



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

February 12, 2009

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

Subject: FORT CALHOUN STATION NRC INTEGRATED INSPECTION REPORT  
05000285/2008005

Dear Mr. Reinhart:

On December 31, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Fort Calhoun Station. The enclosed integrated inspection report documents the inspection findings, discussed on January 8, 2009, with you and other members of your staff.

The inspections examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two NRC identified findings and one self-identified finding of very low safety significance (Green). Two of these findings were determined to involve violations of NRC requirements. Additionally, this report lists one licensee-identified violation, which was determined to be of very low safety significance. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as noncited violations, consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest the violations or the significance of the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 East Lamar Blvd., Suite 400, Arlington, Texas 76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Fort Calhoun Station facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, and its enclosure, will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document 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/*

Jeffrey A Clark, P.E.  
Chief, Project Branch E  
Division of Reactor Projects

Docket: 50-285  
License: DPR-40

Enclosure:

NRC Inspection Report 05000285/2008005  
W/Attachment: Supplemental Information

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**U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

Docket: 50-285  
License: DPR-40  
Report: 05000285/2008005  
Licensee: Omaha Public Power District  
Facility: Fort Calhoun Station  
Location: Fort Calhoun Station FC-2-4 Adm.  
P.O. Box 399, Highway 75 - North of Fort Calhoun  
Fort Calhoun, Nebraska  
Dates: October 1 through December 31, 2008  
Inspectors: J. Hanna, Senior Resident Inspector  
J. Kirkland, Resident Inspector  
C. Graves, Health Physicist  
C. Osterholtz, Senior Operations Engineer  
Approved By: Jeff A. Clark, Chief, Project Branch E  
Division of Reactor Projects

## SUMMARY OF FINDINGS

IR 05000285/2008005; 10/01/2008 – 12/31/2008; Fort Calhoun Station, Integrated Resident and Regional Report; Operability Evaluations, ALARA Planning and Controls, Identification and Resolution of Problems.

The report covered a 3-month period of inspection by resident inspectors and an announced inspection by regional inspectors. Two Green noncited violations and one Green finding of significance were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### **A. NRC-Identified Findings and Self-Revealing Findings**

#### Cornerstone: Initiating Events

- Green. The inspectors identified a Green finding for inadequate corrective actions, which resulted in a plant transient. Specifically, prior corrective actions were ineffective at preventing repeated failures of condensate makeup control Valve, LCV-1190, a condition which had the potential to initiate a secondary plant event and/or adversely affect mitigating systems equipment (e.g., impacting the availability of the diesel-driven auxiliary feedwater Pump FW-54.)

The finding was greater than minor because the random failure of LCV-1190 could be reasonably viewed as a precursor to a significant event. The finding, which is under the Initiating Events cornerstone, was of very low safety significance because it did not (1) result in exceeding the Technical Specification limit for reactor coolant system leakage, (2) contribute to both the likelihood and a reactor trip and that mitigation equipment would be unavailable, or (3) increase the likelihood of a fire or flood. This finding had a crosscutting aspect in problem identification and resolution, specifically the evaluation aspect [P.1.(c)] because, as Inspection Manual Chapter 0305 states, licensees should "thoroughly evaluate problems such that the resolutions address the causes and extent of condition..." Based on the inspectors' review of the previous events, the cause determinations lacked rigor and directly led to the recurrence of this condition. (Section 4OA2)

#### Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green noncited violation for failure to comply with Technical Specification 2.0.1.(2), which required that a system, subsystem, or train must be considered inoperable if its associated emergency power source is inoperable and either (1) its normal power source is inoperable, or (2) any redundant systems, subsystems, trains or components are inoperable. On March 21, 2008, the licensee had Emergency Diesel Generator 1 inoperable and the turbine-driven auxiliary feedwater pump inoperable, concurrently. This failure resulted in a condition where neither safety-related auxiliary feedwater pump was operable or available. This condition existed for approximately 18 minutes.

This finding was determined to be greater than minor because it was similar to a non-minor example 2.g in Inspection Manual Chapter 0612, Appendix E; “Examples of Minor Issues” in that all required equipment was not operable. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix A, “Significance Determination of Reactor Inspection Findings for At-Power Situations,” Phase 1 screening. The inspectors determined that the finding screened as very low safety significance (Green) since it did not result in (1) a loss of operability; (2) loss of system safety function (the diesel-driven auxiliary feedwater pump remained operable during this time period); (3) actual loss of safety function of a single train for greater than its Technical Specification allowed outage time; (4) actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (5) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance, specifically the decision-making crosscutting aspect [H.1(a)] because there was no “systematic process” to prohibit the concurrent removal of opposite trains of equipment. (Section 1R15)

#### Cornerstone: Occupational Radiation Safety

- Green. The inspectors reviewed a self-revealing noncited violation of Technical Specification 5.8.1 for failure to properly pre-plan the replacement of reactor coolant pump motor A. This failure resulted in the collective dose of a work activity exceeding a five person-rem and the legitimate dose estimate by more than 50 percent. Refuel 24 Outage Job Package 08-AP-14, “RCP Maintenance,” had a dose estimate of 3.551 person-rem but accumulated a final dose of 12.135 person-rem, exceeding the initial dose estimate by approximately 340 percent. The finding was entered into the corrective action program as Condition Report 2008-3321. The licensee is evaluating the condition to determine appropriate corrective actions.

This finding is greater than minor because it is associated with the occupational radiation safety program attribute of exposure control and affected the cornerstone objective, in that it caused increased collective radiation dose. The inspectors determined this finding had very low safety significance. The finding involved ALARA planning and work controls, and although the licensee’s latest official three-year rolling average collective dose was more than a 135 person-rem, the finding involved less than five occurrences. Additionally, this finding had a crosscutting aspect in the human performance area, associated with the work control component, because work planning of maintenance did not consider job site conditions. [H.3(a)] (Section 2OS2)

#### **B. Licensee-Identified Violations**

Violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee’s corrective action program. These violations and corrective action tracking numbers (condition report numbers) are listed in Section 4OA7.

## REPORT DETAILS

### Summary of Plant Status

The unit began this inspection period in Mode 1 at full rated thermal power and operated at 100 percent for the duration of the inspection period.

