



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

December 11, 2013

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 05000285/2013016

Dear Mr. Cortopassi:

On November 15, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Fort Calhoun Station. On December 4, 2013, 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.

The NRC inspectors did not identify any findings or violations of more than minor significance.

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 Hay, Chief
Project Branch F
Division of Reactor Projects

Docket: 50-285
License: DPR-40

Enclosure: NRC Inspection Report 05000285/2013016
w/Attachment: Supplemental Information

cc w/ encl: Electronic Distribution

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 05000285
License: DPR-40
Report: 05000285/2013016
Licensee: Omaha Public Power District
Facility: Fort Calhoun Station
Location: 9610 Power Lane
Blair, NE 68008
Dates: October 1 through November 15, 2013
Inspectors: J. Kirkland, Senior Resident Inspector
J. Wingeback, Resident Inspector
R. Smith, Senior Resident Inspector, Grand Gulf Station
A. Sanchez, Senior Resident Inspector, South Texas Project
R. Baldwin, Senior Operations Engineer, Region II
Approved By: Michael Hay, Chief, Project Branch F
Division of Reactor Projects

SUMMARY

IR 05000285/2013016; 10/01/2013 – 11/15/2013; Fort Calhoun Station; Integrated Resident and Regional Report

The inspection activities described in this report were performed between October 1, 2013, and November 15, 2013, by the resident inspectors at Fort Calhoun Station and three inspectors from the NRC's Region IV Office and other NRC offices.

No findings were identified.

PLANT STATUS

The station began the inspection period in mode 5 with all fuel in the reactor vessel. On October 31, 2013, the plant entered mode 3 to perform plant testing at hot conditions. On November 5 the plant exited mode 3 and remained in mode 5 for the remainder of the inspection period.

REPORT DETAILS

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.

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

.1 (Closed) Licensee Event Report 05000285/2012-009-00: Inoperable Equipment Due to Lack of Environmental Qualifications

"During the review of the current analysis of record for Main Steam Line Break (MSLB) inside containment, no analysis or evaluation could be found to address why the original Electrical Environmental Qualification (EEQ) evaluation of peak MSLB conditions remain valid. The current analysis of record establishes that containment temperatures remain above the Loss of Coolant Accident (LOCA) peak temperature for substantially longer (220 seconds versus 60 seconds), but at a lower temperature (347.9 degrees Fahrenheit vs. 401 degrees Fahrenheit). The longer dwell times could result in a more adverse impact on environmentally qualified equipment.

“A cause analysis is being processed and the results will be reported in a supplement to this LER.”

“Fort Calhoun Station will perform thermal lag analyses for the Electrical Equipment Qualification Program equipment located within containment prior to plant startup. The LER will be supplemented with the information from the EEQ and cause analysis.”

The licensee event report is closed. Revision 1 of this licensee event report was submitted on October 31, 2013.

.2 (Opened) Licensee Event Report 05000285/2012-009-01: Inoperable Equipment due to Lack of Environmental Qualifications

“On December 13, 2011, it was identified that the current analysis of record for the Main Steam Line Break (MSLB) inside containment identified a peak temperature of 358.6 degrees Fahrenheit (F) and the Electrical Environmental Equipment Qualification (EEQ) evaluation assumed a maximum temperature of 401 degrees F. It was also identified that the MSLB temperature has a longer exposure time than the EEQ temperature of approximately 160 seconds. However, no evaluation or analysis could be found to address why the original EEQ assumptions remained valid as the longer exposure time of the MSLB analysis could result in an adverse impact on environmentally qualified equipment. This condition was identified when Fort Calhoun Station was shut down and defueled.”

“FCS performed a thermal lag analysis to determine the impact of the longer exposure time. The results show that the additional exposure time of the lower MSLB temperature did not adversely affect the EEQ analysis as originally assumed in Event Notification No. 47900 (10 CFR 50.72(b)(3)(ii)(B)). The results of the thermal lag analysis are being documented in the updated program basis documentation. The EEQ Harsh Files for the affected equipment have been revised.”

“The original condition no longer represents a safety system functional failure and this condition is being submitted as a voluntary report.”

.3 (Closed) Licensee Event Report 05000285/2013-004-00: Electrical Equipment Impacted by High Energy Line Break Outside of Containment

“On February 22, 2013, while performing testing of the diesel generators in accordance with OP-STESF-0002, the Ametek inverters "A" and "C," instrument bus "A" and "C" Low Voltage/Ground alarms came in and cleared repeatedly. A slight smell of smoke was detected by several personnel in the Control Room in the vicinity of AI-40A. The following equipment had failed and/or was damaged: LIC-2802, PIC-2802, A/PIA-102X, C-VOPT, and possibly one or more of the CCW HX/RW temperature meters.”

