



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

June 13, 2012

EA-12-121

David J. Bannister, Site Vice President  
and Chief Nuclear Officer  
Omaha Public Power District  
Fort Calhoun Station FC-2-4  
P.O. Box 550  
Fort Calhoun, NE 68023-0550

**SUBJECT: FORT CALHOUN STATION - NRC TRIENNIAL FIRE INSPECTION REPORT  
(05000285/2012007)**

Dear Mr. Bannister:

On April 13, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Fort Calhoun Station. The enclosed inspection report documents the inspection results, which were discussed in a debrief meeting on April 13, 2012, with you and other members of your staff. Following additional in-office review, an exit meeting was conducted on May 17, 2012, with Mr. J. Herman, Division Manager, Nuclear Engineering, and other members of your staff.

The inspection 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.

Three NRC identified findings of very low safety significance (Green) were identified during this inspection. All three of these findings were determined to involve violations of NRC requirements. The NRC is treating these violations as non-cited violations consistent with Section 2.3.2 of the Enforcement Policy.

Additionally, two other violations of NRC requirements were identified (EA-12-121). These findings were determined to be violations related to a previously issued Red finding regarding a significant fire event in the 480 Vac safety-related switchgear (Inspection Reports 05000285/2011014 and 05000285/2012010; ADAMS ML12072A128 and ML12101A193, respectively). The significance of these findings was bounded by the Red finding and therefore they were not characterized by color significance. Both of these findings were determined to involve violations of NRC requirements. Separate citations will not be issued as these items associated with the switchgear fire event are being evaluated by the NRC under the Manual Chapter 0350, "Oversight of Reactor Facilities in a Shutdown Condition Due to Significant Performance and/or Operational Concerns," process.

If you contest any non-cited violation in this report, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Senior Resident Inspector at the Fort Calhoun Station. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Resident Inspector at Fort Calhoun Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Geoffrey B. Miller, Chief  
Engineering Branch 2  
Division of Reactor Safety

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

Enclosure: Inspection Report No. 05000285/2012007  
w/Attachment:  
1 - Supplemental Information

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SUNSI Rev Compl.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	ADAMS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Reviewer Initials	BGM
Publicly Avail	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Sensitive	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Sens. Type Initials	GBM
RIV:DRS/EB2	EB2	EB2	EB2	BC:EB2	
JMateychick	GPick	SMakor	JWatkins	GMiller	
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05/18/2012	05/11/2012	05/16/2012	05/29/2012	05/26/2012	
ACES/SES	BC:DRP/F	DRS:SRA	BC:EB2		
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 05000285

License: DPR-40

Report Nos.: 05000285/2012007

Licensee: Omaha Public Power District

Facility: Fort Calhoun Station

Location: 9610 Power Lane  
Blair, NE 68008

Dates: March 26, 2012 through May 17, 2012

Inspectors  
Leader: J. Mateychick, Senior Reactor Inspector, Engineering Branch 2

Inspectors: G. Pick, Senior Reactor Inspector, Engineering Branch 2  
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Approved By: Geoffrey B. Miller, Branch Chief  
Engineering Branch 2  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000285/2012007; 3/26/12 – 5/17/12; Omaha Public Power District; Fort Calhoun Station: Triennial Fire Protection Inspection

The report covered a two-week triennial fire protection inspection by specialist inspectors from Region IV. Five findings were identified. Three Green findings, which were non-cited violations (NCVs), were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Additionally, two findings were identified and were determined to be violations related to and bounded by a previously issued Red finding issued on April 10, 2012, that related to responding to a significant internal fire event in the 480 Vac safety-related switchgear (Inspection Report 05000285/2012010) and, therefore, were not characterized by color. Findings for which the significance determination process (SDP) 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 and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

- N/A. The inspectors identified a violation of Technical Specification 5.8.1.c for an inadequate fire protection procedure. Specifically, the post-fire safe shutdown procedure had several deficiencies that would have prevented implementation for fires that occurred in the East and West Switchgear Rooms. This finding, and its corrective actions, will be managed by the Manual Chapter 0350 Oversight Panel. Enforcement Action 12-121 is associated with this finding.

The failure to ensure a post-fire safe shutdown procedure could be implemented as written for fires in the East and West Switchgear Rooms was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of this finding is bounded by the significance of a related Red finding regarding a fire in the 480 Vac safety-related switchgear in June 2011 (Inspection Report 05000285/2012010). The performance deficiency had a cross-cutting aspect in the area of human performance associated with decision making because the licensee did not perform effective interdisciplinary reviews during development of the post-fire safe shutdown procedure [H.1(a)]. (Section 1R05.01.b)

- N/A. The inspectors identified a violation of Technical Specification 5.8.1.c regarding a failure to adequately implement the fire protection program. Specifically, the fire brigade failed to maintain command and control of the response to a fire event inside the protected area as required by fire protection program procedures. This finding, and its corrective actions, will be managed by the Manual Chapter 0350 Oversight Panel. Enforcement Action 12-121 is associated with this finding.

The failure by station fire brigade personnel to implement the requirements of Procedure SO-G-28, Revision 81, in response to a fire at Fort Calhoun Station inside the licensee's protected area which required fire brigade response was a performance deficiency. The finding was more than minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external events (fire) and it affected the associated cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of this finding is bounded by the significance of a related Red finding regarding a fire in the 480 Vac safety-related switchgear in June 2011 (Inspection Report 05000285/2012010). This finding has a cross-cutting aspect in the area of human performance associated with decision making because the licensee failed to implement the fire brigade roles and authorities as designed for risk-significant decisions [H.1(a)]. (Section 1R05.03.b)

- Green. The inspectors identified a non-cited violation with two examples related to the failure to establish an alternate shutdown capability that met the requirements of License Condition 3.D and the performance criteria in 10 CFR Part 50, Appendix R, Section III.L. Specifically, the licensee failed to establish an alternate shutdown capability that accounted for the effects of an inadvertent safety injection actuation signal and failed to ensure the plant parameters remained similar to those experienced during a loss of normal a.c. power following single spurious component actuations.

The failure to meet the performance goals prescribed by the alternate shutdown capability was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this deficiency using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." The performance deficiency affected the fire protection defense-in depth strategies involving post-fire safe shutdown systems. Because Appendix F does not address control room fire scenarios, a senior reactor analyst evaluated the significance of this performance deficiency.

This finding was evaluated using the process in Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and was determined to be of very low safety significance because the finding was not a design deficiency, confirmed not to result in loss of functionality, did not result in loss of a system safety function, did not result in loss of the safety function for a single train, did not result in loss of safety function for maintenance rule equipment, and did not potentially affect risk significant external initiating events. Because the original failure to comply with the regulations had occurred longer than three years prior to this inspection, this finding did not reflect current licensee performance. (Section 1R05.05.b.1)

- Green. The inspectors identified a non-cited violation of Technical Specification 5.8.1.c for an inadequate fire protection procedure. Specifically, the

post-fire safe shutdown procedure had several deficiencies that would have prevented implementation of the alternate shutdown capability for fires in the control/cable spreading rooms.

