sample as defined in Inspection Procedure 71114.01-05.

b. Findings

Introduction. A Green noncited violation was identified for the failure of the licensee to correct deficiencies identified as a result of four exercises conducted between March 27, 2012, and May 7, 2013, as required by 10 CFR 50.47(b)(14).

Description. The NRC identified that Fort Calhoun Station had not corrected deficiencies associated with the Operations Support Center (OSC) identified as a result of exercises conducted March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013.

The inspectors reviewed the licensee's post-exercise evaluation reports and associated corrective action program entries for exercises conducted March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013. The inspectors noted that Fort Calhoun Station had identified that the following performance deficiencies had occurred during previous exercises:

- Weak implementation of priorities to mitigate the accident (March 27, July 17, March 5, and May 7);

- Delays in dispatching Operations Support Center teams to mitigate the accident (March 27 and March 5); and
- Pre-job and post-job briefings for Operations Support Center teams to mitigate the accident that were incomplete or not performed (July 17, March 5, and May 7)

The inspectors reviewed six condition reports (corrective action program entries) generated by the licensee following the March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013, exercises and noted the following:

- CR 2012-02381, Lack of Repair Team Control, opened March 28, 2012, closed November 6, 2012. The licensee delivered refresher training for Non-Licensed Operators (Action 2, closed June 21, 2012), delivered refresher training for Maintenance Department work planners (Action 3, closed August 27, 2012), and sent a post-exercise lessons-learned email to OSC staff reminding them to review Procedure OSC-9, Emergency Team Briefings (Action 5, closed October 19, 2012);
- CR 2012-07779, Examples of teams dispatched from the OSC without emergency work instructions being completed, opened July 17, 2012, closed September 19, 2012. The licensee sent OSC staff an email, dated September 6, 2012, reminding them to review Procedure OSC-9, Emergency Team Briefings (Action 3, closed September 6, 2012);
- CR 2013-05146, TSC Bypasses OSC Director to Brief Electricians, opened March 7, 2013, closed April 1, 2013. Performance was discussed at the licensee's post-exercise critique and no additional action was taken (Action 2, closed April 1 2013);
- CR 2013-05263, Lack of OSC Team Debriefs, opened March 8, 2013, closed May 3, 2013. The licensee sent post-exercise lessons-learned email, dated March 29, 2013, to OSC staff reminding them to review Procedure OSC-9, Emergency Team Briefings. The issue of a lack of post-job briefings was not addressed in the March 29, 2013, email;
- CR 2013-05363, Control Room directed OSC teams without going through the OSC process, opened March 11, 2013, closed March 26, 2013. The licensee conducted a coaching session on March 15, 2013, for the Shift Manager and Control Room Supervisor participating in the March 5, 2013, exercise. No additional corrective actions were taken, and
- CR-2013-10486, Concens over OSC Priority Setting, opened May 10, 2013, closed May 30, 2013. This condition report was administratively closed without taking corrective action.

The inspectors subsequently observed emergency response organization performance in the Operations Support Center during the December 3, 2013, exercise and identified the following performance deficiencies:

- Non-Licensed Operators present in the Operations Support Center were assigned work by the Control Room and not by the Operations Support Center Director;
- Delays in forming and briefing repair and mitigation teams to be dispatched into the plant;
- Ineffective tracking of repair and mitigation teams in the plant, including,
  - No documentation by Control Room staff of tasks assigned Non-Licensed Operators;
  - No tracking method for Non-Licensed Operators leaving the Operations Support Center;
  - A single team dispatched three times, each time with different individuals, without appropriate records; and,
  - Incomplete documentation as evidenced by log and/or tracking board records documenting 12 repair and mitigation teams dispatched into the plant, records of 15 repair and mitigation teams returning from the plant, and 8 pre-job briefing forms completed in the Operations Support Center.
- Ineffective pre-job briefings, including:
  - One team leaving the Operations Support Center with direction to receive its pre-job briefing from the Control Room;
  - A lack of discussion of safety hazards in the plant during station blackout conditions; for example, a lack of discussion of available lighting, and not ensuring that flashlights and other portable lighting were taken into the plant;
  - A lack of discussion of other plant safety requirements; for example, repair teams were not briefed to transport flammable liquids in approved metal containers, and subsequently {simulated} the transport of flammable liquids in open buckets; and,
  - A lack of any pre-job briefings for Non-Licensed Operators.
- The Operations Support Center did not conduct post-job briefings for repair and mitigation teams returning to the facility after performing simulated work on plant equipment.

The inspectors observed the licensee's preliminary critique of emergency response organization performance in the December 3, exercise, conducted December 5, 2013. The licensee identified and entered into the corrective action program, instances of Technical Support Center staff directing repair and mitigation teams without going through the Operations Support Center Director, failures to brief repair and mitigation teams about changing plant and radiological conditions, and shortcuts in the work planning process for repair and mitigation teams.

The inspectors determined that the performance deficiencies observed by the licensee in the exercises conducted March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013, would preclude the effective implementation of the emergency plan if they were to occur during an actual radiological emergency. Specifically, a lack of adequate pre-job and post-job work briefings, lack of adequate controls over Non-Licensed Operators, and delays in dispatching repair and mitigation teams could prevent the licensee from bringing the plant into a safe and stable condition and terminating radiological releases affecting the public. Inspectors also determined the licensee relied on individual coaching and post-exercise emails as corrective actions for deficiencies observed during exercises, with an emphasis on individual (e.g. non-directed) review of Procedure OSC-9, "Emergency Team Briefings." The inspectors concluded that corrective actions for the exercises conducted March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013; were ineffective, in that the issues continued to re-occur, and also recurred during the December 3, 2013, exercise. In addition, the licensee repeated the same corrective actions multiple times without achieving results, and did not evaluate their effectiveness. The inspectors concluded from the above information that deficiencies identified as a result of exercises had not been appropriately corrected as required by 10 CFR 50.47(b)(14).

The inspectors determined that some deficiencies identified by the licensee following the exercises conducted March 27, 2012; July 17, 2012; March 5, 2013; and May 7, 2013, had been corrected and did not recur during the December 3, 2013, exercise. These deficiencies included a lack of sufficient Radiation Protection Technician support in the Operations Support Center, emergency worker briefings for issuance of potassium iodide that were ineffective or not performed, poor strategies for directing offsite environmental monitoring, and degraded radiation protection for emergency workers in the Technical and Operations Support Centers.

Analysis. A deficiency (weakness) is defined in Manual Chapter 0609, Appendix B, Section 2.(o), as a level of performance by the emergency response organization demonstrated during an exercise that would preclude effective implementation of the emergency plan if it were to occur during an actual radiological emergency. The inspectors determined that the licensee's failure to correct deficiencies identified by licensee evaluators as a result of four exercises conducted in 2012 and 2013 is a performance deficiency within the licensee's control. Specifically, the licensee did not correct deficiencies in its ability to assign work to Operations Support Center teams, and to dispatch and track work teams. This finding is more than minor because it affected the emergency preparedness cornerstone objective and the Emergency Response

Organization Performance cornerstone attribute. The finding affected the emergency preparedness cornerstone objective because an inability to dispatch and track emergency work teams may prevent the licensee from implementing adequate measures to protect the health and safety of the public during a radiological emergency. The finding was associated with a violation of NRC requirements. This finding was evaluated using the Emergency Preparedness Significance Determination Process and was determined to be of very low safety significance because it was a failure to comply with NRC requirements, was not a risk significant planning standard function, and was not a loss of planning standard function. The finding was not a loss of planning standard function because the licensee adequately corrected some deficiencies identified as a result of exercises conducted in 2012 and 2013. The finding was assigned a cross-cutting aspect in the area of Problem Identification and Resolution because the finding was reflective of current performance and the licensee did not take appropriate corrective action to address safety issues and adverse trends [P.1(d)].

Enforcement. Title 10 of the Code of Federal Regulations, Part 50.47(b)(14) states, in part, that “Periodic exercises are conducted to evaluate major portions of emergency response capabilities...deficiencies identified as a result of exercises...will be corrected.” Contrary to the above, Fort Calhoun Station failed to correct deficiencies identified as a result of exercises. Specifically, Fort Calhoun did not correct deficiencies in the assignment of work to Operations Support Center teams, and the dispatch and tracking of in-plant work teams, identified in four exercises between March 27, 2012, and May 7, 2013. Because this failure is of very low safety significance and has been entered into the licensee’s corrective action system as Condition Report 2013-22495, this violation is being treated as an NCV, consistent with Section 2.3.2(a) of the NRC Enforcement Policy: 05000285/2013019-01, [Failure to Correct Deficiencies in Operations Support Center Functions].

#### 4. OTHER ACTIVITIES

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

#### 4OA2 Problem Identification and Resolution (71152)

##### .1 Routine Review

##### a. Inspection Scope

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

problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

**40A3 Follow-up of Events and Notices of Enforcement Discretion (71153)**

.1 (Closed) Licensee Event Report 05000285/2012-017-01: Containment Valve Actuators Design Temperature Ratings Below those Required for Design Basis Accidents

“While performing an extent of condition review associated with the adequacy of air operated equipment inside containment to withstand containment main steam line break (MSLB) and loss of coolant accident (LOCA) temperatures, it was discovered that the Reactor Coolant System (RCS) Loop 1A Charging Line Stop Valve, the RCS Loop 2A Charging Line Stop Valve, and the Pressurizer RC-4 Auxiliary Spray Inlet Valve have nitrile based elastomers used in the air filter regulator and actuator. The design temperature limit for the nitrile elastomers used in the valves is 180°F which is acceptable for the normal operating conditions inside containment of 120°F. However, during the main steam line break and loss of coolant accident the temperature inside containment is analyzed to reach 370°F. Since these valves have both open and close functions supported by an air accumulator, failure of the nitrile based elastomers could prevent the valves from fulfilling their intended safety function.

The causal analysis did not determine why the nitrile elastomers were installed during original plant construction. However, it was determined that a procedural deficiency and human error resulted in the wrong type of elastomer material being used in the instrument air filter regulators when the air accumulators were added to the valves to support their safety function.”

The licensee event report is closed. Revision 2 of this licensee event report was submitted on December 6, 2013.

.2 (Opened) Licensee Event Report 05000285/2012-017-02: Containment Valve Actuators Design Temperature Ratings Below those Required for Design Basis Accidents

“On July 26, 2012, while performing an extent of condition review associated with air operated valves (AOV), it was discovered that several valves had nitrile based elastomers used in the air filter regulator and actuator that may not be acceptable for harsh environment conditions. On September 6, 2012, it was also identified that due to a lack of documentation, the States terminal blocks associated with the AOV's control circuit may not be acceptable for harsh environment conditions. These were entered into the station's corrective action program as Condition Report 2012-08621 and 2012-12739.

“During design basis accidents, the limiting analysis temperature inside containment is 374.2 degrees Fahrenheit (F). The design service temperature for the nitrile elastomers is 180 degrees Fahrenheit and the testing performed on the States terminal blocks did not



bound the required accident conditions. Since these valves have both open and/or close functions, failure of the nitrile based elastomers or the States terminal blocks could prevent the valves from fulfilling their intended safety function.

“A causal analysis was conducted and found that the station did not fully implement and or maintain the electrical equipment qualification program. This resulted in a lack of qualification documentation and equipment not qualified for expected design basis accident conditions.”