“Fort Calhoun had replaced the original Elgar inverters with new Ametek SCI inverters during the 2008 refueling outage. After installation, continuing intermittent inverter trouble alarms and instrument bus low voltage/ground alarms occurred when loads are placed on or

removed from various a-c buses. A design change completed in April of 2011 removed a ground connection between two capacitors in the inverters. However, testing of the modification was not completed before the 2011 flood and the station did not operate with the modification installed. A causal analysis is in progress and the results of the analysis will be published in a supplement to this LER.”

Based on the final causal analysis, the voltage swings experienced during the event were caused by the removal of a ground wire internal to the (Ametek) vital instrument bus inverters during the 2011 refueling outage. This ground has been replaced and the inverters were tested satisfactorily. The station vital instrument bus inverters are not required below temperatures of 300 degrees Fahrenheit. The grounds were removed while the plant was not in a condition requiring the inverters to be operable, and the condition was identified and corrected prior to restoring the inverters to an operable status.

The licensee withdrew this licensee event report based on the results of the final causal analysis (ML13280A295). The inspectors reviewed the causal analysis and concluded that the withdrawal of the licensee event report was appropriate.

This licensee event report is included in Section 3.b of the restart checklist basis document. This licensee event report and the corresponding line item in the restart checklist basis document are closed.

.4 (Closed) Licensee Event Report 05000285/2013-010-00: HPSI Pump Flow Imbalance

“On May 03, 2013, at approximately 1759 CST, it was identified that the high pressure injection pump injection flows to the reactor coolant system are not balanced in accordance with the Fort Calhoun Station (FCS) Updated Safety Analysis Report Section 14.15.5.2. FCS is currently shutdown with fuel removed from the vessel.”

“A causal analysis is in progress. The results of the analysis 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 October 23, 2013.

.5 (Opened) Licensee Event Report 05000285/2013-010-01: HPSI Pump Flow Imbalance

“On May 03, 2013, at approximately 1759 CST, station personnel identified that the high pressure safety injection (HPSI) pump injection flows to the reactor coolant system were not balanced in accordance with the Fort Calhoun Station (FCS) Updated Safety Analysis Report. When discovered, FCS was shutdown with fuel removed from the vessel.”

“The cause of the event was determined to be the emergency core cooling system pre-operational testing (1972) to balance HPSI system flow and record loop injection valve positions was not adequately translated into design documents. This resulted in the periodic flow balance requirements not being sustained. It was also identified that engineers had

limited understanding of HPSI system flow balance design and unclear or incomplete HPSI design basis documents inhibited understanding of the reason for HPSI flow balance.”

“HPSI flow to the reactor coolant loops has been balanced and a testing procedure will be developed to periodically verify that HPSI injection flow into the four reactor coolant loops remains balanced.”

.6 (Opened) Licensee Event Report 05000285/2013-015-00: Unqualified Coating used as a Water Tight Barrier in Rooms 81 and 82

“On September 13, 2013, it was identified that the floor coatings in Rooms 81 and 82 may not maintain its integrity during a high energy line break environment allowing water to migrate into the rooms below which contain the diesel generators and safety-related switchgear. This was reported on September 23, 2013, under 10 CFR 50.72(b)(3)(ii)(8), Unanalyzed Condition (Event Notification 49378). Fort Calhoun Station was shutdown in MODE 5 when the condition was identified and entered into the station's corrective action program as Condition Report 2013-17605.”

“Engineering is reviewing this condition and the evaluation performed in 2009 for a previous condition. The completed results of this review will be used to update this report.”

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

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 FCS'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 October 1 through November 15, 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.

.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 FCS are in appropriate condition to support safe restart and continued safe plant operation. Section 2 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 Flood Recovery Plan Actions Associated With Facility and System Restoration

Item 2.a is the NRC's independent evaluation of FCS's Flood Recovery Plan. An overall flood recovery plan is important to ensure the station takes a comprehensive approach to restoring the facility structures, systems, and components to pre-flood conditions.

The areas to be inspected are identified in the CAL. Inspection items are considered complete when the licensee has submitted a closure package that has been satisfactorily reviewed by the inspectors.

(1) CAL Action Item 2.2.1.22

i. Inspection Scope

The purpose of Action Item 2.2.1.22 was to assess the effects of the flood on the Structures System and identify actions to restore the system. This item was required to be completed prior to exceeding 210°F in the reactor coolant system.

The inspectors independently reviewed the system to identify if there were any temporary modifications in place as a result of the flood, if there were any outstanding preventive maintenance activities that had been deferred due to the flood, and reviewed condition reports to determine if there were any deficiencies noted due to the flood. The inspectors queued condition reports that were related to flooding, written between April 1, 2011, and December 31, 2011. The inspectors also conducted a complete system walkdown to identify any adverse conditions related to flooding. The inspectors compared the results of their independent assessment to those contained in the licensee's Flooding Recovery Startup System Health Assessment report.