#### 1. REACTOR SAFETY

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

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

##### .1 Readiness for Offsite and Alternate-AC Power

###### a. Inspection Scope

The inspectors performed a review of the licensee's preparations for selected systems, including conditions that could lead to loss-of-offsite power and conditions that could result from low temperatures. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator and the plant to verify that the appropriate information is exchanged when issues arise that could affect the offsite power system. Examples of aspects considered in the inspectors' review included:

- The coordination between the transmission system operator and the plant during off-normal or emergency events
- The explanations for the events
- The estimates of when the offsite power system would be returned to a normal state
- The notifications from the transmission system operator to the plant when the offsite power system was returned to normal

During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Safety Analysis Report and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. The report attachment lists the specific documents reviewed during this inspection. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures. These activities constitute completion of one readiness for weather affect on offsite and alternate ac power sample as defined in Inspection Procedure 71111.01.

###### b. Findings

No findings of significance were identified.

## **1R04 Equipment Alignments (71111.04)**

### **.1 Partial Equipment Walk-downs**

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

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

- December 4, 2008, Review of Diesel Generator 1 alignment given that Diesel Generator 2 was rendered inoperable due to a relay failure on December 3, 2008
- December 17, 2008, Review of Diesel Generator 2 while Diesel Generator 1 was inoperable for routine monthly surveillance test

The inspectors selected these systems based on their risk significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could affect the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Safety Analysis Report, technical specification requirements, administrative technical specifications, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two partial system walkdown samples as defined in Inspection Procedure 71111.04.

#### **b. Findings**

No findings of significance were identified.

## **1R05 Fire Protection (71111.05)**

### **.1 Quarterly Fire Inspection Tours**

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

The inspectors walked down the four plant areas listed below to assess the material condition of active and passive fire protection features and their operational lineup and readiness. The inspectors: (1) verified that transient combustibles and hot work activities were controlled in accordance with plant procedures; (2) observed the condition of fire detection devices to verify they remained functional; (3) observed fire

suppression systems to verify they remained functional and that access to manual actuators was unobstructed; (4) verified that fire extinguishers and hose stations were provided at their designated locations and that they were in a satisfactory condition; (5) verified that passive fire protection features (electrical raceway barriers, fire doors, fire dampers, steel fire proofing, penetration seals, and oil collection systems) were in a satisfactory material condition; (6) verified that adequate compensatory measures were established for degraded or inoperable fire protection features and that the compensatory measures were commensurate with the significance of the deficiency; and (7) reviewed the Updated Safety Analysis Report to determine if the licensee identified and corrected fire protection problems.

- November 3, 2008, Fire Area 35B, emergency diesel generator ventilation enclosure area including Room 65
- November 12, 2008, Fire Area 23, piping penetration area including Room 59
- November 12, 2008, Fire Area 6.4, radwaste monitor tank area specifically Room 10
- November 24, 2008, Fire Area 2, safety injection and containment spray pump area specifically Room 22

Documents reviewed by the inspectors are listed in the attachment.

These activities constitute completion of four quarterly fire-protection inspection samples as defined in Inspection Procedure 71111.05.

b. Findings

No findings of significance were identified.

**1R11 Licensed Operator Requalification Program (71111.11)**

.1 Resident Inspector Quarterly Review

a. Inspection Scope

On December 2, 2008, the inspectors observed a crew of licensed operators in the plant's simulator to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Crew's ability to take timely actions in the conservative direction
- Crew's prioritization, interpretation, and verification of annunciator alarms

- Crew's correct use and implementation of abnormal and emergency procedures
- Control board manipulations
- Oversight and direction from supervisors
- Crew's ability to identify and implement appropriate technical specification actions and emergency plan actions and notifications

The inspectors compared the crew's performance in these areas to pre-established operator action expectations and successful critical task completion requirements. Specific documents reviewed during this inspection are listed in the attachment.

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

b. Findings

No findings of significance were identified.

.2 Biennial Requalification Inspection

a. Inspection Scope

The licensed operator requalification program involved two training cycles that were conducted over a 2-year period. In the first cycle, the annual cycle, the operators were administered an operating test consisting of job performance measures and simulator scenarios. In the second part of the training cycle, the biennial cycle, operators were administered an operating test and a comprehensive written examination. The biennial testing cycle ended on December 24, 2008. The inspectors reviewed the results of the biennial cycle for Fort Calhoun Station.

To assess the performance effectiveness of the licensed operator requalification program, the inspectors reviewed both the operating tests and written examinations, and observed on-going operating test activities.

The inspectors reviewed operator performance on the written examinations and operating tests. These reviews included observations of portions of the operating tests by the inspectors. The operating tests observed included five job performance measures and three scenarios that were used in the current biennial requalification cycle. These observations allowed the inspectors to assess the licensee's effectiveness in conducting the operating test to ensure operator mastery of the training program content. The inspectors also reviewed medical records of licensed operators for conformance to license conditions, and the licensee's system for tracking qualifications and records of license reactivation for licensed operators.

The results of these examinations were reviewed to determine the effectiveness of the licensee's appraisal of operator performance and to determine if feedback of performance analyses into the requalification-training program was being accomplished. The inspectors reviewed operator training feedback forms to assess the responsiveness of the licensed operator requalification program to incorporate the lessons learned from

both plant and industry events. Examination results were also assessed to determine if they were consistent with the guidance contained in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors", Revision 9, Supplement 1, and NRC Inspection Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process."

In addition to the above, the inspectors reviewed examination security measures, simulator fidelity, and existing logs of simulator deficiencies. The inspectors also reviewed all Licensee Event Reports generated over the last two years to ensure enhancements to operator training were identified and incorporated into the licensed operator-training program.

On December 24, 2008, the licensee informed the lead inspector that 46 of 47 reactor operators and senior reactor operators passed the biennial written examination. The individual that failed was remediated, retested, and passed the retake examinations. The inspectors reviewed the remediation package, as well as all other remediation packages that were prepared and implemented over the last training cycle.

On the simulator portion of the examination, all crews examined on the simulator passed.

Documents reviewed by the inspectors are listed in the attachment.

These activities constitute one biennial licensed-operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings of significance were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk significant systems:

- December 2008, electro-hydraulic control system failure that caused a reactor trip on March 15, 2008, and the associated 10 CFR 50.65 a(1) goal setting
- December 2008, boundary leakage from steam generator 'A' feedwater regulating bypass Valve HCV-1105 due to a maintenance error

The inspectors reviewed events such as, where ineffective equipment maintenance has resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- Implementing appropriate work practices
- Identifying and addressing common cause failures

- Scoping of systems in accordance with 10 CFR 50.65(b)
- Characterizing system reliability issues for performance
- Charging unavailability for performance
- Trending key parameters for condition monitoring
- Ensuring proper classification in accordance with 10 CFR 50.65(a)(1) or (a)(2)
- Verifying appropriate performance criteria for structures, systems, and components classified as having an adequate demonstration of performance through preventive maintenance, as described in 10 CFR 50.65(a)(2), or as requiring the establishment of appropriate and adequate goals and corrective actions for systems classified as not having adequate performance, as described in 10 CFR 50.65(a)(1)

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two quarterly maintenance effectiveness samples as defined in Inspection Procedure 71111.12.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed licensee personnel's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- October 27, 2008, Review of yellow risk configuration and associated risk management actions while Intake Cell A was out-of-service, in conjunction with scheduled engineered safety feature testing and station battery testing
- October 29, 2008, Review of inadvertent entry into an orange risk condition that initially went un-detected by the licensee. Please refer to Section 4OA7 of this report for a detailed description of this issue.