The failure to establish a procedure that could be implemented as written for fires that require operators to abandon the control room was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this deficiency using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." The performance deficiency affected the fire protection defense-in depth strategies involving post-fire safe shutdown systems. Because Appendix F does not address control room fire scenarios, a senior reactor analyst evaluated the significance of this performance deficiency.

This finding was evaluated using the process in Inspection Manual Chapter 0609, Attachment 4, and was determined to be of very low safety significance because the finding was not a design deficiency, confirmed not to result in loss of functionality, did not result in loss of a system safety function, did not result in loss of the safety function for a single train, did not result in loss of safety function for maintenance rule equipment, and did not potentially affect risk significant external initiating events. This finding had a cross-cutting aspect in the area of human performance associated with decision making because the licensee did not perform effective interdisciplinary reviews during development of the post-fire safe shutdown procedures [H.1(a)]. (Section 1R05.05.b.2)

- Green. The inspectors identified a non-cited violation of License Condition 3.D and the Quality Assurance Plan for failure to take timely corrective action. Specifically, the licensee revised procedure steps to open the breakers for the reactor coolant gas vent system valves in response to Non-cited Violation 05000285/2008009-02; however, the licensee did not revise the procedures until March 24, 2012, after the inspectors requested to review the corrective actions for the 2008 violation.

The failure to take timely corrective action to address inadequate procedure guidance to safely shutdown the plant following a fire was a performance deficiency. The finding was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This finding was evaluated using the Fire Protection Significance Determination Process and was determined to be of very low safety significance because of the design of the vent system valves (i.e., three spurious actuations needed to exceed charging pump capability), availability of reliable reactor coolant system pressure and pressurizer level indications in the control room, and the ability of the operator to compensate for the deficiency because of their experience and familiarity. This finding had a cross-cutting aspect in the area of human performance associated with decision making because the licensee did not use a systematic

process to correct fire protection procedure deficiencies in response to a violation in 2008 [H.1(a)]. (Section 4OA2)

B. Licensee-Identified Violations

None



## REPORT DETAILS

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

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

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure 71111.05T, "Fire Protection (Triennial)," at the Fort Calhoun Station. The licensee committed to adopt a risk informed fire protection program in accordance with National Fire Protection Association 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition (NFPA-805), but have not yet completed the program transition. The inspectors evaluated the implementation of the approved fire protection program in selected risk-significant areas, with an emphasis on the procedures, equipment, fire barriers, and systems that ensure the post-fire capability to safely shutdown the plant.

Inspection Procedure 71111.05T requires the selection of three to five fire areas for review. The inspectors used the fire hazards analysis section of the Fort Calhoun Station Individual Plant Examination of External Events and the Fire Probabilistic Risk Assessment to select the following four risk-significant fire areas (inspection samples) for review:

- Fire Area 30, Containment
- Fire Area 35A, Diesel Generator Room 1, Room 63
- Fire Area 36A, East Switchgear Area, Room 56E
- Fire Area 36B, West Switchgear Area, Room 56W

The inspectors evaluated the licensee's fire protection program using the applicable requirements, which included plant Technical Specifications, Operating License Condition 2.C.(5), NRC safety evaluations, 10 CFR 50.48 and Branch Technical Position 9.5-1. The inspectors also reviewed related documents that included the Final Safety Analysis Report, Section 9.5; the fire hazards analysis; and the post-fire safe shutdown analysis.

Specific documents reviewed by the inspectors are listed in the attachment. Four inspection samples were completed.

#### .1 Protection of Safe Shutdown Capabilities

##### a. Inspection Scope

The inspectors reviewed the piping and instrumentation diagrams, safe shutdown equipment list, safe shutdown design basis documents, and the post-fire safe shutdown analysis to verify that the licensee properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for fires in the selected fire areas. The inspectors observed walk downs of the procedures used for achieving and

maintaining safe shutdown in the event of a fire for fires outside of the control room to verify that the procedures properly implemented the safe shutdown analysis provisions.

For each of the selected fire areas, the inspectors reviewed the separation of redundant safe shutdown cables, equipment, and components located within the same fire area. The inspectors also reviewed the licensee's method for meeting the requirements of 10 CFR 50.48; Branch Technical Position 9.5-1, Appendix A; and 10 CFR Part 50, Appendix R, Section III.G. Specifically, the inspectors evaluated whether at least one post-fire safe shutdown success path remained free of fire damage in the event of a fire. In addition, the inspectors evaluated whether the licensee met applicable license commitments.

b. Findings

Introduction. The inspectors identified a violation of Technical Specification 5.8.1.c for an inadequate fire protection procedure. Specifically, the post-fire safe shutdown procedure had several deficiencies that would have prevented implementation for fires that occurred in the East and West Switchgear Rooms. The licensee documented these deficiencies in their corrective action program.

Discussion. The inspectors walked down three fire areas inside the auxiliary building to verify that manual actions could be accomplished as described in Procedure AOP-06-01, "Auxiliary Building Radiation Controlled Areas and Containment," Revision 2 and Procedure AOP-06-02, "Uncontrolled Areas of Auxiliary Building," Revision 3. The licensee had implemented these manual actions in lieu of providing the separation required by 10 CFR Part 50, Appendix R, Section III.G.2. Because the licensee continued the process of transitioning to NFPA 805, the inspectors evaluated the manual actions to determine whether they provided appropriate compensatory measures.

The inspectors identified the following deficiencies related to implementing the manual actions for fire areas outside of the control room:

- For a fire in either the East Switchgear Room or the West Switchgear Room, the equipment operator implementing Procedure AOP-06-02, Section V, Step 4.7 (East Switchgear Room), or Section VI, Step 4.6 (West Switchgear Room), could not complete the step as written. The equipment operator did not know where to obtain the key for the breaker locking device located on the battery disconnect molded case breaker. The inspectors noted that the procedure did not caution that a key would be necessary nor had the licensee made the key readily available to operators. Opening the battery disconnect de-energized electrical equipment to protect post-fire safe shutdown equipment and fire fighting personnel. The licensee documented this deficiency in Condition Report 2012-02390.
- For a fire in either the East Switchgear Room or the West Switchgear Room, the equipment operator implementing Procedure AOP-06-02, Section V, Contingency Steps 3.c and 6.1 (East Switchgear Room), or Section VI, Contingency Step 3.c and Step 6 (West Switchgear Room) would require entry into the affected fire area. Regulatory requirements do not allow entry into the affected fire area to perform

operator actions. The licensee documented this deficiency in Condition Report 2012-02842.