.3 (Closed) Licensee Event Report 05000285/2013-001-00: Mounting of GE HFA Relays does not Meet Seismic Requirements

“On January 15, 2013, while reviewing a previous condition report, it was identified that a previous operability determination (OD) completed for General Electric (GE) model HFA relays was incorrect in that it did not appear to fully address the condition of the mounting screws that required torqueing. The seismic test results stated that the GE HFA relays passed the seismic testing, but the relays required two screws to be torqued to 5 foot-pounds. This condition of the additional required torqueing was initially entered into the corrective action program on December 21, 2012.

Currently, approximately 136 relays, that provide various indication and control functions in systems such as high pressure safety injection, charging, containment ventilation, and the emergency diesel generator, have been identified as potentially affected. Relay replacement/torqueing is in progress. A cause analysis is in progress, the results of which will be published in a supplement to this LER.”

The licensee event report is closed. Revision 1 of this licensee event report was submitted on December 5, 2013.

.4 (Opened) Licensee Event Report 05000285/2013-001-01: Mounting of GE HFA Relays does not Meet Seismic Requirements

“On January 15, 2013, while reviewing a previous condition report, it was identified that the initial I operability determination (OD) completed for General Electric (GE) model HFA relays was incorrect in that it did not appear to fully address the condition of the mounting screws that required torqueing. The seismic test results stated that the GE HFA relays passed the seismic testing, but the relays required two back plate mounting screws to be torqued to 5 foot-pounds. The condition of the additional required torqueing had been initially entered into the corrective action program on December 21, 2012.

“Approximately 136 relays that provide various indication and control functions in systems such as high pressure safety injection, charging, containment ventilation, and the emergency diesel generator, were identified as potentially affected. Relay replacement torqueing has been completed for all identified relays. An investigation found that poor communication (both in writing of technical documents and in interfacing between individuals) was the cause of not identifying the need for the two back plate mounting

screws to be torqued to 5 foot-pounds when first reported by the vendor. Corrective actions to provide training on the event and revise procedures have been initiated.”

.5 (Closed) Licensee Event Report 05000285/2013-003-00: Calculations Indicate the HPSI Pumps will Operate in Run-out During a DBA

At approximately 1721 Central Standard Time, on January 30, 2013, during hydraulic evaluations for the alternate hot leg injection project, Design Engineering determined that design basis calculations indicated that the high pressure safety injection (HPSI) pumps would operate in a run-out condition under worst case design basis accident conditions. Previous changes to the operation of the HPSI pumps and the containment spray pumps have resulted in an increase in the injection phase time and an increase in HPSI pump flow during the accident. This could have resulted in the HPSI pumps operating in run-out for longer than the one hour manufacturer's recommended time limit.

A preliminary causal analysis identified that the station failed to obtain vendor technical information on HPSI pump performance in a 10 CFR 50, Appendix B, Quality Assurance validated format. An analysis of HPSI pump performance during the injection phase will be performed and design or procedural actions to prevent HPSI pump operation in the extended flow region and to ensure that sufficient net positive suction head is available will be taken.”

The licensee event report is closed. Revision 1 of this licensee event report was submitted on November 27, 2013.

.6 (Opened) Licensee Event Report 05000285/2013-003-01: Calculations Indicate the HPSI Pumps will Operate in Run-out During a DBA

“At approximately 1721 Central Standard Time, on January 30, 2013, during hydraulic evaluations for the alternate hot leg injection project, Design Engineering determined that the high pressure safety injection (HPSI) pumps would operate in a run-out condition under worst case design bases accident conditions. The calculated HPSI pump flow is beyond the manufacturer's head-flow curves developed from original pump testing. The station was shutdown in Mode 5 when discovered and the condition was entered into the station's corrective action program as Condition Report 2013-02100. The HPSI pumps were declared inoperable.

A causal analysis identified that the initial HPSI pump cross-tie valve (HCV-304 and HCV-305) required position, impeller design, and runout characteristics identified during pre-operational testing were not translated into design and licensing basis documents. This allowed several HPSI system configuration and procedural changes that reduced the margin to reliable pump operation. A new analysis shows that a new design flow rate of 450 gpm is acceptable for up to 1000 hours. Orifices have been installed and tested that limits maximum flow to prevent the HPSI pumps from operating beyond 450 gpm during a design basis accident.”

.7 (Closed) Licensee Event Report 05000285/2013-008-00: Previously Installed GE IVA Relays Failed Seismic Testing

“On April 11, 2013, the test results of seven General Electric (GE) IAV relays indicated that three safety-related, seismically qualified, relays did not pass seismic testing. The condition was entered in to the Station's corrective action program. A causal analysis determined that the failure was caused by the control spring in the relay contacting either the disk or the drag magnet during seismic testing resulting in a short. A wire used to support the spring was not installed in the relays that failed the testing, allowing the control spring to sag and make electrical contact.

There are a total of 45 GE IAV relays identified in the plant, of which 32 are safety-related. Twelve of these had previously been replaced and two more were verified to have the support wire installed. The remaining 18 relays will be inspected, and if the support wire is missing, they will be replaced prior to plant startup.”

The licensee event report is closed. Revision 1 of this licensee event report was submitted on December 18, 2013.

.8 (Opened) Licensee Event Report 05000285/2013-008-01: Previously Installed GE IVA Relays Failed Seismic Testing

“On April 11, 2013, the test results of seven General Electric (GE) IVA relays, indicated that three safety-related, seismically qualified, relays did not pass seismic testing. The condition was entered into the Station's corrective action program. A causal analysis determined that the failure was caused by the control spring in the relay contacting either the disk or the drag magnet during seismic testing resulting in a short. A wire used to support the spring was not installed in the relays that failed the testing allowing the control spring to sag and make electrical contact.

There are a total of 4 GE IAV relays identified in the plant, of which 32 are safety-related. Twenty-seven of the relays required replacement due to missing the support wire.”

.9 (Opened) Licensee Event Report 05000285/2013-014-00: Unqualified Components used in Safety System Control Circuit

“On October 3, 2013 station personnel identified that a condition with the control loop for HCV-1369, Turbine-Driven Auxiliary Feedwater Pump FW-10 Recirculation Valve, was incorrectly evaluated as not reportable. The original condition was identified on October 18, 2012, which identified unqualified components in the control loop whose failure could cause a spurious closure of HCV-1369 and result in pump damage. The station was shutdown in MODE 5 when discovered.

The condition was entered in to the station's corrective action program as Condition Report 2013-18752. Engineering is reviewing this condition and the results of this review will be used to update this report. This report was previously submitted on December 9, 2013 with a duplicate LER number.”

.10 (Opened) Licensee Event Report 05000285/2013-017-00: Containment Spray Pump Design Documents do not Support Operation in Runout

“Fort Calhoun Station (FCS) has identified that design basis documents for the containment spray (CS) pumps SI-3A, SI-3B and SI-3C did not fully support pump operation during runout conditions which could occur under certain system configurations. On October 31, 2013, additional design work was completed which showed that the containment spray pumps would not meet their required mission time under specific accident scenarios. However, the analysis also showed that the containment peak pressure for the limiting design basis accident occurs at 202.3 seconds, which is prior to the containment spray delay time of 228.2 seconds. Therefore, the peak containment pressure would not be affected by this failure.

Fort Calhoun Station has completed a calculation necessary to support a temporary modification which throttles the containment spray pump discharge valves to increase system resistance. A new containment spray pump curve has been issued to include operation in the extended pump operating range. A permanent modification to prevent containment spray pump runout is being pursued.”

.11 (Opened) Licensee Event Report 05000285/2013-018-00: Postulated Fire Event Could Result in Shorts Impacting Safe Shutdown

“On October 9, 2013, an event notification applicable to Callaway Nuclear Power Plant was posted that documented a postulated fire event regarding the impact of unfused direct current (DC) ammeter circuits in the control room (CR). In the postulated event, a fire in the control room could cause one of the ammeter wires to short to the ground plane. Simultaneously, if the fire causes another direct current wire from the opposite polarity on the same battery to also short to the ground plane, a ground loop would be established through the unprotected ammeter wiring. This event could result in excessive current flow (heating) in the ammeter wiring to the point of causing a secondary fire in the raceway system. The secondary fire could adversely affect safe shutdown equipment and potentially result in the loss of the ability to conduct a safe shutdown as required by 10 CFR50 Appendix R. Plant engineering personnel reviewed the information against station electrical schematics and at approximately 1230 central daylight time on October 28, 2013, an 8-hour notification was made pursuant to 10 FR 50.72(b)(3)(ii)(8). The station was in Mode 5 when the condition was identified.

An hourly fire watch was established in the affected locations of the station. Fort Calhoun Station will install fuses in the direct current ammeter circuitry as determined by Engineering Change 62826, Add Fuses to the direct current Ammeter Circuitry for Ammeters.”

**40A4 IMC 0350 Inspection Activities (92702)**

Inspectors continued implementing IMC 0350 inspection activities, which include follow-up on the restart checklist items contained in the Confirmatory Action Letter (CAL) issued February 26, 2013 (EA-13-020, ML 13057A287). The purpose of these inspection activities is to

assess the licensee's performance and progress in addressing its implementation and effectiveness of Fort Calhoun Station's Integrated Performance Improvement Plan (IPIP), significant performance issues, weaknesses in programs and processes, and flood restoration activities.

Inspectors used the criteria described in baseline and supplemental inspection procedures, various programmatic NRC inspection procedures, and IMC 0350 to assess the licensee's performance and progress in implementing its performance improvement initiatives. Inspectors performed on-site and in-office activities, which are described in more detail in the following sections of this report. This report covers inspection activities from November 16 through December 31, 2013. Specific documents reviewed during this inspection are listed in the attachment.

The following inspection scope, assessments, observations, and findings are documented by CAL restart checklist item number.

#### **.1 Causes of Significant Performance Deficiencies and Assessment of Organizational Effectiveness**

Section 1 of the restart checklist contains those items necessary to develop a comprehensive understanding of the root causes of safety-significant performance deficiencies identified at Fort Calhoun Station. In addition, Section 1 includes the independent safety culture assessment with the associated root causes and findings. The integration of the assessments under Item 1.f identifies the fundamental aspects of organizational performance in the areas of organizational structure and engagement, values, standards, culture, and human behaviors that have resulted in the protracted performance decline and are critical for sustained performance improvement. Section 1 reviews also include an assessment against appropriate NRC Inspection Procedure 95003 key attributes. These assessments are documented in section 4OA4.5.

##### **.a Flooding Issue – Yellow Finding**

Item 1.a is included in the restart checklist for the failure of Fort Calhoun Station to maintain procedures and equipment that protects the plant from the effects of a design basis flood. These deficiencies resulted in a yellow (substantial safety significance) finding.

##### **(1) Inspection Scope**

- i. The team assessed the licensee's actions taken since NRC Inspection Report 05000285/2013008. As documented in NRC Inspection Report 05000285/2013008, the inspectors reviewed this area for closure and noted discrepancies in the extent of condition area and a number of deficiencies noted in the technical bases for the flooding procedure which led to restart checklist items 1.a.1, 1.a.2, and 1.a.3 remaining open. The inspectors reviewed licensee actions to address the inspectors' concerns to ascertain whether they were sufficient to ensure plant safety and support closure of the restart checklist items.

- ii. Open items (Licensee Event Reports (LER) and violations (VIO) for this portion of the restart checklist) specifically related to the Yellow finding were reviewed by the team. The team reviewed the adequacy of the licensee's causal analyses and extent of condition evaluations related to the associated deficiencies that protect the plant from the effects of a design basis flood. In addition, the NRC verified that adequate corrective actions were identified associated with the licensee's causal analyses and extent of condition evaluations and that implementation of these corrective actions were either implemented or appropriately scheduled for implementation.