The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that licensee personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When licensee personnel

performed emergent work, the inspectors verified that the licensee personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Specific documents reviewed during this inspection are listed in the attachment.

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

b. Findings

No findings of significance were identified.

**1R15 Operability Evaluations (71111.15)**

a. Inspection Scope

The inspectors reviewed the following issues:

- October 3, 2008, Review of immediate operability issue associated with the failure to vent the emergency core cooling suction headers from containment to the SI-159/160 check valves following completion of the Spring 2008 refueling outage
- November 13, 2008, Review of the inoperability issue associated with reactor coolant system vent to pressurizer quench tank Valve HCV-180 and the failure to perform post-maintenance testing and surveillance testing on the valve
- December 11, 2008, Review of the Safety Analysis for Operability and the Operations Memorandum associated with the turbine-driven auxiliary feedwater pump recirculation Valve FCV-1369 not being in the "auto" position
- December 31, 2008, Review of the licensee's use of Technical Specification Interpretation 96-13-1 and procedure TDB VIII, Attachment 4, specifically related to the inoperability of redundant equipment on opposite trains

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and Updated Safety Analysis Report to the licensee's evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to

verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four operability evaluations inspection samples as defined in Inspection Procedure 71111.15.

b. Findings

Introduction. The inspectors identified a Green NCV for failure to comply with Technical Specification 2.0.1.(2), which required that a system, subsystem, or train must be considered inoperable if its associated emergency power source is inoperable and either (1) its normal power source is inoperable, or (2) any redundant systems, subsystems, trains or components are inoperable. On March 21, 2008, the licensee had Emergency Diesel Generator 1 inoperable and the turbine-driven auxiliary feedwater pump inoperable, concurrently. This failure resulted in a condition where neither safety-related auxiliary feedwater pump was operable or available. This condition existed for approximately 18 minutes.

Description. On March 15, 2008, the reactor tripped in response to a turbine trip caused by an electro-hydraulic control system failure. The plant remained in Mode 3 while repairs were performed on the electro-hydraulic control system. During the plant shutdown, on March 21, 2008, at approximately 1:02 a.m., reactor operators rendered turbine-driven auxiliary feedwater Pump FW-10 inoperable for the performance of resistance checks on the associated auxiliary oil Pump LO-39 and entered Technical Specification 2.5.(1)B. (Please refer to NRC Inspection Report 05000285/2008006 for a description of the issue associated with auxiliary contact resistances.) At 2:27 p.m., operators then removed Emergency Diesel Generator 1 from service in order to perform OP-ST-RPS-0008, "Reactor Manual Trip Test," Revision 9. Once this condition existed, Technical Specification 2.0.1.(2) became applicable because the motor-driven auxiliary feedwater pump FW-6, which is powered from Diesel Generator 1, became inoperable. The operating crew failed to recognize this condition. Technical Specification 2.0.1(2) states, in part, "When a system, subsystem, train, component, or device is determined to be inoperable solely because its emergency power source is inoperable, or solely because its normal power source is inoperable, it may be considered OPERABLE for the purpose of satisfying the requirements of its applicable Limiting Condition of Operation, provided: (1) its corresponding normal or emergency power source is OPERABLE; and (2) all of its redundant system(s), subsystem(s), train(s), component(s), and device(s) are OPERABLE, or likewise satisfy the requirements of this specification. Unless both conditions (1) and (2) are satisfied, the unit shall be placed in at least HOT SHUTDOWN within six hours..." Eighteen minutes later, at 2:45 p.m. operators restored the diesel generator to an operable condition.

Analysis. The inspectors determined that the failure to comply with Technical Specifications related to general requirements was a performance deficiency. This finding was determined to be greater than minor because it was similar to a non-minor example 2.g in Inspection Manual Chapter 0612, Appendix E; "Examples of Minor Issues" in that all required equipment was not operable. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening. The inspectors determined that the finding screened as very low safety significance (Green)

since it did not result in (1) a loss of operability; (2) loss of system safety function (the diesel-driven auxiliary feedwater pump remained operable during this time period); (3) actual loss of safety function of a single train for greater than its Technical Specification allowed outage time; (4) actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (5) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance, specifically crosscutting aspect [H.1(a)] because there was no “systematic process” to prohibit the concurrent removal of opposite trains of equipment.

Enforcement. Technical Specification 2.0.1.(2) requires, in part, “When a system, subsystem, train, component, or device is determined to be inoperable solely because its emergency power source is inoperable, or solely because its normal power source is inoperable, it may be considered OPERABLE for the purpose of satisfying the requirements of its applicable Limiting Condition of Operation, provided: (1) its corresponding normal or emergency power source is OPERABLE; and (2) all of its redundant system(s), subsystem(s), train(s), component(s), and device(s) are OPERABLE, or likewise satisfy the requirements of this specification. Unless both conditions (1) and (2) are satisfied, the unit shall be placed in at least HOT SHUTDOWN within six hours...” Contrary to the above, on March 21, 2008, both trains of auxiliary feedwater were inoperable and Technical Specification 2.0.1(2) was not entered. This violation of Technical Specification 2.0.1.(2) is being treated as a noncited violation, consistent with Section VI.A of the Enforcement Policy (NCV 05000285/2008005-01), Redundant Trains of Auxiliary Feedwater Inoperable Concurrently. This violation was entered into the licensee corrective action program as CR 2008-6763.

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

### **a. Inspection Scope**

The inspectors reviewed the following temporary modification to verify that the safety functions of important safety systems were not degraded:

- Installation of 91k ohm resistor in containment fire zone 18 detection equipment

The inspectors reviewed the temporary modification and the associated safety evaluation screening against the system design bases documentation, including the Updated Safety Analysis Report and the technical specifications, and verified that the modification did not adversely affect the system operability/availability. The inspectors also verified that the installation and restoration were consistent with the modification documents and that configuration control was adequate. Additionally, the inspectors verified that the temporary modification was identified on control room drawings, appropriate tags were placed on the affected equipment, and licensee personnel evaluated the combined effects on mitigating systems and the integrity of radiological barriers.