- For a fire in the East Switchgear Room, Procedure AOP-06-02, Section V, Step 4.3c, did not require that operators place offsite power feeds in “pull-to-lock” for Bus Tie Breakers BT-1B4A and BT-1B4C. Placing the bus tie breakers in this condition ensures that an offsite power source could not inadvertently reenergize a de-energized bus. The inspectors verified that Procedure AOP-06-02, Section VI, Step 4.3c correctly required that operators place Bus Tie Breaker BT-1B4B in “pull-to-lock” for a fire in the West Switchgear room. The licensee documented this deficiency in Condition Report 2012-02640.
- For a fire in the West Switchgear Room, Procedure AOP-06-02, Section VI, Step 4.7 directed operators to verify power available to at least one of two fuel oil transfer pumps. The operator implementing the step could not locate appropriate instrumentation to verify that power was available to the fuel oil transfer pumps. The inspectors determined that the procedure did not discuss the method to accomplish the task. The licensee documented this deficiency in Condition Report 2012-02583.

Analysis. The failure to ensure a post-fire safe shutdown procedure could be implemented as written for fires in the East and West Switchgear Rooms was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of this finding is bounded by the significance of a related Red finding regarding a fire in the 480 Vac safety-related switchgear in June 2011 (Inspection Report 05000285/2012010). The performance deficiency had a cross-cutting aspect in the area of human performance associated with decision making because the licensee did not perform effective interdisciplinary reviews during development of the post-fire safe shutdown procedure [H.1(a)].

Enforcement. Technical Specification 5.8.1.c specified that written procedures shall be established, implemented, and maintained covering the implementation of the Fire Protection Program. Procedure AOP-06-02, “Uncontrolled Areas of Auxiliary Building,” Revision 3, Sections V and VI, provided instructions to operations personnel for fires outside the control room in the East and West Switchgear Rooms, respectively.

Contrary to the above, from November 1997 to April 13, 2012, the licensee failed to establish written procedures covering the implementation of the Fire Protection Program. Specifically, the licensee failed to establish procedures for fires in the East and West Switchgear Rooms that could be implemented as written. Procedure AOP-06-02 required operators to enter hazardous areas without appropriate protective equipment, specified performing steps that could not be accomplished as written or failed to have all support equipment available, and failed to identify appropriate actions to prevent inadvertently reenergizing a faulted bus. These examples have been entered into the corrective action program (Condition Reports 2012-02390, 2012-02583, 2012 02640, and 2012-02842). This violation and its examples are considered as a related violation to the Red finding issued on April 10, 2012, that related to responding to a significant

internal fire event in the 480 Vac safety-related switchgear(Enforcement Action 12-121). A separate citation will not be issued as this finding and its corrective actions will be managed by the Manual Chapter 0350 Oversight Panel: VIO 05000285/2012007-01, Failure to Provide Adequate Post-Fire Safe Shutdown Actions in the Switchgear Rooms.

## .2 Passive Fire Protection

### a. Inspection Scope

The inspectors walked down accessible portions of the selected fire areas to observe the material condition and configuration of the installed fire area boundaries (including walls, fire doors, and fire dampers) and verify that the electrical raceway fire barriers were appropriate for the fire hazards in the area. The inspectors compared the installed configurations to the approved construction details, supporting fire tests, and applicable license commitments.

The inspectors reviewed installation, repair, and qualification records for a sample of penetration seals to ensure the fill material possessed an appropriate fire rating and that the installation met the engineering design. The inspectors also reviewed similar records for the rated fire wraps and radiant energy heat shields to ensure the material possessed an appropriate fire rating and that the installation met the engineering design.

### b. Findings

No findings were identified.

## .3 Active Fire Protection

### a. Inspection Scope

The inspectors reviewed the design, maintenance, testing, and operation of the fire detection and suppression systems in the selected fire areas. The inspectors verified the automatic detection systems and the manual and automatic suppression systems were installed, tested, and maintained in accordance with the National Fire Protection Association code of record or approved deviations, and that each suppression system was appropriate for the hazards in the selected fire areas.

The inspectors walked down accessible portions of the detection and suppression systems in the selected fire areas. The inspectors also performed a walkdown of major system support equipment in other areas (e.g., fire pumps and Halon supply systems) to assess the material condition of these systems and components.

The inspectors reviewed the electric and diesel fire pump flow and pressure tests to verify that the pumps met their design requirements. The inspectors also reviewed the halon suppression functional tests to verify that the system capability met the design requirements.

The inspectors assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The inspectors also reviewed pre-fire plans and smoke

removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. In addition, the inspectors inspected fire brigade equipment to determine operational readiness for fire fighting.

The inspectors observed an unannounced fire drill, conducted on April 11, 2012, in the Turbine Building and the subsequent drill critique using the guidance contained in Inspection Procedure 71111.05AQ, "Fire Protection Annual/Quarterly." The inspectors observed fire brigade members fight a simulated fire in the Auxiliary Building, located in the radiological controlled area. The inspectors verified that the licensee identified problems; openly discussed them in a self-critical manner at the drill debrief, and identified appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient fire fighting equipment was brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other areas; (7) smoke removal operations; (8) utilization of pre-planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives.

The inspectors also reviewed the licensee's evaluation of fire brigade performance during the fire event that occurred on June 7, 2011, and subsequent corrective actions.

This review was credited as the revised oversight process baseline inspection sample required by Inspection Procedure 71111.05AQ.

b. Findings

Introduction. The inspectors identified a violation of Technical Specification 5.8.1.c regarding a failure to adequately implement the fire protection program. Specifically, the fire brigade failed to maintain command and control of the response to a fire event inside the protected area as required by fire protection program procedures.

Description. On June 7, 2011, a fire occurred in a 480 Vac motor-control center in the West Switchgear Room at Fort Calhoun Station. The fire resulted in a loss of power to six of nine safety-related 480 Vac electrical distribution buses, and an Alert emergency action level declaration. The Halon system in the switchgear room automatically actuated and aided in extinguishing the fire. The station fire brigade responded, as did off-site fire assistance.

Plant fire brigade performance was governed, in part, by Procedure SO-G-28, "Station Fire Plan," Revision 81, which defined fire brigade responsibilities including the command and control functions. Procedure SO-G-28, Section 4.8.4, required, in part, that inside the protected area the fire brigade leader shall maintain the command role, and, when off-site support arrives, they will maintain a mutual aid assignment and direct their own personnel in support of the Fire Brigade Leader.

The fire brigade leader intended for both the attack and backup team to stage at the north end of the switchgear rooms. The fire brigade backup team went to the south

mezzanine level instead of the north mezzanine level as expected by the fire brigade leader. The fire brigade leader formed a second backup team using available fire brigade qualified personnel. This adversely impacted the fire brigade initial response capability. The response was further delayed because the site fire brigade did not enter the switchgear room.

The City of Blair volunteer fire department went to the staging area at the north mezzanine level where the station fire brigade leader was located; however, the City of Fort Calhoun volunteer fire department went to the south mezzanine access without being directed to do so by the station fire brigade. Command and control of the response to the fire was transferred to the off-site fire department when they arrived on site. Offsite responders subsequently entered the fire area and declared the fire extinguished.