The inspectors identified no temporary modifications and no preventive or corrective maintenance activities which were deferred because of the flooding.

The inspectors reviewed all condition reports affecting the Structures System written related to the flood. The majority of these involved leaks identified during the flood. The inspectors reviewed the corrective actions associated with these condition reports and determined that there were no outstanding issues associated with the electrical distribution system.

The independent walkdown performed by the inspectors identified no current adverse conditions to the electrical distribution system and its individual components as a result of the flood.

In addition, this report documents closure of the impact of sub-surface water on soils and structures; Section 2.b below. This section included the impact on structures below grade.

This activity constitutes completion of Action Item 2.2.1.22 as described in CAL EA-13-020.

ii. Findings

No findings were identified.

(2) CAL Action Items 4.2.2.7 and 4.3.2.1

i. Inspection Scope

The purpose of Action Items 4.2.2.7 and 4.3.2.1 were to remove all flood mitigation devices which have been determined to not be permanent fixtures, and to complete all ECs/restoration required for plant start-up. These items were required to be completed prior to the reactor achieving criticality.

These items are duplicated in the review the inspectors completed for CAL Action Item 4.3.1.4, which is documented in Inspection Report 05000285/2012002, ML13045B055. Action Item 4.3.1.4 was to remove non-permanent configuration changes, which include all flood mitigation devices and restoration.

Due to the duplication of these action items, this constitutes completion of Action Items 4.2.2.7 and 4.3.2.1 as described in CAL EA-13-020.

ii. Findings

No findings were identified.

.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 will evaluate the effects of the extended shutdown, and ensure that the structures, systems, and components are ready for plant restart and they conform to the appropriate licensing and design basis requirements.

i. System Health Reviews

The purpose of this item is to validate structures, systems, and components conform to the licensing and design basis. The NRC will evaluate the system health reviews conducted by Fort Calhoun Station. These include comprehensive system walkdowns and reviews of key information regarding system health (e.g., commitments, open and closed condition reports, open and closed work orders, preventative maintenance activities, modifications, operating

experience, violations of NRC requirements, open change-initiating documents, open operational concerns, etc.).

(1) Inspection Scope

The inspectors assessed the startup readiness of the below listed systems. These assessments consisted of reviews of open work orders, condition reports, temporary modifications and operator challenges, and a review of the maintenance rule status of those components scoped in the maintenance rule. The review of open work orders and condition reports did not include those items that were related to equipment service life (ESL), which is being evaluated in Section 3.d.2 of the Restart Checklist Basis Document. The inspectors also conducted system walkdowns using the guidance contained in Inspection Procedure 71111.04, Equipment Alignment.

- 2.b.1.1 Auxiliary Cooling System
- 2.b.1.2 Auxiliary Feedwater System
- 2.b.1.3 Spent Fuel Pool System
- 2.b.1.4 Sampling System
- 2.b.1.5 Chemical and Volume Control System
- 2.b.1.6 Emergency Core Cooling System
- 2.b.1.7 Hoisting Equipment System
- 2.b.1.8 Waste Disposal System
- 2.b.1.9 Control Rod Drive System
- 2.b.1.10 Reactor Coolant System
- 2.b.1.11 Demineralized and Potable Water Systems
- 2.b.1.12 Circulating Water System
- 2.b.1.13 Emergency Diesel Generator
- 2.b.1.14 Ventilation, Heating and Air Conditioning System
- 2.b.1.15 Main Feedwater System
- 2.b.1.16 Structures
- 2.b.1.17 Steam Generator System
- 2.b.1.18 Steam Generator Blowdown Turbine Plant Cooling
- 2.b.1.19 Instrument Air System
- 2.b.1.20 Turbine Generator and Support Systems
- 2.b.1.21 Auxiliary Instrumentation System
- 2.b.1.22 Electrical Distribution System
- 2.b.1.23 Engineered Safeguards System
- 2.b.1.24 Radiation Monitoring System
- 2.b.1.25 Fuel Handling System
- 2.b.1.26 Reactor Protective System
- 2.b.1.27 Fire Protection System

The inspectors reviewed all open work orders that require completion prior to reactor startup. The inspectors verified that the open work orders are scheduled to be complete and are included on the outage schedule. The inspectors will continue to track these work orders to completion.

The inspectors performed a review of all open condition reports for the Reactor Coolant System. The inspectors verified that work orders have been prepared for the open condition reports, and that the work is scheduled prior to restart.

For the system walkdowns, the inspectors reviewed plant procedures, including abnormal and emergency, drawings, USAR and vendor manuals to determine the correct lineup and visually inspected the system to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. The system walkdowns occurred both during hot and cold plant conditions.

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

The inspectors reviewed one Tier 4 operator challenge involving sporadic alarms on Reactor Coolant Pump RC-3D seal leakage, and concluded that the operator challenge did not require resolution prior to start-up.