Documents reviewed by the inspectors are listed in the attachment.

These activities constitute completion of one sample for temporary/permanent plant modifications as defined in Inspection Procedure 71111.18.

b. Findings

No findings of significance were identified.

**1R19 Postmaintenance Testing (71111.19)**

a. Inspection Scope

The inspectors reviewed the following postmaintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- November 6, 2008, Observed the M-coil replacement in the rod control cabinets and reviewed the completed postmaintenance test documents on November 12, 2008
- November 24, 2008, In office review of the postmaintenance surveillance test done on component cooling water Pump AC-3A on November 17, 2008
- November 25, 2008, Observed the postmaintenance test following work performed on raw water system flow Element FE-2890
- December 3, 2008, Observed the failed postmaintenance test on Emergency Diesel Generator 2 following the 2CR contactor replacement and subsequent retest on December 5, 2008
- December 17, 2008, Observed the postmaintenance test on Emergency Diesel Generator 1 air start system following work performed

The inspectors selected these activities based upon the structure, system, or component's ability to affect risk. The inspectors evaluated these activities for the following (as applicable):

- The effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed
- Acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate

The inspectors evaluated the activities against the technical specifications, the Updated Safety Analysis Report, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with postmaintenance tests to determine whether the licensee was identifying problems and entering them in the corrective action program and that the problems were being corrected commensurate with their importance to safety. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of five postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19.

b. Findings

No findings of significance were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors reviewed the Updated Safety Analysis Report, procedure requirements, and technical specifications to ensure that the one surveillance activity listed below demonstrated that the systems, structures, and/or components tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the significant surveillance test attributes were adequate to address the following:

- Preconditioning
- Evaluation of testing impact on the plant
- Acceptance criteria
- Test equipment
- Procedures
- Jumper/lifted lead controls
- Test data
- Testing frequency and method demonstrated technical specification operability
- Test equipment removal
- Restoration of plant systems
- Fulfillment of ASME Code requirements
- Updating of performance indicator data
- Engineering evaluations, root causes, and bases for returning tested systems, structures, and components not meeting the test acceptance criteria were correct
- Reference setting data
- Annunciators and alarms setpoints

The inspectors also verified that licensee personnel identified and implemented any needed corrective actions associated with the surveillance testing.

- December 15, 2008, Review of the In-Service Testing performed on component cooling water Pump AC-3C

Specific documents reviewed during this inspection are listed in the attachment. These activities constitute completion of one surveillance test inspection sample as defined in Inspection Procedure 71111.22.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

**1EP6 Drill Evaluation (71114.06)**

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on December 2, 2008, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator control room to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the attachment.

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

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**2OS1 Access Control to Radiologically Significant Areas (71121.01)**

a. Inspection Scope

This area was inspected to assess licensee personnel's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas, and worker adherence to these controls. The inspectors used the requirements in 10 CFR Part 20, the Technical Specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager,

radiation protection supervisors, and radiation workers. The inspectors performed independent radiation dose rate measurements and reviewed the following items:

- Performance indicator events and associated documentation packages reported by the licensee in the Occupational Radiation Safety Cornerstone
- Radiation work permits, procedures, engineering controls, and air sampler locations
- Adequacy of the licensee's internal dose assessment for any actual internal exposure greater than 50 millirem committed effective dose equivalent
- Physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools
- Self-assessments, audits, licensee event reports, and special reports related to the access control program since the last inspection
- Corrective action documents related to access controls
- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of 10 of the required 21 samples as defined in Inspection Procedure 71121.01.

b. Findings

No findings of significance were identified.

**2OS2 ALARA Planning and Controls (71121.02)**

a. Inspection Scope

The inspectors assessed licensee personnel's performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable. The inspectors used the requirements in 10 CFR Part 20 and the licensee's procedures required by technical specifications as criteria for determining compliance. The inspectors interviewed licensee personnel and reviewed the following:

- Current three-year rolling average collective exposure
- Site-specific trends in collective exposures, plant historical data, and source-term measurements
- Site-specific ALARA procedures
- Three work activities of highest exposure significance completed during the last outage

- ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements
- Intended versus actual work activity doses and the reasons for any inconsistencies
- Dose rate reduction activities in work planning
- Postjob (work activity) reviews
- Assumptions and basis for the current annual collective exposure estimate, the methodology for estimating work activity exposures, the intended dose outcome, and the accuracy of dose rate and man-hour estimates
- Method for adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered
- Exposure tracking system
- Use of engineering controls to achieve dose reductions and dose reduction benefits afforded by shielding
- Exposures of individuals from selected work groups
- Records detailing the historical trends and current status of tracked plant source terms and contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry
- Source-term control strategy or justifications for not pursuing such exposure reduction initiatives
- Self-assessments, audits, and special reports related to the ALARA program since the last inspection
- Resolution through the corrective action process of problems identified through postjob reviews and post outage ALARA report critiques
- Corrective action documents related to the ALARA program and follow-up activities, such as initial problem identification, characterization, and tracking
- Effectiveness of self-assessment activities with respect to identifying and addressing repetitive deficiencies or significant individual deficiencies

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of 12 of the required 15 samples and 7 of the optional samples as defined in Inspection Procedure 71121.02.

b. Findings

Introduction. The inspector reviewed a self-revealing Green noncited violation of Technical Specification 5.8.1 for failure to properly pre-plan the replacement of a reactor coolant pump motor.

Description. Refuel 24 Outage Job Package 08-AP-14, "RCP Maintenance," had a dose estimate of 3.551 person-rem but accumulated a final dose of 12.135 person-rem, exceeding the initial dose estimate by approximately 340 percent. The primary reason for exceeding the estimated dose was improper planning for the maintenance, which led to using more personnel and spending more time performing work in the vicinity of the reactor coolant pumps. Specifically, the work planning to replace a reactor coolant pump motor did not take into consideration the in-plant modifications the licensee had made over the previous years. This fact was not discovered until the new motor was put into place and could not be installed properly.

The licensee determined that it would be more cost effective to perform modifications for the installation while the motor was in place. This involved having to use more personnel and spend more hours than what was previously planned which resulted in unplanned, unintended collective dose exposure. The licensee's three-year rolling average collective dose for 2004 through 2006 was approximately a 195 person-rem.