Analysis. The failure by station fire brigade personnel to implement the requirements of Procedure SO-G-28, Revision 81, in response to a fire at Fort Calhoun Station inside the licensee's protected area which required fire brigade response was a performance deficiency. The finding was more than minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external events (fire) and it affected the associated cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of this finding is bounded by the significance of a related Red finding regarding the fire in the 480 Vac safety-related switchgear in June 2011 (Inspection Report 05000285/2012010).

This finding has a cross-cutting aspect in the area of human performance associated with decision making because the failed to implement the fire brigade roles and authorities as designed for risk-significant decisions [H.1(a)].

Enforcement. Technical Specification 5.8.1.c requires that written procedures and administrative policies be established, implemented, and maintained covering the implementation of the fire protection program. Procedure SO-G-28, "Station Fire Plan," Revision 81, defined the composition and responsibilities of the plant fire brigade when responding to an emergency incident at Fort Calhoun Station, and required that inside the station's protected area the fire brigade leader maintain the command role in response to emergency incidents.

Contrary to the above, on June 7, 2011, the licensee failed to implement written procedures covering the implementation of the fire protection program. Specifically, the licensee failed to implement the requirements of Procedure SO-G-28 that required the fire brigade leader to maintain the command role in the station response to a fire in the West Switchgear Room requiring off-site fire fighting assistance. The fire brigade leader relinquished the command function to off-site fire responders during the event. This violation and its examples are considered as a related violation to the Red finding issued on April 10, 2012, that related to responding to a significant internal fire event in the 480 Vac safety-related switchgear (Enforcement Action 12-121). A separate citation will not be issued as this finding and its corrective actions will be managed by the Manual Chapter 0350 Oversight Panel: VIO 05000285/2012007-02, Failure to Maintain Command and Control Function during Fire Fighting Activities in the Protected Area.

#### .4 Protection from Damage from Fire Suppression Activities

##### a. Inspection Scope

The inspectors performed plant walkdowns and document reviews to verify that redundant trains of systems required for hot shutdown, which are located in the same fire area, would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the inspectors verified that:

- A fire in one of the selected fire areas would not directly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage all redundant safe shutdown trains
- A fire in one of the selected fire areas or the inadvertent actuation or rupture of a fire suppression system would not directly cause damage to all redundant trains (e.g., sprinkler-caused flooding of other than the locally affected train)
- Adequate drainage is provided in areas protected by water suppression systems

##### b. Findings

No findings were identified.

#### .5 Alternative Shutdown Capability

##### a. Inspection Scope

###### Review of Methodology

The inspectors reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings, electrical drawings, the Final Safety Analysis Report, the supporting thermal-hydraulic analysis and other supporting documents to verify that hot and cold shutdown could be achieved and maintained from outside the control room for fires that require evacuation of the control room, with or without offsite power available.

The inspectors conducted plant walk downs to verify that the plant configuration was consistent with the description contained in the safe shutdown and fire hazards analyses. The inspectors focused on ensuring the adequacy of systems selected for reactivity control, reactor coolant makeup, reactor decay heat removal, process monitoring instrumentation, and support systems functions.

The inspectors also verified that the systems and components credited for shutdown would remain free from fire damage. Finally, the inspectors verified that the transfer of control from the control room to the alternative shutdown location would not be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

## Review of Operational Implementation

The inspectors verified that licensed and non-licensed operators received training on alternative shutdown procedures. The inspectors also verified that sufficient personnel to perform a safe shutdown were trained and available onsite at all times, exclusive of those assigned as fire brigade members.

A walkthrough of the post-fire safe shutdown procedure with licensed and non-licensed operators was performed to determine the adequacy of the procedure. The inspectors verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time critical actions that were verified included restoring electrical power, establishing control at the remote shutdown and local shutdown panels, establishing reactor coolant makeup, and establishing decay heat removal.

The inspectors reviewed manual actions to ensure that they had been properly reviewed and approved and that the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire area.

### b. Findings

#### .1 Alternate Shutdown Procedure Does Not Account for Single Worst Case Spurious Actuations

Introduction. The inspectors identified a Green non-cited violation with two examples related to the failure to establish an alternate shutdown capability that met the requirements of License Condition 3.D and the performance criteria in 10 CFR Part 50, Appendix R, Section III.L. Specifically, the licensee failed to establish an alternate shutdown capability that accounted for the effects of an inadvertent safety injection actuation signal and failed to ensure the plant parameters remained similar to those experienced during a loss of normal a.c. power following single spurious component actuations.

Description. The inspectors reviewed the alternate shutdown capability implemented by Procedure AOP-06, "Fire Emergency," Revision 25, and existing permanent plant equipment. From review of Procedure AOP-06 and calculations to support alternate shutdown capability, the inspectors determined that the licensee identified transients that could result from spurious actuation of plant equipment during a control room fire. The approach assumed that operators would take actions within the first 10 minutes to terminate the transients by removing power from the control systems. The inspectors verified that the approach prevented the plant from experiencing an unrecoverable event. The inspectors identified that this approach established by the licensee for a control room evacuation failed to meet the requirements of 10 CFR Part 50, Appendix R, Section III.L, which specified that alternative or dedicated shutdown capability provided for a specific fire area shall be able to maintain reactor coolant inventory variables within those predicted for a loss of normal a.c. power.

The first example related to an inadvertent safety injection actuation signal. The



licensee had determined that a control room fire could result in an inadvertent safety injection actuation signal; however, the transient analysis had not evaluated the amount of water that would be injected by the positive displacement charging pumps and the corresponding pressurizer level increase caused by an inadvertent safety injection actuation signal.

The second example related to the approach taken by the licensee for implementing the alternate shutdown capability. Both Procedure AOP-06 and supporting calculations relied upon the plant response not creating an unrecoverable event. This approach did not meet the requirements of 10 CFR Part 50, Appendix R, Section III.L nor the approved fire protection licensing basis. Also, Letter 82-0060, "Fire Protection Rule – 10 CFR 50.48(C)(5) Alternative Safe Shutdown-Section III.G.3 of Appendix R to 10 CFR 50, Fort Calhoun Nuclear Power Station," dated April 8, 1982, specified, "The performance goals for post fire safe shutdown will be met using existing mechanical systems and equipment." Section III.L.2.b specified the performance goals for the shutdown functions for the reactor coolant makeup function shall be capable of maintaining the reactor coolant level within the level indicating range in the pressurizer for PWRs (pressurized water reactors). The licensee documented both of these deficiencies in Condition Report 2012-02338.

Analysis. The failure to meet the performance goals prescribed by the alternate shutdown capability was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this deficiency using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." The performance deficiency affected the fire protection defense-in depth strategies involving post-fire safe shutdown systems. Because Appendix F does not address control room fire scenarios, a senior reactor analyst evaluated the significance of this performance deficiency.