The inspectors have concluded that the above listed systems are ready for plant startup pending resolution of the equipment service life issues, completion of those open work orders required prior to restart, and successful resolution of those condition reports required prior to restart. The inspectors also concluded that the licensee has an adequate method of ensuring that work orders and condition reports required for plant restart are adequately identified and tracked.

The inspectors will have one final opportunity to ensure that all open items are completed, and that is Section 7.b of the Restart Checklist, "Final system readiness and mode restraint review."

This activity constitutes completion of Action Items 2.b.1.1 through 2.b.1.27 as described in restart checklist basis document.

(2) Findings

No findings were identified.

ii. Impact of Sub-Surface Water on Soils and Structures

Fort Calhoun Station was subjected to flood waters for several months. The licensee will perform an assessment to evaluate:

- functionality of site systems, structures, and components (SSCs) affected by the flood
- condition of subsurface soil
- floodwater impacts on subsurface SSCs.

The NRC will review, monitor, and inspect activities associated with the geo-technical surveys and assessments, and ensure proper actions were taken for the associated corrective actions and any identified safety concerns in this area.

(1) CAL Action Item 3.3.1.3

a) Inspection Scope

The purpose of Action Item 3.3.1.3 was to resolve any deficiencies affecting operability or functionality (if needed). This item was required to be completed prior to RCS temperature >210°F.

This action item was in place to correct any deficiencies identified during the licensee's investigation of the impact of sub-surface water on soils and structures. This inspection report, specifically items (2) through (6) below, completes the NRC's review of this section of the restart checklist basis document, and no outstanding deficiencies remain. Therefore, this item will be closed.

This activity constitutes completion of Action Item 3.3.1.3 as described in Confirmatory Action Letter EA-13-020.

b) Findings

No findings were identified.

(2) CAL Action Item 4.1.1.25

c) Inspection Scope

The purpose of Action Item 4.1.1.25 was to complete a post-flood river channel evaluation. This item was required to be completed prior to RCS temperature >210°F.

The licensee completed a technical memorandum on April 19, 2012, for the Missouri River Gage Analysis, followed by an internal assessment of the impacts to plant procedures and operations for accessing the Missouri River

water through the intake structure for one-through cooling during low river flows. The inspectors reviewed the technical memorandum and the licensee's assessment of any possible impacts to the plant.

This activity constitutes completion of Action Item 4.1.1.25 as described in Confirmatory Action Letter EA-13-020.

d) Findings

No findings were identified.

(3) CAL Action Item 4.1.1.30

a) Inspection Scope

The purpose of Action Item 4.1.1.30 was to verify no structural or geotechnical impact to Turbine Building and Auxiliary Building/Containment as a result of the 2011 flood (HDR Rev 1)

This item was required to be completed prior to Reactor Coolant System temperature >210°F.

The licensee performed visual inspection of the facilities as well as periodic building elevation surveys to verify no settlement of the structures. Soil boring testing, and static and dynamic cone penetration testing was completed to locate and characterize the extent of loose soils. Remediation efforts under the Turbine Building included relining of the broken sump lines. A summary of these inspection efforts, testing, and remediation descriptions are documented in the Fort Calhoun Station Flood Recovery Action Plan 4.1 Plant and Facility Geotechnical and Structural Assessment, Revision 2, report completed by HDR and dated May 4, 2012.

There are no indications of negatively affected soils beneath the Auxiliary Building or Containment. Cone penetration testing of the space between these structures and the Turbine Building indicated the more densely compacted foundation beneath the Class 1 structures is intact and in accordance with original construction design records. Additionally, the licensee constructed a structural analysis to show that even under a severe, postulated scenario where subgrade soils were impacted, the building continues to respond in accordance with original design basis. This analysis was included in Stevenson & Associates Report 12Q4067-C-002, Revision 3, dated September 25, 2013.

The inspectors reviewed the referenced reports as well as observed activities associated with the soil penetration testing, and reviewed documents associated with the new turbine building sump line repairs. There are no indications that the buildings have been negatively impacted by the flood of 2011.

This constitutes completion of Action Item 4.1.1.30 as described in Confirmatory Action Letter EA-13-020.

b) Findings

No findings were identified.

(4) CAL Action Item 4.1.1.32

a) Inspection Scope

The purpose of Action Item 4.1.1.32 was remediation of the Turbine Building and Class 1 structure voids. This item was required to be completed prior to Reactor Coolant System temperature >210°F.

Remediation efforts under the Turbine Building included relining of the broken sump lines, followed by performing video of the new lines to ensure successful installation. The inspectors reviewed work orders documenting the repairs, the video recordings, and visually inspected the new catch basins in May 2013.

This activity constitutes completion of Action Item 4.1.1.32 as described in Confirmatory Action Letter EA-13-020.

b) Findings

No findings were identified.