Open items reviewed were:

- LER 2012-001, Inadequate Flooding Protection Procedure
- LER 2012-019, Traveling Screen Sluice Gates Found with Dual Indication
- LER 2011-003, Inadequate Flooding Protection Due to Ineffective Oversight
- VIO 2012002-01, Inadequate Procedures to Mitigate a Design Basis Flood Event
- VIO 2012002-02, Failure to Classify Intake Structure Sluice Gates as Safety Class III
- VIO 2012002-03, Failure to Meet Design Basis Requirements for Design Basis Flood Event
- VIO 2010007-01, Failure to Maintain External Flood Procedures

## (2) Observations and Findings

### i. Resolution of Root Cause, Corrective Action, and Extent of Condition Issues

#### a) Licensee's Evaluations and Associated Improvement Actions Related to the Yellow Flooding Finding

From previous inspections, the major aspects which the licensee had not adequately addressed for the root cause analyses and associated efforts for the Yellow flooding finding were extent of condition review and addressing deficiencies in the technical bases for the licensee's flood mitigation procedures. The inspectors reviewed licensee actions below.

Resolution of Extent of Condition Review Weaknesses. In NRC Inspection Report 05000/285/2013008, the team noted several areas where the licensee had not adequately addressed the extent of condition of the inadequate flooding procedure. Inspectors identified the following observations which were previously documented related to extent of condition.

- URI 05000285/2013008-01, "Inadequate Procedure for Combatting Frazil Ice"

- FIN 05000285/2013008-02, "Frazil Ice Monitor Not Operational"
- NCV 05000285/2013008-03, "Lack of Safety-Related Equipment For Design Basis Low River Level"
- NCV 05000285/2013008-04, "Non-conservative Value for Declaring An Alert on Low River Level"
- NCV 05000285/2013008-05, "Inadequate Procedure for Combating Loss of Raw Water"

The inspectors observed that the licensee had entered each of these conditions into their corrective action program for resolution.

To address the overall concern that the licensee's review of the extent of condition for the inadequate procedure which led to the Yellow flooding finding, the licensee performed additional reviews of their abnormal operation procedures. Additionally, the licensee has post-restart actions in place to perform additional reviews associated with a procedural quality improvement effort that is part of the licensee's Performance Improvement Integrated Matrix (PIIM). Action Numbers 2013-0031 and 2013-0086 of the PIIM cover the procedural improvement program by the licensee.

The inspectors determined that the licensee's actions addressing the identified deficiencies associated with the extent of condition coupled with the licensee conducting a procedure improvement initiative were adequate to address the weaknesses in the licensee's extent of condition review for the Yellow flooding finding.

Resolution of Procedural Technical Bases Observations. In NRC Inspection Report 05000/285/2013008, the team noted several areas where the licensee had not adequately addressed weaknesses in the technical bases of the flooding mitigation procedures. The team reviewed the technical bases for procedural steps in the revised flooding procedure. The technical bases prove that the procedures and the equipment they call upon would work when demanded under a design basis flood. In Inspection Report 05000285/201008, the team identified the following issues related to FCS personnel's ability to adequately address technical inadequacies in the procedures to mitigate flooding:

- NCV 05000285/2013008-06, "Failure to Account for Worst Case Conditions in Fuel Oil Inventory Calculation"
- URI 05000285/2013008-07, "Administrative Controls for a Technical Specification for Low River Level"
- NCV 05000285/2013008-08, "Sluice Gate Leakage Not Periodically Verified"

- NCV 05000285/2013008-09, "Failure to Prevent Failures of the Sluice Gates to Close"
- NCV 05000285/2013008-10, "Failure to Accurately Model Raw Water Flow into the Intake Structure"
- NCV 05000285/2013008-11, "Failure to Account for Usable Fuel Oil Tank Level in Inventory"

The inspectors observed that the licensee had entered each of these conditions into their corrective action program for resolution.

To address the overall concern with inadequacies in the technical bases of their flooding mitigation procedures, the licensee performed additional reviews of their abnormal operation procedure for acts of nature, their emergency plan implementing procedures, and their second level support procedures called on in their flooding procedure AOP-01, "Acts of Nature." This review and future reviews were and will be part of the larger review performed for the procedural quality improvement effort post restart as part of the PIIM. Action Numbers 2013-0031 and 2013-0086 of the PIIM cover the procedural improvement program by the licensee.

The team concluded that Fort Calhoun Station had adequately resolved the identified technical issues associated with technical bases for their flooding mitigation procedures by their actions to address the identified deficiencies coupled with the effort to conduct a procedure improvement initiative as described in their PIIM.

#### Conclusion

The inspectors determined that the licensee had adequately addressed the extent of condition and procedural technical bases areas which had previously been of concern associated with Restart Checklist Bases Document Items 1.a.1, "Flooding Yellow Finding root and contributing cause evaluation", 1.a.2, "Flooding Yellow Finding extent of condition and cause evaluation", and 1.a.3, "Flooding Yellow Finding corrective actions addressing root and contributing causes."

Items 1.a.1, 1.a.2, and 1.a.3 are closed.

#### ii. Resolution of Open Items Related to the Yellow Flooding Finding on the Restart Checklist Basis Document

##### a) LER 2012-001, "Inadequate Flooding Protection Procedure"

Licensee Event Report LER 2012-001 documented the deficiencies in Procedure AOP-01, "Acts of Nature," that were associated with the NRC Yellow finding. The inspectors reviewed and closed the causal analyses, corrective actions, and extent of condition for this issue in Section a above.

This LER is closed.



b) LER 2012-019, "Traveling Screen Sluice Gates Found with Dual Indication"

Licensee Event Report LER 2012-019 documented a condition where intake sluice gates were found with dual indication. With this indication, the position of the sluice gates could not be positively confirmed to be closed as required by the licensee's flood procedure. The licensee entered this condition into their CAP and reviewed the licensee's corrective actions. The licensee took action to close the sluice gates and ensure the flooding mitigation feature was restored. The inspectors began inspection of this item in NRC Inspection Report 05000285/2012012 and included its review under Finding FIN 5000285/2012012-03, "Failure to Properly Manage the Functionality of the River Sluice Gates." To address any future concerns with conflicting information for the position of the sluice gates, the licensee revised their maintenance procedure to provide an affirmative method of ensuring the sluice gates were closed. The inspectors reviewed this method and considered the method adequate.

This LER is closed.

c) LER 2011-003, "Inadequate Flooding Protection Due to Ineffective Oversight"

Licensee Event Report LER 2011-003 documented that the predominant cause of the Yellow flooding finding for an inadequate flooding mitigation procedure was historical ineffective oversight by station management. The licensee came to this conclusion as a result of their root cause analyses. The inspectors noted that station management had been changed and new managers in the principal positions were supplied in an operating agreement with Exelon Nuclear. The remaining aspects for the inadequate flooding protection were addressed under CR 2010-2387. The inspectors reviewed this and the licensee's actions during the review of the causal analyses, corrective actions, and extent of condition for this issue in Section a above.

This LER is closed.

d) VIO 2012002-01, "Inadequate Procedures to Mitigate a Design Basis Flood Event"

Violation VIO 2012004-01 documented multiple examples of a violation of Technical Specification 5.8.1.a, "Procedures," for failure to establish and maintain procedures to mitigate an external flooding event. The procedural guidance for flooding was inadequate to mitigate the consequences of external flooding. The inadequacies were a failure to provide operators with sufficient information to ensure a transfer of power from offsite to an onsite emergency diesel generator prior to a loss of offsite power; a failure to identify that the class-1E powered motor operators of the six intake structure sluice gates were located at an elevation of 1,010 feet mean sea level (below the design basis flood level); a failure to identify that three of the six sluice gate motor operators would be de-energized when offsite power was transferred from offsite to one onsite

emergency diesel generator; and a failure to adequately ensure the fuel transfer hose to emergency diesel generator day tanks was staged prior to river level exceeding 1,004 feet mean sea level. The licensee entered these conditions into their CAP as Condition Report CR 2010-2387. The inspectors reviewed the licensee's corrective actions.

The failures were adequately corrected by the licensee with procedure revisions. The inspectors conducted walkthroughs with licensee operators and maintenance personnel in the simulator to ensure the revisions adequately addressed the issues.

This violation is closed.

- e) VIO 2012002-02, "Failure to Classify Intake Structure Sluice Gates as Safety Class III"

Violation VIO 2011002-02 documented a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for failure of the licensee to classify the six intake structure exterior sluice gates and their motor operators as Safety Class III. Inspectors identified that the licensee's previous mitigation scheme to raise and lower the intake cell sluice gates as a method to control level in those cells would require the sluice gates to be classified as safety class equipment. The licensee originally denied this violation, but the NRC's further independent review re-affirmed the validity of the original violation. The licensee entered this condition into their CAP as Condition Report CR 2010-2387. The inspectors reviewed the licensee's corrective actions. These actions included a modification to the plant and the licensee's submittal of license amendment request that is currently under review.

The new method uses four new lines which tap off of the circulating water system trash rack blowdown piping. This method requires all sluice gates to be fully closed and not used for controlling cell level. Four new valves in the blowdown piping would be used to control the intake cell level during a flood. Inspectors reviewed the modification and the licensee's operability determination to use this new method while the licensing amendment is under review and found them adequate to support plant safety.

This violation is closed.

- f) VIO 2012002-03, "Failure to Meet Design Basis Requirements for Design Basis Flood Event"

Violation VIO 2012002-03 documented a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the failure to meet design basis requirements for protection of the safety related raw water system during a design basis flood for flood levels between 1,010-1,014 feet mean sea level (msl) as identified in Updated Safety Analysis Report, Section 9.8, "Raw Water System." Specifically, the design basis states, in part, that water level inside the intake cells can be

controlled during a design basis flood by positioning the exterior sluice gates to restrict the inflow into the cells. Inspectors identified that the sluice gate motor operators would be submerged below 1,014 feet msl adversely affecting the ability to position the sluice gates. The licensee entered this condition into their CAP as Condition Report CR 2010-2387. The inspectors reviewed the licensee's corrective actions. These actions, as previously discussed, included a modification to the plant and the licensee's submittal of license amendment request, both related to a change in the licensee's method of controlling intake cell level during flooding conditions up to the design basis flood.

This violation is closed.

g) VIO 2010007-01, "Failure to Maintain External Flood Procedures"

Violation VIO 2010007-01 documented the original concern the NRC identified with the licensee's ability to mitigate a design basis flood. The NRC conducted numerous follow-up inspections of the licensee's actions to address their readiness for a design basis flood event. The root cause analyses for the condition were reviewed during the inspections of Sections 1.a.1, 1.a.2, and 1.a.3 of the Restart Checklist Basis Document. Inspection Report 05000285/2013008 identified areas of concern which were re-inspected and deemed to be satisfactorily addressed by the licensee as previously documented in this report.

This violation is closed.

(3) Assessment Results

i. Licensee's Evaluations and Associated Improvement Actions Related to the Yellow Flooding Finding

Based on the licensee's efforts to address the discrepancies previously identified by the inspectors in the extent of condition area and the in the technical bases for the flooding procedure, restart checklist items 1.a.1, 1.a.2, and 1.a.3 were closed.

ii. Resolution of open Items associated with the Yellow Flooding Finding

Based on the reviews the team conducted, the following items were closed:

- a) LER 2012-001, "Inadequate Flooding Protection Procedure"
- b) LER 2012-019, "Traveling Screen Sluice Gates Found with Dual Indication"
- c) LER 2011-003, "Inadequate Flooding Protection Due to Ineffective Oversight"
- d) VIO 2012002-01, "Inadequate Procedures to Mitigate a Design Basis Flood Event"
- e) VIO 2012002-02, "Failure to Classify Intake Structure Sluice Gates as Safety Class III"

f) VIO 2012002-03, "Failure to Meet Design Basis Requirements for Design Basis Flood Event"

g) VIO 2010007-01, "Failure to Maintain External Flood Procedures"

iii. Overall Assessment of Item 1.a: Flooding Issue – Yellow Finding (CLOSED)

Closure of all individual items in Section 1.a, "Yellow Flooding Finding," of the Restart Checklist are closed.