Because these deficiencies involved front line mitigating system performance, the senior reactor analyst used Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," to determine the risk significance of this finding. The thermal-hydraulic calculation demonstrated that no core damage resulted from the spurious actuations. Using Attachment 4, the senior reactor analyst determined finding was not a design deficiency, confirmed not to result in loss of functionality, did not result in loss of a system safety function, did not result loss of the safety function for a single train, did not result in loss of safety function for maintenance rule equipment, and did not potentially affect risk significant external initiating events. Consequently, the senior reactor analyst concluded this finding had very low safety significance (Green). Because the original failure to comply with the regulations had occurred longer than three years prior to this inspection, this finding did not reflect current licensee performance.

Enforcement. License Condition 3.D specifies that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the Updated Safety Analysis Report for the facility and as approved in the SERs dated

February 14, and August 23, 1978, November 17, 1980, April 8, and August 12, 1982, July 3, and November 5, 1985, July 1, 1986, December 20, 1988, November 14, 1990, March 17, 1993 and January 14, 1994.

Letter 82-0060, "Fire Protection Rule – 10 CFR 50.48(C)(5) Alternative Safe Shutdown-Section III.G.3 of Appendix R to 10 CFR 50, Fort Calhoun Nuclear Power Station," dated April 8, 1982, specified, "The performance goals for post fire safe shutdown will be met using existing mechanical systems and equipment."

Appendix R, Section III.L.1.(b) specified that alternative or dedicated shutdown capability provided for a specific fire area shall be able to maintain reactor coolant inventory. Section III.L.2.b specified the performance goals for the shutdown functions for the reactor coolant makeup function shall be capable of maintaining the reactor coolant level within the level indication in the pressurizer for PWRs (pressurized water reactors).

Procedure AOP-06, "Fire Emergency," Revision 25, provides instructions for implementing the alternate shutdown capability.

Contrary to the above, from April 1982 through April 2012, the licensee failed to establish alternative shutdown capability that met their license condition and the requirements of 10 CFR 50, Appendix R, Section III.L. Specifically, Procedure AOP-06 did not have actions to mitigate an inadvertent safety injection actuation and was not designed to ensure that pressurizer level remained within the parameters for a loss of normal a.c. power or remained within the indicating range. Because this finding is of very low safety significance and has been entered into the corrective action program (Condition Report 2012-02338), this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000285/2012007-03, Alternate Shutdown Procedure Does Not Account for Single Worst Case Spurious Actuations.

## .2 Failure to Provide Adequate Alternate Shutdown Capability

Introduction. The inspectors identified a Green non-cited violation of Technical Specification 5.8.1.c for an inadequate fire protection procedure. Specifically, the post-fire safe shutdown procedure had several deficiencies that would have prevented implementation of the alternate shutdown capability for fires in the control room or cable spreading room.

Discussion. The inspectors walked down the alternate shutdown capability for a control room/cable spreading room fire to verify that the operators could perform the actions required by the post-fire safe shutdown procedure. The licensee utilized Procedure AOP-06, "Fire Emergency," Revision 25, Section II to implement their alternate shutdown capability for hot shutdown.

From the walk downs, the inspectors identified the following deficiencies related to implementing the alternate shutdown capability for a control room/cable spreading room fire:

- In Attachment C, Step 18 contingency actions, a licensed operator was directed to use a “ratchet” to charge a 4160 Vac breaker. The breaker did not require a ratchet but operated via a charging spring handle. The operator was directed to obtain a ratchet instead of a charging spring handle in Step 16. In addition, the inspectors determined that the ratchet selected was a tool no longer required. The licensee documented this deficiency in Condition Report 2012-02407.
- In Attachment D, Step 5, the control room communicator places the 125 Vdc breakers to off for DC-PNL-1-15, “ELP-5 Emergency Lighting Panel.” This removes the power to emergency lights within the first 15 minutes for lights required to be illuminated for 8 hours. The licensee documented this deficiency in Condition Report 2012-02680.
- In Attachment C, Step 5, the licensee had insufficient emergency lighting to allow an individual to manipulate Swing Inverter EE-8T as specified in the procedure. The inspectors determined that the licensee had failed to account for the need for emergency lighting when installing the swing battery charger. The licensee documented this deficiency in Condition Report 2012-02692.

Analysis. The failure to establish a procedure that could be implemented as written for fires that require operators abandon the control room was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this deficiency using Inspection Manual Chapter 0609, Appendix F, “Fire Protection Significance Determination Process.” The performance deficiency affected the fire protection defense-in depth strategies involving post-fire safe shutdown systems. Because Appendix F does not address control room fire scenarios, a senior reactor analyst evaluated the significance of this performance deficiency.

- The senior reactor analyst evaluated the first example and determined the likelihood of core damage by multiplying the frequency of fire that requires control room abandonment by the likelihood of a 4.16 kV breaker failure to close. Previously, the senior reactor analyst calculated and documented that the Fort Calhoun Station control room abandonment frequency resulting from a fire equaled 1E-05/yr. From NUREG/CR-6978, “Industry Average Performance for Components and Initiating Events at US Commercial Nuclear Power Plants,” Revision 0, Appendix A, Section A.2.10, the senior reactor analyst determined the probability for a 4.16 kV breaker failure to close was 2.05E-03. The resulting value equaled 2.05E-08/yr; therefore, this performance deficiency example has very low safety significance (Green).
- Because the second and third examples involved front line mitigating system support performance, the senior reactor analyst used Inspection Manual Chapter 0609, Attachment 4, “Phase 1 - Initial Screening and Characterization of Findings,” to determine the risk significance of this finding. The senior reactor analyst determined that operators were required by procedures to carry

flashlights, and the team determined that they do have flashlights on their persons when standing watch. Using Attachment 4 the senior reactor analyst determined finding was not a design deficiency, confirmed not to result in loss of functionality, did not result in loss of a system safety function, did not result loss of the safety function for a single train, did not result in loss of safety function for maintenance rule equipment, and did not potentially affect risk significant external initiating events. Consequently, the senior reactor analyst concluded this finding had very low safety significance (Green).

These examples of the performance deficiency had a cross-cutting aspect in the area of human performance associated with decision making because the licensee did not perform effective interdisciplinary reviews during development of the post-fire safe shutdown procedures [H.1(a)].

Enforcement. Technical Specification 5.8.1.c specified that written procedures shall be established, implemented, and maintained covering the implementation of the Fire Protection Program. Procedure AOP-06, "Fire Emergency," Revision 25, implemented the alternate shutdown capability and provided directions to operations personnel for fires in the control room and cable spreading room.

Contrary to the above, from November 1997 to April 13, 2012, the licensee failed to implement written procedures covering the implementation of the Fire Protection Program. Specifically, for the alternate shutdown capability Procedure AOP-06 provided inadequate direction on tools required by the operators, directed operators to turn off required emergency lighting, and directed operators to take actions in areas without adequate emergency lighting. Because this finding is of very low safety significance and has been entered into the corrective action program (Condition Reports 2012-02407, 2012-02680, and 2012-02692), this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy:  
NCV 05000285/2012007-04, Failure to Provide Adequate Alternate Shutdown Capability.