(5) CAL Action Item 4.1.2.2

i. Inspection Scope

The following action item is related to the impacts of flooding to verify that no geotechnical or structural impact to site structures occurred.

This item was required to be completed prior to reactor being critical.

The licensee performed visual inspection of the facilities as well as periodic building elevation surveys to verify no settlement of the structures. Soil boring testing and static and dynamic cone penetration testing were completed to locate and characterize the extent of loose soils. These inspections were documented in field reports and included in the Fort Calhoun Station Flood Recovery Action Plan 4.1 Plant and Facility Geotechnical and Structural Assessment, Revision 2, report completed by HDR and dated May 4, 2012.

Final penetration testing in small annulus space between the Turbine Building and the Auxiliary Building indicates that the loose soils do not extend beyond the Turbine Building footprint into the more densely compacted, vibroflotated

foundation of the Class 1 structures (Auxiliary Building and Containment). In lieu of core drilling the auxiliary building floor slab, a nuclear qualified consultant constructed an analysis to show even with a loss of some foundation soil, the seismic response of the Class 1 structures remains within the design basis criteria. To date, there are outstanding review comments by the NRC senior geotechnical engineer regarding this analysis that still need to be addressed.

The inspectors conducted visual walkdowns of the facility in September 2011 and again in May 2013. The field notes were reviewed, as well as comparison to prior plant records completed for the structures monitoring program. The inspectors verified that there are no indications of structural damage in site structure, however, the licensee's geotechnical and structural assessment reports contain open-ended statements requiring resolution of the turbine building sump piping and structural analysis beneath the Class I structures before closure.

This activity constitutes completion of Action Item 4.1.2.2 as described in Confirmatory Action Letter EA-13-020.

Findings

No findings were identified.

(6) CAL Action Items 4.1.3.10

a) Inspection Scope

The purpose of Action Item 4.1.3.10 was remediation of the loose soils area under the Turbine Building and Class 1 structures if required. This was a long-term action item.

The licensee completed relining of the subgrade pipes in the basement of the Turbine Building. Successful completion of this activity was verified by the licensee performing video of the pipes.

The inspectors observed the documents associated with the relining of the sump piping, as well as the isolation testing results the licensee conducted to verify that only equipment discharge was being seen in the piping, and no groundwater intrusion, even during elevated river levels.

This constitutes completion of Action Item 4.1.3.10 as described in Confirmatory Action Letter EA-13-020.

b) Findings

No findings were identified.

40A5 Operational Readiness Assessment Team Inspections (93806)

The purpose of this inspection was to complete the evaluations associated with the Fort Calhoun Station plant operations staff readiness for restart. In April and May of 2013 the NRC performed a team inspection that evaluated the adequacy of operations procedures, self assessment program, Technical Specification appraisal process, qualifications of key managers and operators, and training. Additionally, that inspection reviewed the licensee's evaluations and actions taken to address a licensee identified Fundamental Performance Deficiency associated with "Site Operational Focus." The results of this inspection are document in NRC Inspection Report 05000285/2013010 dated July 11, 2013. The team concluded that there is notable improvement in that "Personnel at all levels understand and embrace the roles they play in maintaining an operationally focused team." Although procedures are in place, the majority of the changes have occurred since Exelon leadership was put into place in late 2012. It is therefore too early to tell if the changes are sustainable. Confirmatory Action Letter Items 7.a.2, 3 and 4 will be closed pending a sustainability review.

This inspection report documents the results of the second operations focused inspection that focused on operator performance during a plant heat up to normal operating temperature and pressure using reactor coolant pumps. Based on the team's review, the team did not observe any activities that would make the team question the ability of the Fort Calhoun Station Operations Staff to safely operate the plant. The NRC performance of

a. Inspection Scope

The NRC team performed an Operational Readiness Assessment Team inspection the week of October 27, 2013. The team performed approximately 60 hours of continuous control room observations of activities while the licensee conducted a plant heat-up to normal operational temperature and pressure evolution.

This inspection reviewed for closure the following Restart Checklist items:

- Item 7.a.1 – Perform Operational Readiness Assessment Team Inspection
- Item 7.a.2 – Licensee Assessment of the Fundamental Performance Deficiency associated with Site Operational Focus
- 7.a.3 – Adequacy of extent of condition and extent of causes
- 7.a.4 – Adequacy of corrective actions

The team observed the following:

- pilot operated relief valve testing,
- reactor coolant pump starts,
- securing shutdown cooling operations,
- and other heat-up activities.

The team evaluated the operators' performance in the following areas:

- shift turnover,

- control room documentation and operator logs,
- clarity and formality of communications,
- interdepartmental interactions,
- procedural adequacy and implementation,
- operator professionalism,
- group dynamics,
- annunciator response,
- control board manipulations,
- plant and equipment awareness,
- control and prioritization of support activities,
- pre-job briefings,
- and managerial oversight.

b. Observations and Findings

No findings were identified.