.b Reactor Protection System Contactor Failure – White Finding

Item 1.b is included in the restart checklist for the failure of Fort Calhoun Station to correct a degraded contactor, which subsequently failed, in the reactor protection system. These deficiencies resulted in a white (low to moderate safety significance) finding.

(1) Inspection Scope

The team reviewed the licensee's assessment of the failure of the M-2 contactor in the reactor protection system that occurred June 14, 2010. The team verified that the licensee adequately identified the root and contributing causes of the risk significant issue; verified that the extent of condition and extent of causes of the risk significant issue were identified, and verified that the corrective actions adequately addressed the causes to preclude repetition. (Restart Checklist Basis Document Items 1.b.1; 1.b.2; 1.b.3)

An open item specifically related to the White finding was reviewed by the team. The team verified that the licensee had performed adequate root cause and extent of condition evaluations related to the associated deficiencies. In addition, the NRC verified that adequate corrective actions were identified associated with the licensee's root and contributing causes and extent of condition evaluations and that implementation of these corrective actions are either implemented or appropriately scheduled for implementation. (VIO 2011007-01)

Specifically, the team assessed Revision 4 of the Root Cause Analysis (RCA) for CR 2011-00451, for which the problem statement was:

*"Reactor Protection System M-2 contractor was identified as "chattering" on November 3, 2008 and non-conforming maintenance was performed. The M-2 contractor remained in a degraded and non-conforming condition without an appropriate analysis to evaluate until it failed surveillance testing on June 14, 2010."*

This revision to the root cause changed the wording significantly.

The team's assessment was based on the evaluation criteria from Section 02.02 of NRC Inspection Procedure 95001, which aligned with this item. The inspection objectives were to:

- Provide assurance that the root and contributing causes of risk-significant issues were understood;
- Provide assurance that the extent-of-condition and extent-of-cause of risk-significant issues were identified;
- Provide assurance that the licensee's corrective actions for risk-significant performance issues were, or will be, sufficient to address the root and contributing causes and to preclude repetition.

(2) Observations and Findings

Determine that the problem was evaluated using a systematic methodology to identify the root and contributing causes.

The team determined that the licensee evaluated this problem using a systematic methodology to identify the root and contributing causes. Specifically, RCA 2011-00451 employed the use of event and causal factor charting, barrier analysis, comparative analysis, and causal factor test, root and contributing cause statements, and the root and contributing cause testing. The barrier analysis and event and causal factor chart associated with RCA 2011-00451 identified a number of failed barriers that appeared to play a significant role in the events leading to the failure of the reactor protection system M-2 contactor. Included in the analysis were failures of the Preventive maintenance program, operations procedures, system engineering, operations' degraded non-conforming process, work control process, and the Plant Review Committee Process.

Based on the analysis, the licensee concluded the following were the root and contributing causes of the failure to address the degraded M-2 contactor in the reactor protection system:

- RC-1: Electrical Maintenance workers did not follow the procedure / work order instructions for the M-2 contactor issue. When presented with conditions outside of the expected, they did not use the Human Performance Tool DUCS (Distracted, Uncertain, Confused, Stop) to obtain the necessary guidance to correct the issue.
- RC-2: The Operations Department did not have an effective nuclear safety culture and ownership of plant equipment necessary to challenge unexpected events and take prompt action to drive the action to restore degraded equipment to reliable operation.

- CC-1: System Engineering did not recognize and implement their responsibility to perform appropriate evaluations to address plant technical issues and act as the site technical conscience.
- CC-2: Preventive Maintenance strategies were not implemented to replace the M-contactors before they exhibited degradation and did not consider the increased failure rate associated with their reaching end of service life.
- CC-3: Engineering judgment used to support Operability Evaluations was not rigorous or formally documented.
- CC-4: The Plant Review Committee Degraded / Nonconforming condition subcommittee process was allowed to change operations department decisions on whether equipment was degraded without operations concurrence or formal documentation of the basis.
- CC-5: Operations surveillance test guidance allowed pausing surveillance tests to perform repairs, which is a practice that is contrary to industry practices and regulatory guidance.
- CC-6: Operations knowledge of Technical Specification requirements related to the M-contactors was inadequate resulting in entry into TS 2.15(1) instead of TS 2.0.1.

Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

The team determined that the RCA was conducted to a level of detail commensurate with the significance of the problem. Specifically, the licensee performed a significant revision to the RCA based on the inspection concerns documented in IR 2013-008. The licensee systematically used Methods 1 and 2 for cause testing as defined by FCSG 24 5, "Condition Report and Cause Evaluation." The eight causal statements, developed from merged causal factors, were evaluated using the flow chart. Two causal statements were identified as Root Causes and the other six were determined to be Contributing Causes.

Determine that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

The team determined that the RCA included evaluation of both internal and industry operating experience as documented in Attachment 4 to RCA 2011-00451.

Determine that the root cause evaluation addressed the extent of condition and the extent of cause of the problem.

The team reviewed the licensee's RCA as it relates to extent of condition and extent of cause.

For extent of condition, the licensee used same-same, same-similar, similar-same, and similar-similar evaluation method which is documented as Attachment 3 to RCA 2011-00451. Based on this analysis, the licensee determined that an extent of condition does exist. The licensee based this conclusion, in part, on the findings of Condition Report CR 2012-09494, related to deficiencies in identifying degraded/nonconforming conditions and in the performance of operability determinations.

For extent of cause, the licensee determined an extent of cause does exist for the root causes identified in this analysis. They believe the extent of causes have been addressed by the collective sum of all corrective actions from the following RCAs:

- 2011-01719, Incorrect Technical Specification Entered when AI-3-M2 Contactor failed
- 2011-03025, Area for Improvement (EN 1-1)
- 2012-03986, Organizational Ineffectiveness
- 2012-08125, Engineering Design / Configuration Control
- 2012-08132, Site Operational Focus and Conservative Decision Making
- 2012-08135, Human Performance
- 2012-08134, Equipment Reliability / Work Mangement
- 2012-08137, Regulatory Process and Infrastructure
- 2012-09491, End of Service Life
- 2012-09494, Deficiencies in Identifying Degraded and Non-Conforming Condition and Performing Operability Determinations
- 2013-05570, Design and Licensing Bases Configuration Control

The team concluded that RCA 2011-00451 determined an appropriate extent of condition and appropriate extent of cause for the root cause related to the reactor protection system M-2 contactor issue.

Determine that the root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0310.

The root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0310. Specifically, the licensee documented their consideration of the IMC 0310 cross-cutting aspects in

Attachment 9 of RCA 2011-00451. The licensee identified several cross-cutting aspects in the area of human performance, problem identification and resolution (PI&R), and other components that were applicable to issues related to deficiencies in degraded/nonconforming condition review and operability evaluations. The final evaluation concluded that only a small number of the safety culture attributes were not to be applicable to RCA 2011-00451.

Determine that appropriate corrective actions are specified for each root and contributing cause.

The team reviewed Attachment K to 2011-00451 and determined that generally the licensee's proposed corrective actions were appropriate to address the root and contributing causes identified.

Determine that a schedule has been established for implementing and completing the corrective actions.

The team determined that due dates have been established for implementation and completion of corrective actions.

Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.

The team determined that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.

### (3) Assessment Results

The team concluded that for Item 1.b: Reactor Protection System Contact Failure - White Finding, the root and contributing causes of risk-significant issues were understood; the extent-of-condition and extent-of-cause of risk-significant issues were identified; and, the licensee's corrective actions for risk-significant performance issues were, or will be, sufficient to address the root and contributing causes and to preclude repetition.

All items in Section 1.b, "Reactor Protection System Contactor Failure - White Finding," are closed.

## **.2 Flood Restoration and Adequacy of Structures, Systems, and Components**

Section 2 of the Restart Checklist contains those items necessary to ensure that important structures, systems, and components affected by the flood and safety significant structures, systems and components at Fort Calhoun Station are in appropriate condition to support safe restart and continued safe plant operation.

### .b System Readiness for Restart Following Extended Plant Shutdown



Systems that have been shut down for prolonged periods may be subject to different environments than those experienced during power operations. The NRC verified that the licensee adequately evaluated the effects of the extended shutdown to ensure that the structures, systems, and components are ready for plant restart and they conform to the appropriate licensing and design bases requirements.

(1) Inspection Scope

.ii Detailed Review of Alternating and Direct Current Electrical Distribution, and High Pressure Safety Injection Systems

The licensee performed a comprehensive review to evaluate and verify the capability of selected systems to fulfill their intended safety functions as defined by the licensing and design basis and identified broad-based safety, organizational, and performance issues. The review was structured consistent with NRC Inspection Procedure 95003 (Sections 02.03 and 03.03). The selected systems for detailed review (vertical slice) as part of the Reactor Safety Strategic Performance Area were based on their high risk significance, input from system health reports, performance indicators, condition reports, and licensee event reports. Teams of Omaha Public Power District and independent external experts performed the Reactor Safety Strategic Performance Area reviews.

Systems selected are:

- AC and DC Electrical Distribution Systems. These systems include the 4160V breakers, 480V breakers, batteries, and battery chargers. Electrical distribution systems at Fort Calhoun Station provide necessary power for Mitigating Systems. The AC and DC systems provide power to key pumps, motors, valves, and instruments required to monitor and respond to plant conditions. From the plant's probabilistic assessment, the AC and DC electrical systems account for a substantial portion of plant risk. The electrical distribution system was selected for self assessment by the licensee based on both identified issues and their importance to safety.
- Emergency Core Cooling System. This includes the high pressure injection system. This system is important to provide mitigation for postulated accident conditions in the reactor plant. This review assessed and validated key aspects of the suction and discharge pathways, system alignments, power sources, and emergency actuation.

Results and insights from these reviews were incorporated into the Integrated Performance Improvement Plan that supported the restart of Fort Calhoun Station. The NRC inspected each of the licensee's detailed reviews and select samples for independent verification that the licensee properly assessed each system.

(2) Observations and Findings

No findings or observations.

(3) Assessment Results

Inspectors concluded that based on their reviews of the cause evaluations, and the extent of cause/extent of condition reviews, that this area has been reviewed by the licensee to a sufficient level of detail.

Items 2.b.2.1, 2.b.2.2, 2.b.2.3, and 2.b.2.4 are closed.

**.3 Adequacy of Significant Programs and Processes**

Section 3 of the Restart Checklist addresses major programs and processes in place at FCS. Section 3 reviews will also include an assessment of how the licensee appropriately addressed the NRC Inspection Procedure 95003 key attributes as described in Section 6.

.a Corrective Action Program

(1) Inspection Scope

- i. The team assessed the licensee's actions taken since NRC Inspection Report 05000285/2013008. In Inspection Report 05000285/2013008, the inspectors reviewed this area for closure and observed that because the licensee was continuing implementation of corrective actions to improve the effectiveness of the CAP, the licensee had unsatisfactory results on effectiveness reviews, and because the licensee was still generating additional corrective actions to address CAP effectiveness, items 3.a.1, 3.a.2, 3.a.3, and 3.a.4 remained open.