## .6 Circuit Analysis

### a. Inspection Scope

The inspectors reviewed the post-fire safe shutdown analysis to verify that the licensee identified the circuits that may impact the ability to achieve and maintain safe shutdown. The inspectors verified, on a sample basis, that the licensee properly identified the cables for equipment required to achieve and maintain hot shutdown conditions in the event of a fire in the selected fire areas. The inspectors verified that these cables were either adequately protected from the potentially adverse effects of fire damage or were analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown.

The inspectors focused on the cables of selected components from the reactor coolant system, specifically the pressurizer power-operated relief valves (PCV-102-1, PCV-102-2), the pressurizer block valves (HCV-150, HCV-151), and the safety injection and refueling water tank (SIRWT) outlet valves (LCV-383-1, LCV-383-2). For the

sample of components selected, the inspectors reviewed process and instrumentation drawings, electrical elementary and block diagrams and identified power, control, and instrument cables necessary to support their operation. In addition, the inspectors reviewed cable routing information to verify that fire protection features were in place as needed to satisfy the separation requirements specified in the fire protection license basis.

b. Findings

No findings were identified.

.7 Communications

a. Inspection Scope

The inspectors reviewed the adequacy of the communication system to support plant personnel in the performance of alternative post-fire safe shutdown functions and fire brigade duties. The review verified that the licensee established and maintained in working order primary and backup communications. Further, the inspectors evaluated the environmental impacts such as ambient noise levels, coverage patterns, and clarity of reception. The inspectors reviewed that the electrical power supplies and cable routing for the phone system would allow them to remain functional following a fire in the control room and other fire areas.

b. Findings

No findings were identified.

.8 Emergency Lighting

a. Inspection Scope

The inspectors reviewed the emergency lighting system required to support plant personnel in the performance of alternative post-fire safe shutdown functions to verify it was adequate to support the performance of manual actions required to achieve and maintain hot shutdown conditions, and for illuminating access and egress routes to the areas where manual actions are required. The review verified that the licensee: (1) installed emergency lights with an 8-hour battery capacity or utilized incandescent lighting powered from the station 125 VDC batteries, (2) maintained the emergency light batteries in accordance with manufacturer recommendations, and (3) tested and performed maintenance in accordance with plant procedures and industry practices. The inspectors evaluated the locations and positioning of emergency lights during a walkthrough of the control room evacuation procedure and during review of manual actions performed for fires in areas outside of the control room. The inspectors witnessed an emergency lighting test in the electrical switchgear room and alternative shutdown equipment room.

b. Findings

No findings were identified.

.9 Cold Shutdown Repairs

a. Inspection Scope

The inspectors verified that the licensee identified repairs needed to reach and maintain cold shutdown and had dedicated repair procedures, equipment, and materials to accomplish these repairs. Using these procedures, the inspectors evaluated whether these components could be repaired in time to bring the plant to cold shutdown within the time frames specified in their design and licensing bases. The inspectors verified that the repair equipment, components, tools, and materials needed for the repairs were available and accessible on site.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The inspectors verified that compensatory measures were implemented for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems and equipment; passive fire barriers; or pumps, valves, or electrical devices providing safe shutdown functions). The inspectors also verified that the short-term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified.

.11 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's implementation of guidance and strategies intended to maintain or restore core, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire as required by Section B.5.b of the Interim Compensatory Measures Order, EA-02-026, dated February 25, 2002, and 10 CFR 50.54(hh)(2).

The inspectors reviewed the strategies to verify that they continued to maintain and implement procedures, maintain and test equipment necessary to properly implement

the strategies, and ensure station personnel are knowledgeable and capable of implementing the procedures. The inspectors visually inspected the fire truck, portable river pump, and other equipment used to implement the strategies to ensure the availability and material readiness of the equipment. The inspectors evaluated the adequacy of the trailer hitch attachments and verified the availability of on-site vehicles capable of towing the portable pump. The licensee implemented their strategies in accordance with Procedure OCAg-1, "Operational Contingency Action Guideline," Revision 20. The inspectors selected the following four specific strategies this inspection sample:

- Reactor Coolant System Heat Removal - Condition 1
- Reactor Coolant System Heat Removal - Condition 2
- Reactor Coolant System Heat Removal - Condition 3
- Spent Fuel Pool - Condition 1

The inspectors completed four samples.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES [OA]

4OA2 Identification and Resolution of Problems

Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The inspectors selected a sample of condition reports associated with the licensee's fire protection program to verify that the licensee had an appropriate threshold for identifying deficiencies. In addition the inspectors reviewed the corrective actions proposed and implemented to verify that they were effective in correcting identified deficiencies. The inspectors also evaluated the corrective actions implemented for violations identified during the 2008 fire protection triennial inspection.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of License Condition 3.D and the Quality Assurance Plan for failure to take timely corrective action. Specifically, the licensee revised procedure steps to open the breakers for the reactor coolant gas vent system valves in response to Non-cited Violation 05000285/2008009-02; however, the licensee did not revise the procedures until March 24, 2012, after the inspectors requested to review the corrective actions for the 2008 violation.

Description. Inspection Report 05000285/2005008 documented Green Non-cited Violation 05000285/2005008-07 for the failure to ensure that, if reactor coolant gas vent system valves spuriously actuate because of fire damage, they will not cause an uncontrolled loss of reactor coolant inventory. All of the reactor coolant gas vent system

valves are normally closed, air operated valves that can spuriously open because of a hot short on the unprotected power cable to the valves.

The licensee addressed this issue in Condition Report 200504013. For the four fire areas affected, the licensee revised Procedures AOP-06-01 and AOP-06-02 to incorporate actions to remove power in the event one of the reactor coolant gas vent system valves opens because of fire damage. Inspection Report 05000285/2008009 documented Green Non-cited Violation 05000285/2008009-02 for inadequate corrective actions related to revising a post-fire safe shutdown procedure. The 2008 inspectors determined that the procedures did not identify any specific diagnostic instrumentation operators could use to determine if any of the reactor coolant gas vent system valves spuriously operated. The inspectors concluded that operators could not be expected to reliably perform the procedure steps as written and, therefore, the licensee had implemented inadequate corrective actions. The licensee documented this deficiency in Condition Report 2008-05325.

The inspectors requested to review the corrective actions for the 2008 violation in a letter dated January 12, 2012 (Fort Calhoun Station - Notification of NRC Triennial Fire Protection Baseline Inspection (05000285/2012007) and Request for Information, (ML120130238). The licensee subsequently implemented revisions to Procedures AOP-06-01 and AOP-06-02 to direct operators to remove power to these valves if a fire occurred in an area of concern without relying on operators having to diagnose if a valve had spuriously opened. Because the licensee revised the procedures just prior to the inspection on March 24, 2012, the inspectors considered the corrective actions untimely.