Analysis. The performance deficiency associated with this finding was the failure to include previous design modifications for the reactor coolant pump motor into the work package for the motor replacement. This finding is greater than minor because it is associated with the occupational radiation safety program attribute of exposure control and affected the cornerstone objective, in that it caused increased collective radiation dose. Using the Occupational Radiation Safety significance determination process, the inspector determined this finding had very low safety significance. The finding involved ALARA planning and work controls, and although the licensees' latest, official three-year rolling average collective dose was more than a 135 person-rem, the finding involved less than five occurrences. Additionally, this finding had a crosscutting aspect in the human performance area, associated with the work control component, because work planning of maintenance did not consider job site conditions [H.3(a)].

Enforcement. Technical Specification 5.8.1 requires procedures in accordance with Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2. Regulatory Guide 1.33, Appendix A, Section 9a, requires, in part, that procedures performed for maintenance be properly pre-planned appropriate to the circumstances. Contrary to the above, on May 14, 2008, Work Package 08-AP-14 for replacement of a reactor coolant pump motor was not properly pre-planned; consequently, the pump motor could not be installed without performing additional modifications. The additional work scope resulted in a much higher accumulated dose than originally planned because the licensee failed to consider previous plant modifications. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as Condition Report 2008-3321, it is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000285/2008005-02, "Failure to Properly Pre-plan a Maintenance Activity."

#### 4. OTHER ACTIVITIES

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

###### .1 Mitigating Systems Performance Index - Emergency AC Power System

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Emergency AC Power System performance indicator for the period from the fourth quarter 2007 through the third quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, mitigating systems performance index derivation reports, issue reports, event reports and NRC integrated inspection reports for the period of October 1, 2007, through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none was identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one mitigating systems performance index emergency ac power system sample as defined in Inspection Procedure 71151.

###### b. Findings

No findings of significance were identified.

###### .2 Mitigating Systems Performance Index - Heat Removal System

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Heat Removal System performance indicator for the period from the fourth quarter 2007, through the third quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, mitigating systems performance index derivation reports, and NRC integrated inspection reports for the period of October 1, 2007, through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance

indicator data collected or transmitted for this indicator and none was identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one mitigating systems performance index heat removal system sample as defined in Inspection Procedure 71151.

b. Findings

No findings of significance were identified.

.3 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Cooling Water Systems performance indicator for the period from the fourth quarter 2007, through the third quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, mitigating systems performance index derivation reports, event reports and NRC integrated inspection reports for the period of October 1, 2007, through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none was identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one mitigating systems performance index cooling water system sample as defined in Inspection Procedure 71151.

b. Findings

No findings of significance were identified.

.4 Occupational Radiological Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Radiological Occurrences performance indicator for the period from the second quarter 2008 through third quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's assessment of the performance indicator for occupational radiation safety to determine if indicator related data was adequately assessed and reported. To assess the adequacy of the licensee's performance indicator data collection and analyses, the inspectors discussed with

radiation protection staff, the scope and breadth of its data review, and the results of those reviews. The inspectors independently reviewed electronic dosimetry dose rate and accumulated dose alarm and dose reports and the dose assignments for any intakes that occurred during the period reviewed to determine if there were potentially unrecognized occurrences.

These activities constitute completion of the occupational radiological occurrences sample as defined by Inspection Procedure 71151.

b. Findings

No findings of significance were identified.

.5 Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences performance indicator for the period from the second quarter 2008 through third quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's issue report database since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates between second quarter 2008 and third quarter 2008 to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Additionally, the inspectors reviewed the licensee's historical 10 CFR 50.75(g) file and selectively reviewed the licensee's analysis for discharge pathways resulting from a spill, leak, or unexpected liquid discharge focusing on those incidents which occurred over the last few years.

These activities constitute completion of the radiological effluent technical specifications/offsite dose calculation manual radiological effluent occurrences sample as defined by IP 71151.

b. Findings

No findings of significance were identified.

## 40A2 Identification and Resolution of Problems (71152)

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

### .1 Routine Reviews of Identification and Resolution of Problems

#### a. Inspection Scope

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

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

#### b. Findings

No findings of significance were identified.

### .2 Daily Corrective Action Program Reviews

#### a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. The inspectors accomplished this through review of the station's daily corrective action documents. The inspectors performed these daily reviews as part of their daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

#### b. Findings

No findings of significance were identified.

### .3 Operator Workarounds

#### a. Inspection Scope

The inspectors selected this issue for review to verify that licensee personnel were identifying operator workaround problems at an appropriate threshold and entering them in the corrective action program, and has proposed or implemented appropriate corrective actions. The inspectors considered the following, as applicable, during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

#### a. Findings

No findings of significance were identified.

### .4 Semiannual Trend Review

#### a. Inspection Scope

The inspectors performed a semiannual assessment (one inspection sample) of the licensee's corrective action program. The assessment covered trends of condition reports written involving failures of a condensate makeup valve and the licensee's response to those events. The focus of the inspection was determining whether the licensee had taken effective corrective actions from prior failures, which had caused plant transients. The inspectors reviewed the licensee's condition reports and root-cause assessments against the guidance in Inspection Procedure 71152 while using the corrective action categorization guidance found in Inspection Manual Chapter 0305.

#### b. Findings and Observations

Introduction. A Green finding was identified for inadequate corrective actions, which resulted in a plant transient. Specifically, prior corrective actions were ineffective at preventing repeated failures of condensate makeup control Valve, LCV-1190, a condition which had the potential to initiate a secondary plant events and/or adversely affect mitigating systems equipment (e.g., impacting the availability of the diesel-driven auxiliary feedwater Pump FW-54).

Description. On November 18, 2008, at 3:47 a.m., reactor operators in the Control Room responded to a low-level alarm for Steam Generator B and lowering levels on both steam generators. During the next 15 minutes of the event, (1) condensate pump discharge pressures decreased (2) indicated reactor power increased above licensed thermal power limits necessitating increasing boron concentration on charging system to turn reactor power, (3) condensate pump dissolved oxygen levels spiked high, (4) hotwell levels increasing and (5) decreasing condensate storage tank levels. Operators responding to the event found that valve LCV-1190 had failed open and took manual control of the valve. The licensee responded to the transient effectively and

by 4:15 a.m. had re-stabilized the plant. The inspectors assessed the licensee's response to the casualty.