The inspectors reviewed licensee actions to address the inspectors' concerns to ascertain whether they were sufficient to ensure the CAP was adequate to support plant restart. Also, the team reviewed the licensee's assessment of the Fundamental Performance Deficiency associated with the CAP.

In addition, the team reviewed the licensee's assessment of the past issues involving inadequate operating experience reviews identified in NRC Inspection Report 05000285/2013008. In that report, the team determined that the effort by the licensee to lump operating experience weaknesses in the RCA did not provide for the proper analysis needed to address this deficiency which was prevalent in nearly all of the Fundamental Performance Deficiency RCAs. Therefore, restart checklist items 3.a.8, 3.a.9, 3.a.10, and 3.a.11 remained open pending the verification of the effective resolution. The inspectors reviewed licensee actions to ascertain whether they were sufficient to ensure that operating experience reviews by the licensee were adequate.

Finally, in NRC Inspection Report 05000285/2013008, the team performed a problem identification and resolution team inspection. That team concluded that

overall, the CAP at FCS was functional in identifying, evaluating, and correcting issues with various degrees of effectiveness. The team had a large number of observations provided in each of the areas of CAP, and observed that there was significant room for improvement. Based on all the observations identified by the team, in all 3 areas of CAP, restart checklist item 3.a.12 remained open for additional inspections to ensure an improved implementation of the CAP was in place. The inspectors reviewed licensee actions to address the inspectors' concerns to ascertain whether they were sufficient to ensure the CAP was being adequately implemented.

- ii. Open items (Licensee Event Reports (LER), noncited violations (NCV), and violations (VIO) specifically related to the corrective action program were reviewed by the team. The team reviewed the adequacy of the licensee's causal analyses and extent of condition evaluations related to the associated deficiencies noted in the licensee's corrective action program. In addition, the NRC verified that adequate corrective actions were identified associated with the licensee's causal analyses and extent of condition evaluations and that implementation of these corrective actions were either implemented or appropriately scheduled for implementation.

Open items reviewed were:

- VIO 2011006-02, "Inadequate Corrective Actions to Ensure Reliability of Raw Water Pump Power"
- NCV 2011006-06, "Failure to Implement an Adequate Trending Program"
- NCV 2010003-01, "Failure to Provide Adequate Limiting Condition for Operation for High River Level"
- LER 2012-007, "Failure of Pressurizer Heater Sheath"
- LER 2012-004, "Inadequate Analysis of Drift Affects Safety Related Equipment"
- LER 2012-010, "Seismic Qualification of Instrument Racks"

## (2) Observations and Findings

### i. Corrective Action and Operational Experience Programs Assessment

#### a) Resolution of Corrective Action Program Deficiencies

NRC Inspection Report 05000/285/2013008 documented that based on the ongoing implementation of corrective actions, the licensee's unsatisfactory results on effectiveness reviews, and because the licensee was still generating additional corrective actions to address CAP effectiveness, restart checklist items 3.a.1, 3.a.2, 3.a.3, and 3.a.4 would remain open.

The inspectors assessed licensee actions addressing the noted deficiencies. The inspectors reviewed CR 2013-08675 which was initiated after the inspection documented in Inspection Report 05000285/2013008. The licensee performed a root cause analysis to evaluate the quality and timeliness of CAP actions and the fact that prior actions taken to prevent recurrence of problems had not been fully effective.

The root cause was determined by the licensee to be:

*Station personnel have not consistently followed CAP procedures and station leadership has not reinforced CAP procedure compliance, as a result improvements in CAP performance have been limited.*

Corrective actions taken to address this were the establishment of a CAP oversight function and to develop and implement CAP Fundamentals reinforced through an accountability model for specific CAP behaviors. Each of these actions were put in place with periodic effectiveness measures being used to monitor progress. The inspectors reviewed the first effectiveness measurement results and noted continued improvement in the functioning of the CAP. The final effectiveness measures and continued actions for improvement of the CAP are contained in the PIIM in Action Plan Numbers 2013-0055, "CAP Excellence Plan - Problem Identification," 2013-0065, "CAP Excellence Plan - Root Cause and Apparent Cause Quality," and 2013-0062, "CAP Excellence Plan - Corrective Action Closure."

The licensee also identified six contributing causes that included:

- CAP volume has significantly increased without significant process or prioritization changes to ensure quality and timeliness requirements can be maintained.
- The CAP strategy for improving performance was not well implemented and understood at all levels in the organization.
- The ActionWay software is not being used as an effective barrier to ensure that certain required actions within the CAP process are performed and that certain prohibited actions are prevented.
- Inadequate procedure guidance for action types in ActionWay has led to inappropriate use and untimely resolution of conditions adverse to quality.
- Station personnel have not received the requisite training to assure that station leadership and staff have the knowledge and skills to effectively and efficiently implement the CAP program.

- Station trending has been time consuming and ineffective due a large number of flat level codes, the inability to trend on common subjects, and the lack of connectivity between event and cause codes.

The inspectors reviewed the licensee's actions to address these contributing causes. The inspectors determined that the corrective actions to address the contributing causes appeared to adequately address the deficiencies. Based on the licensee's improvements in CAP performance, continued effectiveness measurement to monitor sustained improvement and make corrections when needed, and the continued station focus on CAP improvements contained in the PIIM, the inspectors considered that the CAP was adequately healthy and should continue to improve.

Based on this assessment Restart Checklist Basis Document Items 3.a.1, "Licensee Assessment of Corrective Action Program," 3.a.2, "Adequacy of Extent of Condition and Extent of Causes," 3.a.3, "Adequacy of Corrective Actions," and 3.a.4, "Adequacy of Effectiveness Measures to Monitor Program Improvements," are closed.

b) Resolution of the Functional Performance Deficiency Associated with the CAP

In NRC Inspection Report 05000/285/2013008, the team noted that the licensee had chartered a team to perform another root cause analysis in this area and therefore assessing closure of this area would not be appropriate until that effort was completed and inspected by the NRC. The licensee completed the root cause analysis as part of CR 2013-08675. This root cause addressed both the CAP deficiencies and the functional performance deficiency associated with the CAP since both were closely related. Actions to correct the fundamental performance deficiency were reviewed and found to be adequate. The inspectors noted the actions were bounded by the actions to improve the effectiveness of the CAP, including the emphasis of the continued CAP improvements contained in the PIIM.

Based on this assessment Restart Checklist Basis Document Items 3.a.5, "Licensee Assessment of the Fundamental Performance Deficiency Associated with the Corrective Action Program," 3.a.6, "Adequacy of Extent of Condition and Extent of Causes," and 3.a.7, "Adequacy of Corrective Actions," are closed.

c) Resolution of Operational Experience Program Deficiencies

In NRC Inspection Report 05000/285/2013008, the team concluded that the licensee's assessment of Performance Improvement initiatives, specific to operating experience, was too general to effectively address the operating experience portion of the CAP. The NRC's concern with the licensee's practices with operating experience was that the site Operating Experience Program was not effectively being implemented to enhance the performance of FCS.

During this inspection the inspectors noted actions by the licensee to enhance the use of operating experience. An example of this was in CR 2013-02062 where the licensee noted the operating experience program should be reviewed to determine if any changes can be made to enhance the security organization use of operating experience. The inspectors noted similar instances in other areas, including improved use of operating experience in root cause analyses. The inspectors noted that improvement in the use of operating experience was incorporated into the PIIM in Action Plan Number 2013-0061, "Human Performance," to improve human performance at the station. Operating Experience was also included in the PIIM as part of the Performance Improvement Program ensuring the CAP Coordinators for each department drive the use of operating experience. Based on these observations, the inspectors concluded that the licensee had taken adequate actions to increase the use of operating experience in various station work processes and had initiatives in their PIIM to continue improvements in this area.

Based on this assessment Restart Checklist Basis Document Items 3.a.8, "Licensee Assessment of Operating Experience Action Program," 3.a.9, "Adequacy of Extent of Condition and Extent of Causes," 3.a.10, "Adequacy of Corrective Actions," and 3.a.11, "Adequacy of Effectiveness Measures to Monitor Program Improvements," are closed.

d) NRC Problem Identification and Resolution Team Inspection

In NRC Inspection Report 05000/285/2013008, it was documented that the NRC performed a problem identification and resolution team inspection but did not close Item 3.a.12, noting the need for additional inspections to ensure an improved implementation of the CAP was in place. Since that inspection, the licensee performed the additional root cause in CR 2013-08675 and implemented corrective actions. These corrective actions were reviewed by the NRC and it was determined that they adequately addressed the main deficiencies noted during the previous inspection.

Based on the extensive NRC inspection efforts to assess the licensee's actions addressing improvements to the CAP that determined adequate actions have been taken by the licensee and future actions will continue to be implemented and effectiveness monitored, Restart Checklist basis Document Item 3.a.12, "Perform NRC Team Problem Identification and Resolution inspection," is complete.

e) Overall Assessment

The inspectors determined that the corrective actions to address the root and contributing causes addressing the CAP deficiencies appeared comprehensive and were resulting in performance improvements. Additionally, the licensee has implemented measurement processes to monitor the effectiveness of improvements so that corrections can be implemented when needed. The

station has in place CAP improvements initiatives contained in the PIIM that will drive continued improvements to the program.

ii. Resolution of Open Items Related to the Correction Action Program Area in the Restart Checklist Basis Document

a) (Discussed) VIO 05000285/2011006-02, "Inadequate Corrective Actions to Ensure Reliability of Raw Water Pump Power"

This violation involved the failure to take effective corrective action following the initial discovery of water intrusion in cable vault manholes MH-5 and MH-31 in 1998, 2005, 2009, and 2011. Specifically, the licensee failed to take effective corrective action to establish an appropriate monitoring frequency which took into account variable environmental conditions to mitigate potential common mode failure of raw water 4160 V motor cables in underground ducts and manholes identified during the Component Design Basis Inspection performed in 2009.

This item was inspected as part of the 2013 License Renewal inspection and was documented in Inspection Report 05000285/2013009. That team determined that the licensee initiated Condition Report 2013-11857 for the condition. The team concluded that, although the licensee had installed an alarm system to identify a high water level, the licensee had insufficient time to demonstrate reliability and effectiveness of the system.