Team Observations:

- Shift turnovers were conducted professionally, clearly conveying status changes for important plant equipment, and addressing planned/ongoing evolutions.
- Operator logs and rounds were being performed appropriately.
- Three-way communication at times was inconsistent in that there were several missed three-way communications and one instance where an operator's announcement of an alarm was not acknowledged and the operator did not ensure receipt.
- Proper interdepartmental interactions were observed and adequate support was provided to operations from maintenance, engineering, and other support groups. The team observed:
 - operational and organizational response to solving issues with a pilot operated relief valve that failed open during testing,
 - actions to resolve issues with stuck-open relief valves for closed cooling water that provided cooling to auxiliary coolers in the containment,
 - and an issue with pressurization of a crosstie line between the high pressure safety injection system and the charging system.
- The team attended the pre-job brief for the troubleshooting of the pilot operated relief valve and reviewed the troubleshooting work order. The team noted that the work order lacked adequate detail or standards for actions being taken during the troubleshooting process. The licensee entered this issue into their corrective action program.
- Procedures were adequately implemented by operations personnel. However, on one occasion the team identified two operators who were not using the procedure to operate pressurizer heaters to control reactor coolant system pressure. Operators were using

personal knowledge to operate the heaters during plant heatup. This was brought to the attention of the operations staff, and the procedure was obtained and used for future manipulations. The procedure was a “continuous use” procedure. The licensee entered this issue into their corrective action program.

- Operators responded to annunciators and alarms in accordance with applicable standards and procedures.
- Operators usually monitored significant plant parameters and knew the status of plant equipment. The team noticed that on the plant computer the parameter that indicated containment spray flow was oscillating from 185 gallons per minute to approximately 224 gallons per minute for one of the loops. This was brought to the attention of the operations staff and they noted that this was not correct. This is an example that the crew members were/are not being as attentive as they should have been concerning plant parameters. This was entered into the licensee’s corrective actions program. This indication is important because it has to be used to determine sufficient flow to containment when spraying the containment during an accident condition.
- The team observed numerous pre-job briefings covering small and large issues. Most of the infrequently performed tests and evolution briefings conducted were done in a very professional manner. Everyone who attended was asked specifically if they had any issues and if they understood the task.
- Proper command and control by shift management was observed in the control room.
- The licensee provided extra oversight for the plant heat-up activity. However, they did not establish a plan or exceptions of what specific activities to monitor during plant heatup. An example of oversight not being effective was on October 31, 2013, during the morning shift, activities in the main control room increased and the inspection team observed a decrease in rigor. The team addressed this with site management and a shift brief was performed to re-focus the team and an additional control room supervisor was brought to the control room to assist the on-shift crew.
- The team observed operators performing board actions and determined that peer checks were not consistent with industry standards, although no incorrect actions were performed. The team observed operators performing actions such as removing shutdown cooling from service, adjusting water level in the steam generators with auxiliary feedwater, and no peer checks were used during these evolutions.
- The team reviewed the licensee’s “Manager Shift Operations Communications” book. This book appeared to be operation’s management expectations or directions to the shift managers. The team noted that the collection of documents were required to be reviewed by shift managers and then signed off as being reviewed. Some documents were not signed by all shift managers.

In addition to control room observations, prior to the heat-up, the team reviewed the readiness of the site for changing operation mode to hot shutdown. The team performed

a complete review of the site's custom technical specifications to ensure required surveillances were completed and up-to-date for this mode change. The team also reviewed various completed surveillances as inspection items to ensure there were no issues. The team determined through their reviews that the licensee was ready for mode change to hot shutdown. The team observed that the site's custom technical specifications are complicated, cumbersome, and not easy to use. It was a difficult and somewhat frustrating exercise in determining that technical specifications were met in order to change modes. The site is potentially vulnerable to not identifying inoperability of a system due to not having met all surveillance requirements.

The team reviewed just-in-time training material that the licensee used to prepare their crews for the plant heat-up evolution. The team also reviewed the licensee's risk assessment for changing modes, and all outstanding issues involving safety equipment that were in a degraded non-conforming condition for acceptability for the mode change.

c. Conclusions

Based on the team's observations of control room operations, there was reasonable assurance that the operating staff could safely restart and operate the Fort Calhoun Station. Based on the results of these inspections Restart Checklist items 7.a.1, 7.a.2, 7.a.3, and 7.a.4 are closed.