In follow-up to this event, the inspectors decided to review the history of prior failures of this valve based on knowledge that this was a risk-significant component and had failed previously. The inspectors reviewed the licensee's corrective action program history for prior events and their associated corrective actions. The inspectors found a number of instances where the valve had repositioned (approximately three):

- August 22, 2008, loss of control of condenser hotwell level including a low level alarm (CR 2008-5438)
- March 24, 2008, loss of control of condenser hotwell level including a high-level alarm, a rising feedwater header pressure and a steam generator level transient (CR 2008-1890)
- December 4, 2006, loss of control of condenser hotwell level including low level and low-low level alarms (CR 200605784)

The inspectors concluded that these events were related because they involved the same component (LCV-1190), had identical effects on plant operations, and all had failed in similar ways (i.e., for unknown reasons in either the open or shut direction). In all three of the prior events, the licensee had failed to determine the cause of the valve failure (e.g., air supply line clogging, failure of the control circuit, etc.). Consequently, there were no (effective) corrective actions taken by the licensee. The inspectors concluded that these valve failures could initiate an event. For example, if the valve failed shut, condenser hotwell level could decrease to the point of losing suction to the condensate pump (i.e., Loss of Normal Feed event). If the valve failed open, the flow to the steam generators would increase; reactor power would increase and would remove a significant amount of inventory from the condensate storage tank, which could affect the functionality of the diesel-driven auxiliary feedwater pump. The inspectors determined that the prior corrective actions taken by the licensee had been ineffective at preventing recurrence of this problem.

Analysis. The failure to take effective corrective actions from prior events was a performance deficiency. The finding was greater than minor because the random failure of LCV-1190 could be reasonably viewed as precursor to a significant event. The finding, which is under the Initiating Events cornerstone, was of very low safety significance because it did not (1) result in exceeding the Technical Specification limit for reactor coolant system leakage, (2) contribute to both the likelihood and a reactor trip and that mitigation equipment would be unavailable, or (3) increase the likelihood of a fire or flood. This finding had a crosscutting aspect in problem identification and resolution, specifically the evaluation aspect [P.1.(c)] because, as Inspection Manual Chapter 0305 states, licensees should "thoroughly evaluate problems such that the resolutions address the causes and extent of condition..." Based on the inspectors' review of the previous events, the cause determinations lacked rigor and directly led to the recurrence of this condition.

Enforcement. The inspectors determined that the procedures and equipment involved with this performance deficiency were not safety-related; therefore, no violation of regulatory requirements was identified. However, a finding was identified in that

Standing Order SO-R-2, "Condition Reporting and Corrective Action," Revision 43, paragraph 4.9.10 states, in part, "Condition Report Owner ... reviews completed Condition Reports to verify that actions performed fulfill the intent of correcting the condition or ensuring it will not recur." Contrary to the above, the licensee has documented several failures of LCV-1190 in the corrective action system, which indicates that previously performed actions were ineffective and have not corrected the problems. Since this performance deficiency was of very low safety significance and was documented in the licensee's corrective action program as Condition Report 2008-6850 the performance deficiency is being treated as a finding, Inadequate Corrective Actions for Repetitive Failures of a Risk-Significant Valve (FIN 0500285/2008005-03).

.5 Crosscutting Issue Aspects

The inspectors identified one finding with problem identification and resolution crosscutting aspects. As described in section 4OA2.4 of this report, licensee personnel failed to determine the cause of repeated failures of LCV-1190, and take effective corrective actions [P.1.(c)].

**4OA3 Event Follow-up (71153)**

.1 (Closed) LER 05000285/2008001-01, Reactor Trip Due to Turbine Control System Failure

On March 15, 2008, a circuit board in the electro-hydraulic control system of the main turbine failed. This failure caused turbine control Valves CV-1 and CV-3 to shut and resulted in a reactor trip due to the loss of load. The failed turbine control system component was replaced. Postmaintenance testing was performed to ensure reliable operation of the system and the plant returned to full power. Revision 0 of this LER was closed in NRC Inspection Report 05000285/2008003. The current revision of this LER was reviewed by the inspectors and no findings of significance were identified, and no violation of NRC requirements occurred. The licensee documented the failed equipment in Condition Report 2008-1592. This LER is closed.

.2 (Closed) LER 05000285/2008002-01, Loss of Containment Integrity due to a Leaking Isolation Valve

On March 15, 2008, at 8:33 a.m., following a reactor trip from 85 percent power, relief Valve CH-223 lifted and failed to close causing a 2-gallon per minute reactor coolant system leak through the letdown system to the pressurizer quench tank. Valve CH-223 is located on a branch line between two automatic containment isolation valves and is therefore part of the containment boundary. The operators did not immediately recognize Valve CH-223 as a containment boundary valve governed by Technical Specifications. On March 16, 2008, at 1:55 p.m., operators determined Valve CH-223 to be a containment boundary valve and shut the component at 2:01 p.m. The licensee determined the cause to be a failure to translate containment integrity design requirements from the Updated Safety Analysis Reports into appropriate operating procedures and guidance. Revision 0 of this LER was closed in NRC Inspection Report 05000285/2008003. The current revision of this LER was reviewed by the inspectors and no findings of significance

were identified, and no violation of NRC requirements occurred. The licensee documented the failed equipment in Condition Report 2008-1592. This LER is closed.

#### **40A5 Other Activities**

##### **.1 Quarterly Resident Inspector Observations of Security Personnel and Activities**

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

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours. These quarterly resident inspectors' observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

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

No findings of significance were identified.

##### **.2 Implementation of Temporary Instruction 2515/176, " Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing"**

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

The objective of Temporary Instruction 2515/176 was to gather information to assess the adequacy of nuclear power plant emergency diesel generator endurance and margin testing as prescribed in plant-specific Technical Specifications. The inspectors reviewed the licensee's technical specification, procedures, and calculations and interviewed licensee personnel to complete the temporary instruction. The information gathered while completing this temporary instruction was forwarded to the Office of Nuclear Reactor Regulation for further review and evaluation on December 15, 2008.

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

No findings of significance were identified.

#### **40A6 Meetings**

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

On November 20, 2008, the inspectors presented the occupational radiation safety inspection results to Mr. J. Reinhart, Vice President, and other members of his staff who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

On December 18, 2008, the inspectors briefed Mr. T. Nellenbach, Plant Manager, and other members of the licensee's staff, on the results of the licensed operator requalification program inspection. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified

On January 8, 2009, the resident inspectors presented the inspection results to Mr. J. Reinhart, Vice President, and other members of licensee management, who acknowledged the inspection findings. The inspectors confirmed that no proprietary information had been provided.