This violation remains open pending future inspection of completed corrective actions. The inspectors determined the corrective actions appeared adequate and closed this item on the Restart Checklist Basis Document.

b) NCV 05000285/2011006-06, "Failure to Implement an Adequate Trending Program"

This item was identified as a Green non-cited violation as part of the 2011 Problem Identification and Resolution Team Inspection and documented in NRC Inspection Report 05000285/2011006. That team identified a deficiency regarding the licensee's inability to implement adequate procedures for gathering, analyzing, and communicating information related to low-level performance vulnerabilities and repeat occurrences prior to the emergence of more significant events. Inspectors originally reviewed licensee actions as part of the team inspection documented in Inspection Report 05000285/2013008 from which they concluded the licensee still had performance gaps in effective trending to resolve issues at lower levels, especially equipment trending. The inspectors noted that the licensee took action to address this condition as part of Condition Report CR 2013-08675 in April 2013. The root cause found that trending was not effective due to the lack of configuration of the CAP software to provide the functionality to efficiently and accurately code and trend condition reports. The inspectors reviewed the licensee's actions which included software changes to the CAP software to establish a tiered coding structure and utilize the existing Exelon fleet model for trending codes. The inspectors reviewed recent examples of trends and noted improvement in trending within the

CAP. From this, the inspectors considered that the licensee had adequately addressed this noncited violation and this Restart Checklist Basis Document item is closed.

c) NCV 05000285/2010003-01, "Failure to Provide Adequate Limiting Condition for Operation for High River Level"

This NCV documented a failure to include an adequate limiting condition for operation in the technical specification. Specifically, the reactor could not be placed in a cold shutdown condition using normal operating procedures when the river level exceeded 1009 feet mean sea level, as required by Technical Specification 2.16. The inspectors confirmed that licensee entered this condition into their corrective action program. The inspectors noted that the licensee had changed procedure AOP-01, "Acts of Nature," to administratively shutdown the reactor and place it in cold shutdown at a time where plant and flood conditions permitted. The inspectors also confirmed that the licensee submitted a license amendment request to change Technical Specification 2.16, "River Level" to require plant shutdown at 1004 feet mean sea level. The inspectors reviewed this level relative to the actions and time needed to place the plant in cold shutdown and considered them adequate. On January 28, 2014, the NRC issued Amendment No. 274 to OPPD approving the changes to Technical Specification 2.16, "River Level," (ADAMS ML 14003A003). This NCV is closed on the Restart Checklist Basis Document.

d) (Closed) Licensee Event Report 05000285/2012-007, "Failure of Pressurizer Heater Sheath"

This LER documented a condition where a pressurizer heater sheath (Number 26 heater) was found cracked after it had failed. This condition was considered a degradation of the reactor coolant system boundary. The licensee conducted a root cause for the condition and concluded that fabrication of the heater sheath during the manufacturing process induced high tensile residual stresses on the outer surface of the sheaths which led to the failure. The inspectors reviewed this causal analysis and the corrective actions associated with it. The inspectors observed that the heater sheath has been removed and replaced, and that other heater sheaths have been inspected and none of them had indications of cracking. The inspectors also concluded that the heater design, which included a secondary seal (not the RCS pressure boundary) prevented any leakage from the reactor coolant system, and functioned as anticipated for such a condition. The inspectors also confirmed that future inspections of heaters were included as corrective actions for this condition. This LER and Restart Checklist Basis Document item is closed.

e) (Closed) Licensee Event Report 05000285/2012-004, "Inadequate Analysis of Drift Affects Safety Related Equipment"

This LER documented a condition where Static "0" Ring pressure switches with certain housing styles exhibit a setpoint shift when exposed to a change in temperature if the switch body is not vented. These pressure switches that provide



signals for high containment pressure to the reactor protection system and engineered safeguards actuation circuitry had this configuration. The inspectors determined that from a review of an evaluation of actual data that safety analysis limits were not exceeded. The inspectors also examined the instruments and confirmed that as corrective action the licensee had removed the vent plugs. Also, the inspectors confirmed that the causal factor of inadequate vendor documentation was addressed by the licensee. This LER and Restart Checklist Basis Document item is closed.

f) (Closed) Licensee Event Report 05000285/2012-010, "Seismic Qualification of Instrument Racks"

This LER documented an incident where safety-related reactor coolant system pressure instruments were installed in non-seismically qualified instrument racks. The licensee performed an analysis and demonstrated that the instrument racks were designed to withstand the loads from a seismic event, and retracted the event report. The enforcement aspects of this finding are discussed in Section 40A7. This LER and Restart Checklist Basis Document item is closed.

**.5 Assessment of NRC Inspection Procedure 95003 Key Attributes**

Section 5 of the Restart Checklist is provided to assess the key attributes of NRC Inspection Procedure 95003. Performing Inspection Procedure 95003 will provide the NRC with supplemental information regarding licensee performance, as necessary to determine the breadth and depth of safety, organizational, and programmatic issues. While the procedure does allow for focus to be applied to areas where performance issues have been previously identified, the procedure does require that some sample reviews be performed for all key attributes of the affected strategic performance areas. The key attributes are listed as separate subsections below. It is intended that the activities in these subsections be conducted in conjunction with reviews and inspections for Sections 1 - 4, rather than a stand-alone review.

.c Procedure Quality

Item 5.c is included in the restart checklist because the licensee performed an integrated assessment and identified 15 Fundamental Performance Deficiencies (FPD) that resulted in the overall performance decline at the station. One of the deficiencies identified was "Procedure Quality/Procedure Management." This FPD was entered into the licensee's corrective action program as CR 2012-08136.

The NRC assessed the thoroughness of the licensee's Procedure Quality/Procedure Management evaluation, adequacy of extent of condition and extent of causal analysis, and adequacy of associated corrective actions.

a. Inspection Scope

During April 2013, a two-week NRC onsite inspection was conducted to review the thoroughness of the licensee's Procedure Quality/Procedure Management evaluation.

The inspectors conducted a review of the status of operations department procedures, including Emergency Operating Procedures (EOPs), Abnormal Operating Procedures (AOPs), Operating Procedures (OPs), Alarm Response Procedures (ARPs) and Operating Instructions (OIs).

In addition, the inspectors also reviewed several internal and external assessments conducted for Operations Department procedures, condition reports, root cause analyses and apparent cause analyses. These reviews were conducted to provide the inspection team an insight into the current quality of operations procedures as well as the anticipated quality of procedures required to support restart of the unit.

The observations and findings of this inspection were documented in NRC IMC 0350 Inspection Report 05000285/2013010, dated July 11, 2013. Overall, the inspection team concluded that the status of procedures used by Operations was not of sufficient quality to support closure of this area.

The scope of this inspection was to 1) evaluate known deficiencies in Operations procedures and verify the licensee implemented adequate corrective actions commensurate with their importance to safety, and 2) assess the adequacy of licensee actions to be taken prior to restart to gain assurance that Operations procedures are adequate.

This inspection reviewed the following Restart Checklist Basis Document items:

- 5.c.1 – Licensee Assessment of the Fundamental Performance Deficiency of Procedure Quality/Procedure Management,
- 5.c.2 – Adequacy of extent-of-condition and extent of cause, and
- 5.c.3 – Adequacy of corrective actions.

b. Observations and Findings

Following the inspection in April 2013, the licensee initiated and completed a Procedure Recovery project (CR 2013-08856) to address procedure quality concerns. This project included almost 300 procedures, identified by six Priority definitions:

- Priority 1: procedures included all safety related ARPs, EOPs and AOPs that branch to OIs, OIs associated with the EOP/AOP set, and procedures with prior NRC concerns.
- Priority 2: procedures included EOPs and AOPs without present OI branching, and AOPs associated with safety systems.

- Priority 3: procedures included OIs associated with safety related systems
- Priority 4: procedures included AOPs and OIs associated with only non-safety related systems.
- Priority 5: procedures included OIs associated with systems that will neither be used nor conditions encountered before completion of the review process.
- Priority 6: procedures included OIs designated as non-safety related.

The process used to conduct the recovery project included the following elements:

- Verification – process of ensuring procedures are technically correct, operational correctness, and procedures accurately adhere to guidance in the procedure writer’s guide, including human factors.
- Validation – process of confirming procedures are compatible with expected operator responses and plant equipment. Validation methods included walk-through, table-top, simulator, and reference.

To assess the adequacy of the Procedure Recovery project in meeting the inspection requirements, a sample of each procedure type was selected and reviewed. The review consisted of the procedure revision in use prior to the upgrade project, the electronic change package (including requisite forms, markups, reviews, comments, etc.) and the new procedure revision issued.

In addition, condition reports, root and apparent cause analyses, external and internal procedure assessments, and procedure related training documentation were reviewed.

c. Assessment Results

The inspector concluded that the licensee adequately scoped the set of Operations procedures to be reviewed and upgraded prior to plant restart. The licensee adequately evaluated and corrected known procedure deficiencies as well as identified and corrected a substantial number of deficiencies identified during implementation of the Procedure Recovery project. Based on the results of the NRC reviews it was determined that the licensee’s Procedure Recovery Project effectively improved Operations procedures to support a safe plant restart. Restart Checklist Basis Document items 5.c.1, 5.c.2 and 5.c.3 are closed.

(1) Restart Checklist Basis Document Items 5.c – NCV 2012301-01, 04 and 06

a. Inspection Scope

The inspectors reviewed the adequacy of licensee's actions in resolving the following non-cited violations that were specific items in the Restart Checklist Basis Document:

- NCV 2012301-01, "Seven Examples of Inadequate Procedures for the Mitigating Systems Cornerstone,"
- NCV 2012301-04, "Five Examples of Inadequate Procedures for the Initiating Events Cornerstone," and
- NCV 2012301-06, "Inadequate Procedures with Four Examples for the Barrier Integrity Cornerstone."

During April 2013, a two-week onsite inspection was conducted to review the three NCV's as part of the overall assessment of the procedural quality attribute. The inspectors reviewed condition reports associated with these violations and procedural changes incorporated as a result of these violations. The assessment documented that Condition Report 2012-03140 was written to encompass all of the examples of procedural deficiencies in the alarm response procedures that were identified in non-cited violations NCV 2012301-01, NCV 012301-04, and NCV 2012301-06. However, a revised apparent cause analysis was in progress and therefore could not be inspected. Although the specific procedural deficiencies documented in the three non-cited violations had been corrected, it was decided these checklist items would remain open pending a future inspection of the revised apparent cause analysis and any associated corrective actions. Inspection results were documented in NRC IMC 0350 Inspection Report 05000285/2013010, dated July 11, 2013.

The scope of this follow-up inspection is a review of the revised apparent cause analysis for CR 2012-03140 and associated corrective actions.

b. Observations and Findings

Apparent Cause Analysis Report, Annunciator Response Procedure (ARP) Quality Issues, Revision 1, was approved May 1, 2013. The revised Apparent Cause Analysis concluded that there was a flaw in the original analysis. As a result, the Apparent Cause Analysis identified apparent cause was changed; the Extent of Condition was revised to bring this section into compliance with FCSG 24-4, Condition Report and Cause Analysis, and FCSG-24-5, Cause Evaluation Manual; and corrective actions were updated and revised based on the completed actions and revised analysis.

Extent of Cause analysis and corrective actions resulted in improved verification and validation processes through changes to procedures SO-G-30, "Procedure Change and Generation," and SO-G-74, "EOP/AOP Procedure Generation

Program.” Extent of Condition analysis identified some operating procedures (EOPs, AOPs, Operating Instructions, Operating Procedures and Annunciaor Response Procedure) were technically inaccurate, lacked clarity, and deviated from the owner's group guidelines. Corrective actions included a Procedure Recovery Project that included a review and validation of procedure technical accuracy and clarity for all operating documents.

c. Assessment Results

The inspector concluded that the licensee adequately addressed the Apparent Cause and Contributing Causes, Extent of Condition and Extent of Cause through the revision of the Apparent Cause Analysis for CR 2012-03140. Therefore, Restart Checklist Items 5.c – NCV 2012301-01, 04, and 06 are closed.

(2) Restart Checklist Basis Document Item 5.c - NCV 2011002-01, Inadequate Operating Instruction Results in a Loss of Auxiliary Feedwater

a. Inspection Scope

During April 2013, a two-week onsite inspection was conducted to review this NCV as part of the overall assessment of the procedural quality attribute. The inspectors reviewed Condition Report 2011-0839 and the associated Root Cause Analysis. The inspectors documented one concern from this review associated with Contributing Cause 8.2 (“insufficient criteria to ensure periodic V&V (verification and validation) of infrequently used procedures or procedure sections”) that did not have an associated corrective action. The licensee documented this issue in Condition Report 2013-08677. It was decided this checklist item would remain open until a corrective action for Contributing Cause 8.2 was developed and implemented.