40A6 Meetings, Including Exit

Exit Meeting Summary

On December 4, 2013, 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

None

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

05000285/2012-009-00	LER	Inoperable Equipment Due to Lack of Environmental Qualifications (Section 4OA3.1)
05000285/2013-004-00	LER	Electrical Equipment Impacted by High Energy Line Break Outside of Containment (Section 4OA3.3)
05000285/2013-010-00	LER	HPSI Pump Flow Imbalance (Section 4OA3.4)

Closed

05000285/2012-009-01	LER	Inoperable Equipment Due to Lack of Environmental Qualifications (Section 4OA3.2)
05000285/2013-010-01	LER	HPSI Pump Flow Imbalance (Section 4OA3.5)
05000285/2013-015-00	LER	Unqualified Coating Used as a Water Tight Barrier in Rooms 81 and 82 (Section 4OA3.1)

LIST OF DOCUMENTS REVIEWED

Section 40A2: 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 40A4: IMC 0350 Inspection Activities (92702)

Condition Reports (CR)

200504013	2010-0090	2010-0267	2010-0826	2010-2364
2010-3984	2011-0831	2011-2472	2011-2667	2011-2946
2011-3101	2011-3414	2011-3837	2011-4014	2011-4134
2011-4170	2011-4309	2011-4646	2011-4771	2011-4830
2011-4871	2011-4902	2011-4982	2011-4996	2011-5012
2011-5027	2011-5114	2011-5173	2011-5215	2011-5254
2011-5377	2011-5508	2011-5531	2011-5700	2011-5749
2011-5750	2011-5782	2011-5805	2011-5810	2011-5819
2011-5932	2011-5944	2011-6003	2011-6085	2011-6218
2011-6235	2011-6268	2011-6298	2011-6308	2011-6478
2011-6546	2011-6557	2011-6605	2011-6614	2011-6623
2011-6670	2011-6671	2011-6712	2011-6721	2011-6968
2011-6997	2011-6999	2011-6999	2011-7091	2011-7181
2011-7199	2011-7223	2011-7319	2011-7371	2011-7377
2011-7404	2011-7512	2011-7571	2011-7634	2011-7669
2011-7948	2011-7985	2011-8123	2011-8169	2011-8254
2011-8963	2011-9420	2011-9684	2011-10028	2011-10383
2011-10468	2012-04456	2012-08452	2012-10699	2012-10700
2012-10739	2012-10914	2012-11133	2012-13058	2012-14118
2012-14211	2012-17330	2012-17787	2012-18190	2012-18219
2012-18229	2012-19051	2012-19568	2012-20673	2012-20870
2012-20885	2013-00039	2013-00610	2013-01220	2013-01226
2013-01700	2013-02355	2013-03183	2013-03260	2013-03380
2013-03385	2013-03386	2013-03437	2013-03863	2013-04046
2013-04190	2013-04401	2013-04755	2013-04759	2013-04798
2013-05064	2013-05764	2013-06299	2013-06522	2013-06810
2013-06871	2013-07210	2013-07488	2013-07557	2013-07623

Condition Reports (CR)

2013-08514	2013-10170	2013-10222	2013-10319	2013-10823
2013-10941	2013-10985	2013-10994	2013-10995	2013-10997
2013-10998	2013-11043	2013-11327	2013-11363	2013-11440
2013-11533	2013-11711	2013-11714	2013-11860	2013-11896
2013-11930	2013-11936	2013-12047	2013-12051	2013-12061
2013-12125	2013-12126	2013-12127	2013-12142	2013-12217
2013-12218	2013-12219	2013-12256	2013-12258	

Work Orders (WO)

360983	464541	464542	464543	471135
486227	421700	287130	427292	448411
445544	462404	482788	483355	483795
456998				

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
	Fort Calhoun Station Flood Recovery Action Plan 4.1 Plant and Facility Geotechnical and Structural Assessment	0, 1, 2, 3
	HDR Technical Memorandums on Missouri River Gage Analysis dated 11-4-11 HDR Technical Memorandum Missouri River Gage Evaluation Data Collection	10/20/2011
12Q4067-RPT-001	2011 Stephenson & Associates Post-Flood Analysis	8/20/2012
EA 12-017	Post 2011 Flood Assessment of the Containment and Auxiliary and Turbine Buildings	1
12Q4067-C-002	Seismic Evaluation of FCS Auxiliary Building and Containment Structure	October 25, 2012
12Q4067-C-004	Seismic Analysis of Turbine Building Piles for Degraded Soil Conditions	October 23, 2012
12Q4067-RPT-001	Post 2011 Flood Assessment of the Containment, Auxiliary and Turbine Buildings	October 29, 2012
12Q4067-C-003	Seepage Analysis of Turbine, Auxiliary, and Containment Buildings	October 2, 2012
STM07	System Training Manual – Circulating Water	39
STM13	System Training Manual – Demineralized Water	25
STM21	System Training Manual – Fire Protection	29