Analysis. The failure to take timely corrective action to address inadequate procedure guidance to safely shutdown the plant following a fire was a performance deficiency. The performance deficiency was more than minor because it was associated with the reactor safety mitigating systems cornerstone attribute for protection against external events (fire), and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." During the Phase 1 evaluation, the inspectors determined that this deficiency affected the ability to implement the post-fire safe shutdown response. Because of the design of the vent system valves (i.e., three spurious actuations needed to exceed charging pump capability), availability of reliable reactor coolant system pressure and pressurizer level indications in the control room, and the ability of operator to compensate for the deficiency because of their experience and familiarity, the inspectors assigned this finding a low degradation rating. As specified in Appendix F, Step 1.3, this finding had very low safety significance (Green).

This finding had a cross-cutting aspect in the area of human performance associated with decision making because the licensee failed to use a systematic process to correct fire protection procedure deficiencies in response to a violation in 2008 [H.1(a)].

Enforcement. License Condition 3.D specifies that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in



the Updated Safety Analysis Report for the facility and as approved in the SERs dated February 14, and August 23, 1978, November 17, 1980, April 8, and August 12, 1982, July 3, and November 5, 1985, July 1, 1986, December 20, 1988, November 14, 1990, March 17, 1993 and January 14, 1994.

The Updated Safety Analysis Report, Section 9.11.1, specifies that the design basis of the fire protection systems includes commitment to APCS 9.5 1, Appendix A, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." Fire Hazards Analysis Manual, Appendix A, "Comparison Matrix Guidelines of Appendix A to APCS 9.5-1, 'Overall Requirements of Nuclear Plant Fire Protection Program,'" Section C.8 specifies that the licensee will use, in part, Quality Assurance Plan, Section 10.4. Quality Assurance Plan, Section 10.4, Step 4.1.1, requires that the licensee correct conditions adverse to quality as soon as practicable based upon their safety significance.

Contrary to the above, from September 24, 2008 until March 24, 2012, the licensee failed to correct conditions adverse to quality as soon as practicable based upon their safety significance. Specifically, the licensee failed to implement corrective actions to address Non-cited Violation 05000285/2008009-02 by failing to revise procedures to assure the required actions could be reliably performed. The licensee documented this deficiency in Condition Report 2012-01703. Because this finding is of very low safety significance and has been entered into the corrective action program, this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000285/2012007-05, Untimely corrective actions related to revising a post-fire safe shutdown procedure.

#### 40A6 Meetings, Including Exit

##### Exit Meeting Summary

The inspectors presented the inspection results to Mr. D. Bannister, Vice President and Chief Nuclear Officer and other members of the licensee staff at an debrief meeting on April 13, 2012. The licensee acknowledged the findings presented.

Following additional in-office review, an exit meeting was conducted on May 17, 2012, with Mr. J. Herman, Division Manager, Nuclear Engineering, and other members of your staff.

The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

R. Acker, Licensing Engineer  
D. Bannister, Site Vice President and Chief Nuclear Officer  
S. Baughn, Manager - Nuclear Licensing  
S. Benham, Control Room Supervisor  
B. Blome, Manager - Quality  
C. Cameron, Supervisor - Regulatory Compliance  
K. Daughenbaugh, Control Room Supervisor  
K. Erdman, Supervisor - Engineering Programs  
W. Goodell, Division Manager - Nuclear Performance Improvement and Support  
A. Hedges, Equipment Operator  
J. Herman, Division Manager- Engineering  
R. Hugenroth, Nuclear Safety Review Group/Quality Assurance  
W. Kropp, Recovery Inspectors Lead  
C. Kuchta, Equipment Operator  
B. Linden, Equipment Operator  
J. McManis, Manager Projects - Recovery OPPD  
A. Meusch, Engineering Programs - Co-op  
D. Nemecek, Equipment Operator  
F. De Peralta, TRI-EN Corporation, Fire Protection  
M. Prospero, Plant Manager  
R. Reno, Manager - Operations Support  
R. Ricks, Control Room Supervisor  
G. Riva, Fire Protection System Engineer  
J. Roche, Equipment Operator  
K. Root, ENP Recovery Inspectors  
R. Rybak, ENP recovery Inspectors  
R. Salazar, TRI-EN Corporation, Fire Protection  
R. Short, Manager - Recovery OPPD  
R. Swerczek, Fire Protection Program Engineer

#### **NRC Personnel**

John Kirkland, Senior Resident Inspector

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

- 05000285/2012007-01 VIO Failure to Provide Adequate Post-Fire Safe Shutdown Actions in the Switchgear Rooms (Section 1R05.01.b)
- 05000285/2012007-02 VIO Failure to Maintain Command and Control Function During Fire Fighting Activities in the Protected Area (Section 1R05.03.b)

### Opened and Closed

- 05000285/2012007-03 NCV Alternate Shutdown Procedure Does Not Account for Single Worst Case Spurious Actuations (Section 1R05.05.b.1)
- 05000285/2012007-04 NCV Failure to Provide Adequate Alternate Shutdown Capability (Section 1R05.05.b.2)
- 05000285/2012007-05 NCV Untimely Corrective Actions Related to Revising a Post-Fire Safe Shutdown Procedure (Section 4OA2.b)

## LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CR	Condition Report
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
FPIP	Fire Protection Impairment Permits
NCV	Non-cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PAR	Publicly Available Records
SDP	Significance Determination Process

## LIST OF DOCUMENTS REVIEWED

### B.5.b MITIGATION STRATEGIES

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OCAG-1	Operational Contingency Action Guideline	17
OCAG-1	Operational Contingency Action Guideline	20

COMPONENT CABLE ROUTING DATA

HCV-150, HCV-151 – PORV Block Valves  
PCV-102-1, PCV-102-2 – Power Operated Relief Valves  
LCV-383-1, LCV-383-2 - SIRWT Outlet Valves

CALCULATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EA-91-084	Breaker/Fuse Coordination Study	11
EA-FC-89-055	Emergency Lighting Verification	17
EA-FC-89-055	Fort Calhoun Safe Shutdown Analysis	17
EA-FC-89-055	Attachment 7 Communications Systems Evaluation	17
EA-FC-97-043	Fire Safe Shutdown for Control Room Evacuation Design Basis Analysis	2
EA-FC-97-044	10 CFR 50 Appendix R Cable Identification	10
EA-FC-98-022	Plant Specific Analysis to Support 10CFR50 Appendix R Transient Analysis for Fort Calhoun Station	2
EA-FC-06-008	Engineered Safety Features Actuation System (ESFAS) Fire-Induced Failure Evaluation	0
FC05690	Loads Calculation (In Amps) For Dc Bus #1 (EE-8F)	8
FCO6355	10 CFR 50 Appendix R Functional Requirements and Component Selection	14
FC06766	B.5.b Phase 2 and 3 Mitigation Strategies – Water Flow and Hose Capacities	3