The scope of this follow-up inspection is a review of the corrective action for Contributing Cause 8.2.

b. Observations and Findings

CR 2013-08677 was reviewed. Action Item 3, "Establish and implement criteria to ensure periodic V&V of infrequently used procedures and procedure sections is performed" was completed and approved by the station on July 18, 2013.

c. Assessment Results

The inspector reviewed the criteria and its implementation and concluded that the licensee adequately addressed the corrective action for Contributing Cause 8.2 of CR 2011-0839. Therefore, Restart Checklist Item 5.c – NCV 2011002-01 is closed.

(3) Restart Checklist Basis Document items 5.c - NCV 2010004-10, Inadequate Maintenance Procedure Results in a Plant Shutdown

a. Inspection Scope

During April 2013, a two-week onsite inspection was conducted to review this NCV as part of the overall assessment of the procedural quality attribute. The inspectors reviewed LER 2010-002, "Failed Feeder Cable Due to Inadequate Procedure Causes Station Shutdown," and associated documents (condition reports, causal analyses, procedures) to verify the licensee had performed adequate casual analyses and extent of condition/extent of cause evaluations related to this issue. In addition, the inspectors verified adequate corrective actions were identified for the associated causes and extent of condition/extent of cause evaluations and that implementation of these corrective actions were either implemented or appropriately scheduled for implementation.

b. Observations and Findings

LER 2010-002 and CR 2010-1704 (including causal analysis and extent of condition/extent of cause) were reviewed. Changes to procedure EM-PM-EX-1100, "480 Volt Motor Control Center Maintenance," were reviewed and found to adequately address the deficiencies.

c. Assessment Results

The inspector concluded that the licensee adequately identified Root and Contributing Causes, and adequately addressed corrective actions to preclude recurrence. Therefore, Restart Checklist Item 5.c - NCV 2010004-10 will be closed.

.d Equipment Performance

a. Inspection Scope

The NRC issued NCV 2010004-09 for the failure of the licensee to perform vendor and industry recommended testing on safety-related and risk significant 4160V and 480V circuit breakers. The purpose of this review was to verify the licensee performed an adequate cause analysis and established appropriate corrective actions to address the issues.

b. Observations and findings

The inspectors reviewed the documentation of the licensee's efforts. The licensee's cause analysis determined the causes of the issue were the lack of detail in the Reliability Centered Maintenance (RCM) basis documentation for prescribing adequate circuit breaker maintenance, failure to incorporate all sources of maintenance recommendations, and insufficient coordination and ownership by separate engineering

groups to adequately trend breaker performance and identify all required maintenance activities. The licensee corrective actions included completion of a gap analysis to identify vendor and industry recommended breaker maintenance and deficiencies in the FCS program. The licensee developed a detailed preventive maintenance basis document for switchgear and breaker maintenance based on the results of the gap analysis. The licensee revised applicable maintenance procedures to capture the new maintenance requirements and also revised procedures for trending and monitoring breaker performance, to include a system engineer review. The inspectors concluded the cause analysis and corrective actions appear adequate to minimize recurrence of the issue.

c. Assessment Results

This activity constitutes closure of NCV 2010004-09 as listed in the Restart Checklist Basis Document.

.e Configuration Control

Review of LER 2012-008, "Technical Specification Violation for Fuel Movement (VA-66)"

a. Inspection Scope

The inspectors reviewed the licensee actions associated with LER 2012-008, "Technical Specification Violation for Fuel Movement (VA-66)," that included associated documents (condition reports, causal analyses, procedures) to verify the licensee had performed adequate casual analyses and extent of condition/extent of cause evaluations related to this issue. In addition, to verify adequate corrective actions were identified associated with the causes and extent of condition/extent of cause evaluations and that implementation of these corrective actions were either implemented or appropriately scheduled for implementation.

b. Observations and Findings

A review of LER 2012-008, Condition Report 2011-07800 and Apparent Cause Analysis Summary Report, "Spent Fuel Storage Pool Area Charcoal Filter V A-66 Elemental Iodine Removal Efficiency Test Failure, Revision 1" was conducted.

The Apparent Cause identified was lack of Management Oversight and failure of Engineering to take a pro-active approach in the prevention of future test failures. Action Items (AI) included:

1. Revision of procedure SE-ST-VA-0010, "Spent Fuel Storage Pool Area Charcoal Filter VA-66 Elemental Iodine Removal Efficiency Test" to trend charcoal sample results and predict replacement,
2. Replacement of the depleted charcoal currently installed, and
3. Change the frequency of the charcoal testing from eighteen months to 1 year.

Action Items 1 and 2 have been completed. Action Item 3 is scheduled to be completed under EC 57850. The Apparent Cause Analysis Summary Report documented that the Extent of Condition will be addressed under Condition Report 2011-7798.

c. Assessment Results

The inspector concluded that the licensee adequately assessed and developed corrective actions to address the apparent cause of the performance deficiency associated with this Licensee Event Report. Therefore, Restart Checklist Basis Document Item 5.e (LER 2012-008) will be closed. However, LER 2012-008 will remain OPEN until Action Item 3 is verified complete by inspection.

Review of LER 2012-012, "Multiple Safety Injection Tanks Rendered Inoperable"

a. Inspection Scope

The inspectors reviewed the licensee's actions associated with LER 2012-012 that included documents (condition reports, causal analyses, procedures) to verify the licensee had performed adequate casual analyses and extent of condition/extent of cause evaluations related to this issue. In addition, the inspectors verified that adequate corrective actions were identified associated with the causes and extent of condition/extent of cause evaluations and that implementation of these corrective actions were either implemented or appropriately scheduled for implementation.

b. Observations and Findings

A review of LER 2012-012, Condition Reports 2012-01956, 2012-03140, 2012-04815 and 2013-09711, and Apparent Cause Analysis Report, "Lack of Extent of Condition and Extent of Cause Action for NRC Non-cited Violation, Revision 0" was conducted.

The Apparent Cause Analysis (ACA) from CR 2013-09711 identified the original Apparent Cause Analysis for CR 2012-03140 (deficiencies in several ARPs found during NRC Initial Licensed Operator exam – conducted in August 2012) was inaccurate in that the ACA faulted the writer's guide rather than an incorrect ARP validation process. The ACA from CR 2013-09711 also documented the following causes and extent of conditions:

- Apparent Cause #1 (AC-1) – Operations Department corrective action program prioritization valued correcting the specified condition to a much greater degree than investigating the extent of condition and ensuring corrective action in a timeframe commensurate with the risk of the problem recurring or extending to other procedures.
- Contributing Cause #1 (CC-1) – The original Apparent Cause Analysis for CR 2012-03140 was inaccurate in that the Apparent Cause Analysis faulted the writer's guide rather than an incorrect ARP validation process.



- An Extent of Condition exists with all ARPs.
- An Extent of Cause exists with most EOPs, AOPs, and Operating Instructions.

The findings in the Apparent Cause Analysis contributed to the decision to conduct a procedure upgrade project that included the Alarm Response Procedures identified affected by LER 2012-012.

The Alarm Response Procedure (ARP-CB-4/A7, “Annunciator Response Procedure A7 Control Room Annunciator A7”) and Operating Instruction (OI-SI-1, “Safety Injection – Normal Operation”) that were associated with sluicing of Safety Injection Tanks were reviewed and compared with the revision prior to the changes identified by the upgrade project.

c. Assessment Results

The inspector concluded that the licensee adequately assessed and developed corrective actions to address the apparent cause of the performance deficiency associated with this Licensee Event Report. Therefore, Restart Checklist Basis Document Item 5.e (LER 2012-012) is closed.

**40A6 Meetings, Including Exit**

Exit Meeting Summary

On December 5, 2013, the inspectors presented the results of the onsite inspection of the licensee’s biennial emergency preparedness exercise to Mr. L. Cortopassi, Site Vice President, and other members of the licensee’s staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

The lead inspector obtained the final annual examination results and telephonically exited with Mr. R. Cade, Manager, Operations Training, on December 30, 2013. The inspector did not review any proprietary information during this inspection.

On January 24, 2014, the inspectors presented the inspection results to Mr. L. Cortopassi, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

**40A7 Licensee-Identified Violations**

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

- Title 10 CFR 50, Appendix B, Criterion III, “Design Control”, requires that measures shall be established to assure that the design basis for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. Contrary to this requirement, the licensee failed to assure that the design basis for safety related instrument racks inside containment were correctly translated into specifications, drawings, procedures, and instructions. The licensee initially identified and documented this violation in CR 2012-03100 and CR 2013-10935. This violation was of very low safety significance because it did not result in the loss of operability or functionality of any system or train.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

D. Bakalar, Manager, Security  
J. Bousum, Manager, Emergency Planning and Administration  
C. Cameron, Supervisor Regulatory Compliance  
L. Cortopassi, Site Vice President  
K. Ihnen, Manager, Site Nuclear Oversight  
T. Leeper, Manager, Human Resource Services  
T. Lindsey, Director, Training  
E. Matzke, Senior Licensing Engineer, Regulatory Assurance  
B. Obermeyer, Manager, Corrective Action Program  
T. Orth, Director, Site Work Management  
E. Plautz, Supervisor, Emergency Planning  
R. Short, Assistant Director, Engineering  
T. Simpkin, Manager, Site Regulatory Assurance  
S. Swanson, Manager, Operations

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

#### Opened

05000285-2012-017-02	LER	Containment Valve Actuators Design Temperature Ratings Below those Required for Design Basis Accidents (Section 4OA3)
05000285-2013-001-01	LER	Mounting of GE HFA Relays does not Meet Seismic Requirements (Section 4OA3)
05000285-2013-003-01	LER	Calculations Indicate the HPSI Pumps will Operate in Run-out During a DBA (Section 4OA3)
05000285-2013-008-01	LER	Previously Installed GE IVA Relays Failed Seismic Testing (Section 4OA3)
05000285-2013-014-00	LER	Unqualified Components used in Safety System Control Circuit (Section 4OA3)
05000285-2013-017-00	LER	Containment Spray Pump Design Documents do not Support Operation in Runout (Section 4OA3)
05000285-2013-018-00	LER	Postulated Fire Event Could Result in Shorts Impacting Safe Shutdown (Section 4OA3)

Opened and Closed

05000285/2013019-01	NCV	Failure to Correct Deficiencies in Operations Support Center Functions (Section 1EP1)
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Discussed

05000285/2011006-02	VIO	Inadequate Corrective Actions to Ensure Reliability of Raw Water Pump Power
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Closed

05000285-2011-003-03	LER	Inadequate Flooding Protection Due to Ineffective Oversight (Section 4OA4)
05000285-2012-001-00	LER	Inadequate Flooding Protection Procedure (Section 4OA4)
05000285-2012-004-02	LER	Inadequate Analysis of Drift Affects Safety Related Equipment (Section 4OA4)
05000285-2012-007-01	LER	Failure of Pressurizer Heater Sheath (Section 4OA4)
05000285-2012-008-01	LER	Technical Specification Violation for Fuel Movement (VA-66) (Section 4OA4)
05000285-2012-010-00	LER	Seismic Qualification of Instrument Racks (Section 4OA4)
05000285-2012-012-01	LER	Multiple Safety Injection Tanks Rendered Inoperable (Section 4OA4)
05000285-2012-017-01	LER	Containment Valve Actuators Design Temperature Ratings Below those Required for Design Basis Accidents (Section 4OA3)
05000285-2012-019-00	LER	Traveling Screen Sluice Gates Found with Dual Indication (Section 4OA4)
05000285-2013-001-00	LER	Mounting of GE HFA Relays does not Meet Seismic Requirements (Section 4OA3)
05000285-2013-003-00	LER	Calculations Indicate the HPSI Pumps will Operate in Run-out During a DBA (Section 4OA3)
05000285-2013-008-00	LER	Previously Installed GE IVA Relays Failed Seismic Testing (Section 4OA3)
05000285/2010007-01	VIO	Failure to Maintain External Flood Procedures (Section 4OA4)
05000285/2012002-01	VIO	Inadequate Procedures to Mitigate a Design Basis Flood Event (Section 4OA4)
05000285/2012002-02	VIO	Failure to Classify Intake Structure Sluice Gates as Safety Class III (Section 4OA4)