Section 4OA5: Other Activities

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-ST-RC-3004	Power Operated Relief Valves (PORVs) Low Temperature Low Pressure Exercise Test (PCV-101-1 and PCV-102-2)	32
OP-ST-RC-0008	RCS Heatup/Cooldown Rate	3
TDB-111.7.a	RCS Pressure and Temperature Limits	25
TDB-111.7.d	RCS Pressure and Temperature Limits	8
SO-O-1	Conduct of Operations	101
SO-G-92	Conduct of Infrequently Performed Procedures	16
OP-2A	Operating Procedure Plant Startup	114
SO-G-23	Surveillance Test Program	62
SE-ST-CONT-0003	Compilation and Evaluation of Type B and Type C Local Leak Rate Test Results	3
SO-M-100	Conduct of Maintenance	57
FCSG-28	Development of Formal Troubleshooting Plans	5
FCSG-32	Work Week Management	45
FCSG-22-21	Desk Guide OM-19: Outage Scheduling	2
OP-1	Master Checklist for Plant Operation	12
OP-2A	Plant Startup	114
OPD-6-4	Annunciator Marking	6
FC-1212	Troubleshooting Plan, Affected Equip. Tag: AC-287, AC-289, and AC-290	7

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
3CP4208	Dresser Industrial Valve & Instrument Division Consolidated Electromatic Relief Valve	3
D-4159	Schematic Diagram Solenoid Operated Valves	7

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
STM-RCS Volume 37 Figures	Reactor Coolant System	44a
	ST Daily Progress Report (DPR)	October 29, 2013 5:45 am
FCS-OPS-020-13	MEMO TO: Operations Shift Managers and Senior Reactor Operators FROM: Scot Swanson, Operations Director	October 8, 2013
	Power Operated Relief Valves (PORVs) Surveillance Test OP-ST-RC-3004 SO-G-92 Pre- Testing Briefing	Draft
	Just-In-Time Training Plant Heatup	
Rotation 2013-04	Special Topics and Operating Experience (R13ST4/OE4)	
	Log Entries Report	September 27, 2013
TD D243.0090	Instructional Manual for Installation and Maintenance of Consolidated Electromagnetic Relief Valve Type 31533VX-30 With Bellows	4
	Heat Up	October 28, 2013 8 am
	Heat Up	July 29, 2013 11 pm
	Fundamental Report Fort Calhoun, Human Error Prevention	
	Fundamental Report Fort Calhoun, Industrial Safety	
	Fundamental Report Fort Calhoun, Nuclear Safety	
	Fundamental Report Fort Calhoun, Operational Focus	
	Fundamental Report Fort Calhoun, Radiological Safety	

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Fundamental Report Fort Calhoun, Technical Human Performance	
	Fundamental Report Fort Calhoun, Training and Qualification	
	Fort Calhoun Station Driving Through Restart	October 28, 2013
	RCS Heatup SO-G-92 Briefing	
	Power Operated Relief Valves (PORVs) Surveillance Test OP-ST-3004 (R32) SO-G-92 Pre-Test Briefing	October 29, 2013
	Open Operability Evaluations	October 9, 2013
	Manager Shift Operations Communication Notebook	
	Operations Organization Chart	
	Risk Assessment for Transition Between from RCS Tavg< 300F to >515F and back to <300F	
	Memorandum FCS-OPS-020-13, "Interim Guidance on the Usage of RCS Leak Detection Instrumentation (Revised), Dated October 8, 2013	
	Technical Data Book: RCS Pressure and Temperature Limits	

Condition Reports

2013-20234	2013-20207	2013-20226	2013-20134	2013-20043
2013-20149	2013-20157	2013-20149	2013-20134	2013-20039
2013-20145	2013-20148	2013-20186	2013-20135	2013-20035
2013-20091	2013-20089	2013-20087	2013-20086	2013-13010
2013-20087	2013-20149	2013-14074	2013-19962	2012-08137

Condition Reports

2013-20083	2013-20082	2013-20085	2013-20080	2012-07534
2013-20088	2013-20040	2013-20084	2013-00273	2012-02796
2013-15474	2013-20036	2011-05244	2013-20207	2011-10302
2013-20079	2013-20090	2013-20084	2013-20088	2013-20042
2013-20078	2013-20077	2013-20076	2013-20075	2013-20038
2013-20074	2013-20081	2013-20073	2013-20072	2013-13007
2013-20071	2013-20070	2013-20069	2013-20068	2013-19537
2013-20067	2013-20065	2013-20064	2013-20063	2012-15755
2013-20062	2013-20066	2013-20061	2013-20060	2011-09836
2013-20059	2013-20058	2013-20057	2013-20056	2013-20041
2013-20055	2013-20054	2013-20053	2013-20052	2013-20037
2013-20051	2013-20050	2013-20049	2013-20048	2013-20148
2013-20047	2013-20046	2013-20045	2013-20044	

Work Orders

393118	360637	498276	475846	360638
393491	498198	497481	470850	360691
360692	360609	448879	470547	395858
470558	490630	497013	486958	