#### **40A7 Licensee-Identified Violations**

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- Fort Calhoun Station identified that station personnel failed to adequately assess the increased risk associated with removing the west raw water header from service. On October 22, 2008, station personnel failed to recognize the plant was in an "orange" risk activity due to the west raw water header pressure boundary being opened. Station personnel believed the plant to be in a "green" condition, requiring no risk management actions. After discovery of the elevated risk condition, proper risk management actions were established to address the west raw water header being out-of-service. The failure to adequately assess the elevated risk condition was contrary to 10 CFR 50.65(a)(4), but was of very low safety significance because the incremental core damage probability deficit was less than 1E-6. This corrective action associated with this licensee-identified violation is documented in Condition Report 2008-6548.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

M. Anderson, Supervisor, Radwaste  
A. Clark, Manager, Security  
R. Clemens, Division Manager, Nuclear Engineering  
P. Cronin, Manager, Operations  
J. Fickle, Operations Engineering  
J. Gasper, Manager, Design Engineering  
D. Guinn, Supervisor, Regulatory Compliance  
J. Herman, Manager, Engineering Program  
R. Hodgson, Manager, Radiation Protection  
R. Huber, Outage Planner  
A. Lollis, Supervisor, ALARA for Radiation Protection Manager  
T. Maine, Supervisor, Radiation Protection  
T. Matthews, Manager, Nuclear Licensing  
T. Miller, Maintenance Superintendent/for Maintenance Manager  
T. Nellenbach, Plant Manager  
T. Pilmaier, Manager, Performance  
J. Reinhart, Vice President  
S. Straub, Supervisor, Nuclear Safety Review Group  
D. Trausch, Assistant Plant Manager

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

#### **Opened and Closed**

05000285/2008005-01	NCV	Redundant Trains of Auxiliary Feedwater Inoperable Concurrently
05000285/2008005-02	NCV	Failure to Properly Pre-plan a Maintenance Activity
05000285/2008005-03	FIN	Inadequate Corrective Actions for Repetitive Failures of a Risk-Significant Valve

#### **Closed**

05000285/2008001-01	LER	Reactor Trip Due to Turbine control System Failure
05000285/2008002-01	LER	Loss of Containment Integrity Due to a Leaking Isolation Valve

## LIST OF DOCUMENTS REVIEWED

### **Section 1RO1: Adverse Weather Protection**

#### DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
AOP-31	161 KV Grid Malfunctions	Revision 9
NOD-QP-36	Grid Operations and Control of Switchyard at FCS	Revision 17
OI-EG-3	EMS Post-FCS-Trip 161 KV Voltage Prediction and Switchyard Status	Revision 6

### **Section 1RO4: Equipment Alignment**

#### DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
B120C11509	Drawing, Schematic Diagram Field Flashing Control, Sht. 1	Revision 9
Not Applicable	Control Room Operating Logs	December 3-4, 2008
OI-DG-1	Operating Instruction, Diesel Generator 1	Revision 46
OI-DG-2	Operating Instruction, Diesel Generator 2	Revision 51

### **Section 1RO5: Fire Protection**

#### DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
AOP-6	Abnormal Operating Procedure Fire Emergency	Revision 21
SO-G-102	Standing Order Fire Protection Program	Revision 8
SO-G-28	Standing Order Station Fire Plan	Revision 73
USAR 9.11	Updated Safety Analysis Report Fire Protection Systems	N/A

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

Open Simulator Discrepancy Reports (All)  
Current Simulator Differences List  
Current operator license list from Fort Calhoun Station  
Class Attendance Records for Simulator Evaluations conducted on December 2, 2008  
Closed Simulator Discrepancy Reports Summary from July 2008 thru December 2008

## **Section 1R12: Maintenance Effectiveness**

### **CONDITION REPORTS**

2008-6112	2008-1586	200304445	2008-5254	2008-3077
2008-4560	2008-3548	2008-3578	2008-2351	2006-0808

Maintenance Rule Event Evaluation Worksheet for Condition Report 200601793  
Maintenance Rule Event Evaluation Worksheet for Condition Report 200605784  
Maintenance Rule Functional Scoping Data Sheet for Main Condenser  
LCV-1190 Risk Importance Measure calculations dated December 16, 2008

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

ANSI N18.7, "Administrative Controls for Nuclear Power Plants," dated 1972  
Apparent Cause Analysis Summary Report, "Failure to Identify Plant Maintenance Events Leading to an Orange PRA Condition"  
Condition Report CR-2008-6548  
Control Room Operating Logs, dated October 27 – October 29, 2008  
Risk evaluation and risk management actions from July 30 – August 1, 2008  
Standing Order SO-M-100, "Conduct of Maintenance," Revision 48

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

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
AOP-09	Abnormal Operating Procedure for High Radioactivity	Revision 10
FC-OPS-038-8	Operations Memorandum	12/5/2008
Not Applicable	Operability Evaluation for Condition Report 2008-6112	10/3/2008
Not Applicable	Air in Pipelines: A Literature Review	April 2005
Not Applicable	Mark's Standard Handbook for Mechanical Engineers	Tenth Edit.
Not Applicable	Shift Manager Control Room log entries	12/6/2008
Not Applicable	System Training Manual for Auxiliary Feedwater System	Revision 37

**Section 1R15: Operability Evaluations**

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
Not Applicable	Diesel Outage Log	10/8/2008
OI-RM-1	Operating Instruction for Radiation Monitoring	Revision 54
TDB-VIII	Technical Data Book, Volume 8, Attachment 4	Revision 36
TSI-96-13-1	Technical Specification Interpretation	1996

**CONDITION REPORTS**

2008-7060	2008-7257	2007-4098	2008-6763	200500008
2008-6794	2008-6790			

<u>TITLE</u>	<u>REVISION / DATE</u>
EM-ST-FP-0018, "Calibration and Functional Test of Fire Detection Zone Eighteen,"	Revision 11

Temporary Modification Package for EC 44827 - Containment Fire Zone 18 Being Disabled

**CONDITION REPORTS**

2008-6824	2008-4948	2008-5655	2008-7228
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**Section 1R19: Postmaintenance Testing**

Procedure OP-ST-CCW-3022, "Component Cooling Water Pump In-service Test," Revision 5

Procedure OP-ST-RW-3031, "AC-10D Raw Water Pump Quarterly Inservice Test," Revision 30

Procedure SE-ST-SA-3002, "Diesel Generator-1 Air Start System 40-Month Inservice Pressure Test," Revision 4

Procedure SP-CP-08-480-1B3A, "Calibration of Protective Relays for 480-1B3A Bus," Revision 14

Work Order 00217639-01, Replace Filter or Regulator Assembly for IA-HCV-2883B-FR

Work Order 00218435-01; Replace Steam Generator RC-2A Blow-down to Blow-down Tank FW-7 Control Valve HCV-1390