Closed

05000285/2012002-03	VIO	Failure to Meet Design Basis Requirements for Design Basis Flood Event (Section 4OA4)
05000285/2011007-01	VIO	Failure to Correct a Degraded Contactor in the Reactor Protective System (Section 4OA4)

**LIST OF DOCUMENTS REVIEWED**

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

Condition Reports (CRs)

2013-23048

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
TQ-AA-150-F25	LORT Annual Exam Status Report	5

**Section 1R18: Plant Modifications**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-ST-AFW-3010	Auxiliary Feedwater System Quarterly Category A and B Valve Exercise Test	9

Work Orders (WO)

503315

**Section 1R22: Surveillance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-ST-ESF-0001	Diesel Auto Start Initiating Circuit Check	42

Work Orders (WO)

360607

**Section 1EP1: Exercise Evaluation**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
TBD-EPIP-OSC-1A	Technical Basis Document for the Emergency Action Levels, November 21, 2013	2A
EPIP-EOF-1	Activation of the Emergency Operations Facility, June 6, 2013	19
EPIP-EOF-6	Dose Assessment, September 20, 2013	47
EPIP-EOF-7	Protective Action Guidelines, March 16, 2012	25
EPIP-EOF-11	Dosimetry Records, Exposure Extensions, and Habitability, April 2, 2013	29
EPIP-EOF-21	Potassium Iodide Issuance, June 25, 2009	9
EPIP-OSC-2	Command and Control Position, Actions/Notifications, June 26, 2012	57
EPIP-OSC-7	Emergency Response Organization Activation at the Emergency Operations Facility, March 26, 2013	4
EPIP-OSC-9	Emergency Team Briefings, September 13, 2012	15
EPIP-OSC-15	Communicator Actions, July 19, 2013	30
EPIP-OSC-21	Activation of the Operations Support Center, May 5, 2011	20
EPIP-RR-11	Technical Support Center Director Actions, November 8, 2008	3
EPIP-TSC-1	Activation of the Technical Support Center, May 5, 2011	32
EPIP-TSC-8	Core Damage Assessment, September 29, 2011	20
EPT-20	Exercise Preparation and Control, November 20, 2012	36
EPT-48	Change Out of Protective Clothing in Emergency Facilities, February 18, 2009	3
	Evaluation Report for the June 6, 2011, Alert Classification	
	Evaluation Report for the Exercise conducted February 27, 2012	
	Evaluation Report for the Exercise conducted March 27, 2012	
	Evaluation Report for the Exercise conducted May 22, 2012	
	Evaluation Report for the Exercise conducted July 17, 2012	
	Evaluation Report for the Exercise conducted November 10, 2012	
	Evaluation Report for the Exercise conducted March 5, 2013	
	Evaluation Report for the Exercise conducted May 7, 2013	

## Section 1EP1: Exercise Evaluation

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Evaluation Report for the Exercise conducted June 18, 2013	

### Condition Reports (CR)

2012-02381	2012-07779	2013-05146	2013-05263	2013-05363
2013-10486	2013-22153	2013-22169	2013-22172	2013-22177
2013-22181	2013-22193	2013-22194	2013-22201	2013-22206
2013-22209	2013-22220	2013-22226	2013-22247	2013-22252
2013-22253	2013-22261	2013-22262	2013-22264	2013-22265
2013-22269	2013-22270	2013-22271	2013-22288	2013-22491
2013-22492	2013-22495	2013-22498		

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>
	Fort Calhoun Station Radiological Emergency Response Plan (revision by section)

## Section 4OA2: Problem Identification and Resolution (71152)

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FCSG-24-1	Condition Report Initiation	5
FCSG-24-3	Condition Report Screening	7
FCSG-24-4	Condition Report and Cause Evaluation	7
FCSG-24-6	Corrective Action Implementation and Condition Report Closure	10
SO-R-2	Condition Reporting and Corrective Action	53b

## Section 4OA4: IMC 0350 Inspection Activities

### Condition Reports (CR)

2010-05140	2013-03024	2013-00620	2013-11203	2013-11736
2013-02041	2009-02306	2012-17533	2009-02306	2013-03024

2012-05854	2012-05855	2013-08856	2013-09711	2012-08136
2010-1704	2010-2387	2011-0839	2012-03140	2013-08677
2011-07800	2011-07798	2012-01956	2012-03140	2012-04815
2013-08856	2013-09711	2013-10935	2012-04914	3023-03100
2012-00307	2012-00600	2012-00871	2012-00875	2012-00882
2012-00882	2012-00899	2012-00901	2012-00906	2012-00929
2012-00945	2012-00949	2012-00965	2012-00967	2012-00980
2012-00986	2012-00996	2012-00998	2012-01000	2012-01003
2012-01010	2012-01012	2012-01021	2012-01330	2012-02142

Work Orders (WO)

00484596

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FCSG-24-1	Condition Report Initiation	3
AOP-01	ACTS OF NATURE	37, 38
AOP-05	EMERGENCY SHUTDOWN	11, 12
AOP-17	LOSS OF INSTRUMENT AIR	14, 15
AOP-18	LOSS OF RAW WATER	7a, 8
ARP-AI-66A/A66A	ANNUNCIATOR RESPONSE PROCEDURE A66A CONTROL ROOM ANNUNCIATOR A66A, AFWAS/DSS	15, 16
ARP-CB-1,2,3/A1	ANNUNCIATOR RESPONSE PROCEDURE A1 CONTROL ROOM ANNUNCIATOR A1	36, 37
ARP-CB-4/A20	ANNUNCIATOR RESPONSE PROCEDURE A20 CONTROL ROOM ANNUNCIATOR A20	45, 46
ARP-CB-4/A7	ANNUNCIATOR RESPONSE PROCEDURE A7 CONTROL ROOM ANNUNCIATOR A7	17, 18
EM-PM-EX-1100	480 Volt Motor Control Center Maintenance	23, 37
EOP/AOP ATTACHMENTS	EOP/AOP ATTACHMENTS	34



Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EOP/AOP ATTACHMENTS-HR	HEAT REMOVAL	0
EOP/AOP ATTACHMENTS-MVA	MAINTENANCE OF VITAL AUXILIARIES	0
EOP/AOP FLOATING STEPS	EOP/AOP FLOATING STEPS	3c, 4
EOP-00	STANDARD POST TRIP ACTIONS	29, 30
EOP-03	LOSS OF COOLANT ACCIDENT	36, 37
EOP-20	FUNCTIONAL RECOVERY PROCEDURE	25a, 26
EPIP-TSC-2	Catastrophic Flooding Preparations	14
FCSG-20	Abnormal Operating Procedure and Emergency Operating Procedure Writer's Guide	9
FCSG-24-3	Condition Report Screening	6a
FCSG-24-4	Condition Report and Cause Evaluation	6a
FCSG-24-4	Condition Report and Cause Evaluation	5
FCSG-24-5	Cause Evaluation Manual	5, 6
FCSG-64	External Flooding of Site	1
M8145WD	Flood Control Walk-down Exercise	
NOD-QP-19	Cause Analysis Program	4
OI-AFW-4	AUXILIARY FEEDWATER STARTUP AND SYSTEM OPERATION	87, 88
OI-CW-1	Circulating Water System Normal Operation	65 and 66
OI-RC-9	REACTOR COOLANT PUMP OPERATION	75, 76
OI-SI-1	SAFETY INJECTION – NORMAL OPERATION	136, 137
OP-1	MASTER CHECKLIST FOR PLANT STARTUP	111
OP-2A	PLANT STARTUP	114
OPD-4-09	EOP/AOP Users Guidelines	12, 19

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-ST-SI-3001	SAFETY INJECTION SYSTEM CATEGORY A AND B VALVE EXERCISE TEST	35a, 36
OP-ST-VX-3018	SAFETY INJECTION SYSTEM REMOTE POSITION INDICATOR VERIFICATION SURVEILLANCE TEST	10, 11
QC-ST-SI-3006	SAFETY INJECTION LEAKOFF PIPING FORTY MONTH FUNCTIONAL TEST	5, 6
SE-ST-VA-0010	SPENT FUEL STORAGE POOL AREA CHARCOAL FILTER VA-66 ELEMENTAL IODINE REMOVAL EFFICIENCY TEST	6, 7
SO-G-30	Procedure Changes and Generation	136
SO-G-74	Fort Calhoun Station EOP/AOP Generation Program	20
SO-O-1	CONDUCT OF OPERATIONS	84, 101
TBD-AOP-01	ACTS OF NATURE	37, 38
TBD-AOP-05	EMERGENCY SHUTDOWN	11, 12
TBD-AOP-17	LOSS OF INSTRUMENT AIR	14, 15
TBD-EOP/AOP ATTACHMENTS	TBD-EOP/AOP ATTACHMENTS	34
TBD-EOP/AOP FLOATING STEPS	TBD-EOP/AOP FLOATING STEPS	4
TBD-EOP-00	STANDARD POST TRIP ACTIONS	30
TBD-EOP-06	LOSS OF ALL FEEDWATER	17b, 18
TBD-EOP-20	FUNCTIONAL RECOVERY PROCEDURE	25a, 26

Calculations

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
CN-OA-11-7	Intake Cell Level Control Using the Intake Sluice Gate During Flooding Conditions at the Ft. Calhoun Plant	April 21, 2011
CN-SEE-II-11-2	Intake Cell Level Control – Flood Alternate Flow Path Evaluation for Fort Calhoun Station	April 5, 2011
FC08030	Intake Structure Cell Level Control Using the Intake Structure Sluice Gates	April 25, 2011

FC08070	Validation of Backup Fuel Oil Transfer During Flooding Conditions	
FC08142	Seismic Evaluation of Instrument Racks	12
FC08174	Seismic Analysis of Rack AI-135C	13
FC05153	CQE Instrument Rack Analysis	02
EA93-084	Criteria For Anchors Installed In Concrete Toppings	0

Engineering Change (EC)

<u>Number</u>	<u>Title</u>	<u>Revision</u>
60326	Procedure Upgrade	0
57850	SE-ST-VA-0010 Procedure Change	0
58676	Containment 994' Elev. Instrument Rack Bolt Replacement	1
FDCR 61877	Replace additional anchors securing instrument racks on the 994' elevation	8

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	VERIFICATION PROCESS TO ADDRESS PROCEDURE QUALITY CONCERNS	June 13, 2013
	Simulator Scenario Guide 82103e – Cable Spreading Room Fire and Control Room Evacuation	1
	Simulator Scenario Guide 82103f – 480VAC Bus 1B4A Fire	0
	EONT Qualification Manual	
LER 2012-008	Technical Specification Violation for Fuel Movement (VA-66)	0, 1
LER 2012-012	Multiple Safety Injection Tanks Rendered Inoperable	0, 1
FCS-95003-IACPD-03	IACPD – FCS Performance Goals Assessment Performance Area	
FCS-95003-IACPD-08	IACPD – FCS Audits and Assessments Assessment Performance Area	

Miscellaneous Documents

FCS-95003-IACPD-02      IACPD – FCS Significant Performance Deficiencies  
Assessment Performance Area

Corrective Action Program CR 2012-08124  
Fundamental Performance Deficiency Analysis  
Security Self Assessment Report, August 2012