Work Order 00244394-01; Repair the Fire Main Rupture between FP-106 and FP-104

**Section 1R22: Surveillance Testing**

Procedure OP-ST-CCW-3002, "AC-3A Component Cooling Water Pump In-service Test,"  
Revision 19

**Section 1EP6: Drill Evaluation**

Simulator Evaluation Guide 84298b, "SGTR on RC-2A and SBO – 345KV Recovery,"  
Revision 2

**Section 2OS1: Access Controls to Radiologically Significant Areas (71121.01)**

CONDITION REPORTS

20082816	20082911	20082912	20082975	20083081
20083461	20083508	20083533	20083728	20083804
20085840				

PROCEDURES

RP-204	Radiological Area Controls	Revision 49
RPP	Radiation Protection Plan	Revision 22

**Section 2OS2: ALARA Planning and Controls**

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

08-QUA-040	ALARA Activities
08-QUA-042	Radiation Protection Operations Worker Protection, Radioactive Material, and Contamination Control

PROCEDURES

RP-301	ALARA Planning/RWP Development and Control	Revision 35
RP-307	Use and Control of Temporary Lead Shielding	Revision 15
RP-608	Dose Calculations from Contamination	Revision 13
RP-650	Internal Dosimetry Program	Revision 11
RP-655	In-Vitro Bioassay Sampling	Revision 5
RP-656	Bioassay Calculation	Revision 6
RP-AD-300	ALARA Program	Revision 16
RP-AD-600	Dosimetry Program	Revision 20

## CONDITION REPORTS

20083195	20083255	20083285	20083696	20083712
20083768	20084659	20084731	20085051	20086268
20086386				

## RADIATION WORK PERMITS

20083502 Minor Maintenance Activities During the 2008 RFO  
20083504 Routine RP Support During the 2008 RFO  
20083514 RCP Maintenance  
20083518 Reactor Head Assembly  
20083520 AOV/MOV Inspection and Repair

### **Section 40A1: Performance Indicator Verification**

MSPIBD, "Mitigating Systems Performance Index Basis Document for Fort Calhoun Station,"  
Revision 1

NEI 99-02, "Regulatory Assessment Indicator Guideline," Revision 5

Various Operator logs dated October 1, 2007 through September 30, 2008

Procedure NOD-QP-37, "Performance Indicators Program," Revision 16

## CONDITION REPORTS

2007-4021	2007-4033	2007-4053	2007-4092	2007-4096
2007-4097	2007-4109	2007-4190	2007-4196	2007-4220
2007-4224	2007-4315	2007-4320	2007-4321	2007-4399
2007-4401	2007-4402	2007-4403	2007-4411	2007-4454
2007-4469	2007-4479	2007-4512	2007-4557	2007-4579
2007-4611	2007-4627	2007-4659	2007-4684	2007-4686
2007-4709	2007-4816	2007-4817	2007-4876	2007-4940
2007-5039	2007-5092	2007-5106	2007-5121	2007-5139
2007-5173	2007-5204	2007-5221	2007-5229	2007-5238
2007-5279	2007-5314	2008-71	2008-85	2008-121
2008-206	2008-247	2008-398	2008-418	2008-419
2008-420	2008-421	2008-422	2008-427	2008-449
2008-453	2008-456	2008-459	2008-468	2008-497
2008-499	2008-506	2008-508	2008-510	2008-512
2008-518	2008-528	2008-532	2008-549	2008-552
2008-555	2008-612	2008-615	2008-650	2008-682
2008-721	2008-724	2008-726	2008-727	2008-797
2008-817	2008-842	2008-844	2008-913	2008-978
2008-1031	2008-1061	2008-1082	2008-1092	2008-1107
2008-1108	2008-1125	2008-1134	2008-1190	2008-1196
2008-1228	2008-1331	2008-1398	2008-1460	2008-1521
2008-1567	2008-1579	2008-1596	2008-1634	2008-1704
2008-1711	2008-1712	2008-1733	2008-1788	2008-1804
2008-1835	2008-1916	2008-1956	2008-2084	2008-2086
2008-2159	2008-2375	2008-2419	2008-2426	2008-2429
2008-2431	2008-2586	2008-2642	2008-2744	2008-3087

2008-3126	2008-3170	2008-3377	2008-3379	2008-3455
2008-3482	2008-3528	2008-3544	2008-3546	2008-3559
2008-3611	2008-3632	2008-3651	2008-3690	2008-3700
2008-3740	2008-3798	2008-3808	2008-4153	2008-4193
2008-4229	2008-4517	2008-4518	2008-4551	2008-4662
2008-4716	2008-4800	2008-4803	2008-4806	2008-4822
2008-4858	2008-4943	2008-5030	2008-5087	2008-5155
2008-5178	2008-5218	2008-5224	2008-5272	2008-5477
2008-5623	2008-5674	2008-5744	2008-5759	2008-5793
2008-5833	2008-5848			

PROCEDURES

NOD-QP-37 Performance Indicators Program Revision 16

NOD-QP-40 NRC Performance Indicator Program Revision 2

**Section 4OA2: Identification and Resolution of Problems**

Condition Reports

2006-2399	2007-0204	2007-3654	2007-4105	2007-4358
2007-4420	2008-1184	2008-4245	2008-4328	2008-4357
2008-4374	2008-4474	2008-4922	2008-4936	2008-5044
2008-5514	2008-5759	2008-6481	2008-6485	2008-6490
2008-6511	2008-6858	2008-7022	2008-7125	2008-7197
2008-7317	2008-7339	2008-7425	2008-7429	2008-6850
2008-5438	2008-1890	2008-1865	2008-1279	2007-4897
200605784	200601793	200505686	200101819	

Control Room Operating Logs dated November 18, 2008

ARP-CB-10,11/A11, "Annunciator Response Procedure for Control Boards 10,11," Revision 20

**Section 4OA5: Other Activities**

Procedures

Procedure OP-ST-DG-0001, "Diesel Generator 1 Surveillance Test," Revision 62  
 Procedure OP-ST-DG-0002, "Diesel Generator 2 Surveillance Test," Revision 58  
 Technical Data Book TDB-III.26.A, "Diesel Generator Loading Curve," Revision 14  
 Technical Data Book TDB-III.26, "Diesel Generator Capability Curve," Revision 5

Calculations

EA-FC-92-072, "Diesel Generator Loading Transient Analysis," Revision 4

Miscellaneous

Technical Specifications 2.7, "Electrical Systems," Amendment Number 251

Technical Specifications 3.7, "Emergency Power System Periodic Tests," Amendment Number 140