CONDITION REPORTS

2008-05319	2008-05325	2010-03383	2010-03418	2010-04677
2010-06891	2011-00759	2011-00964	2011-01007	2011-05992
2011-06266	2011-06418	2011-07356	2011-07621	2011-07624
2011-07951	2011-08213	2011-08274	2011-08275	2011-08528
2011-08600	2011-08672	2011-09009	2011-09219	2011-09531
2011-09798	2012-01421	2012-01459	2012-01506	2012-01507
2012-01511	2012-01549	2012-01603	2012-01613	2012-01630
2012-01649	2012-01656	2012-01667	2012-01680	2012-01684
2012-01691	2012-01692	2012-01703	2012-01794	2012-01795
2012-01854	2012-01869	2012-01883	2012-01887	2012-01889
2012-01893	2012-01949	2012-01954	2012-01955	2012-01962
2012-01963	2012-01976	2012-01982	2012-01983	2012-01984
2012-01985	2012-01986	2012-01987	2012-01989	2012-01990

CONDITION REPORTS

2012-01991	2012-02000	2012-02032	2012-02034	2012-02035
2012-02045	2012-02050	2012-02053	2012-02063	2012-02068
2012-02069	2012-02126	2012-02138	2012-02150	2012-02177
2012-02181	2012-02185	2012-02187	2012-02190	2012-02191
2012-02192	2012-02194	2012-02195	2012-02196	2012-02197
2012-02198	2012-02199	2012-02201	2012-02213	2012-02213
2012-02222	2012-02224	2012-02225	2012-02226	2012-02229
2012-02231	2012-02232	2012-02233	2012-02235	2012-02236
2012-02239	2012-02244	2012-02245	2012-02246	2012-02247
2012-02255	2012-02256	2012-02270	2012-02271	2012-02274
2012-02276	2012-02309*	2012-02338*	2012-02386*	2012-02390*
2012-02401*	2012-02404*	2012-02406*	2012-02407*	2012-02410*
2012-02417*	2012-02431*	2012-02436*	2012-02467*	2012-02573*
2012-02575*	2012-02576*	2012-02578*	2012-02579*	2012-02581*
2012-02583*	2012-02640*	2012-02680*	2012-02682*	2012-02692*
2012-02748*	2012-02750*	2012-02781*	2012-02793*	2012-02795*
2012-02798*	2012-02838*	2012-02839*	2012-02839*	2012-02842*
2012-03214*	2012-03238*	2012-03239*		

\*CR initiated due to NRC inspection activities.

DESIGN BASIS DOCUMENTS (DBD)

<u>Number</u>	<u>Title</u>	<u>Revision</u>
SDBD-SI-LP-133	Low Pressure Safety Injection System	30
SDBD-RC-128	Reactor Coolant	34
TBD-OCAG-1	Technical Basis Document – Operational Contingency Action Guide 1	1

DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
B-4063	Switchgear Room and Room 81 Halon/Smoke Damper Information	8
B-4250	Cable Block Diagram PCV-102-2	1
B-4250, Sheet 31	Cable Block Diagram HCV-151	2
B-4250, Sheet 149	Cable Block Diagram LCV-383-1	3
B-4250, Sheet 151	Cable Block Diagram LCV-383-2	3
B-4250, Sheet 190	Cable Block Diagram PCV-102-1	1
B-4280, Sheet 1	Elementary Diagram Limit Switch & 43/SW. Contact Development	2

## DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
D-4094, Sheet 1	Fire Detection System Ground Floor Plan	8
D-4094, Sheet 2	Fire Detection System Basement Floor Plan Elevation 995'-6"	5
D-4094, Sheet 3	Fire Detection System Auxiliary Building and Containment Elevation 1025'-0"	6
D-4094, Sheet 4	Fire Detection System Operating Floor Plan Elevation 1036'-0"	13
D-4094, Sheet 5	Fire Detection System Turbine Building Elevation 990'-0"	4
D-4094, Sheet 6	Fire Detection System Turbine Building Elevation 1011'-0"	5
D-4094, Sheet 7	Fire Detection System Turbine Building Elevation 1036'-0"	3
D-4098, Sheet 1	Auxiliary Building Fire Areas Operating Level	2
D-4098, Sheet 2	Auxiliary Building Fire Areas Ground Level	6
D-4098, Sheet 3	Auxiliary Building Fire Areas Basement Level	1
D-4098, Sheet 4	Auxiliary Building Fire Areas Intermediate Level	3
D-4159	Schematic Diagram Solenoid Operated Valves	7
D-4324, Sheet 1	Wiring Diagram QSPDS Panel AI-208A	5
D-4324, Sheet 3 of 4	Wiring Diagram QSPDS Panel AI-208B	6
D-4364, Sheet 1	Radiant Energy Shields, Sheet 1	2
D-4364, Sheet 2	Radiant Energy Shields, Sheet 2	2
D-4409	13.8 KV One – Line Diagram P & ID	26
D-4547	Radiant Energy Shields For HCV-249	2
D-4575, Sheet 1	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	1
D-4575, Sheet 2	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 3	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 4	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 5	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 6	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric	0

DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Drawing	
D-4575, Sheet 7	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 8	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 9	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 10	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 11	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4575, Sheet 12	Supply Piping For Diesel Generator Room Dry-Pipe Sprinkler System Seismic Support Location Isometric Drawing	0
D-4666	DG-2 Diesel Generator One Line Diagram P & ID	6
D-4665	DG- Diesel Generator One Line Diagram P & ID	6
D-4769 Sheet 1	Emergency Lighting Ground Floor Plan For Fire Safe Shutdown	1
D-4769 Sheet 2	Emergency Lighting Ground Floor Plan For Fire Safe Shutdown	2
D-4769 Sheet 3	Emergency Lighting Ground Floor Plan For Fire Safe Shutdown	2
D-4769 Sheet 4	Emergency Lighting Ground Floor Plan For Fire Safe Shutdown	1
D-4769 Sheet 5	Emergency Lighting Ground Floor Plan For Fire Safe Shutdown	1
E-4228 Sheet 1	Communication Equipment Layout Elevations 989' and 990'	0
E-4228 Sheet 2	Communications Equipment Layout Elevation 1007', 1011', and 1019'	0
E-4228 Sheet 3	Communication Equipment Layout Elevation 1025', 1036', and 1045'	0
E-4228 Sheet 4	Communication Equipment Layout For Radwaste, CARP, TSC, and Maintenance Buildings	0
E-4228 Sheet 5	Communication Equipment Layout For Intake Structure, New Warehouse, Security Building and Training Center	2
E-4228 Sheet 6	Communication Equipment Layout For Administration	0

DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Building and Old Warehouse	
E-4228 Sheet 7	Communication Equipment Layout For Outdoors	1
FS 77-655 Sheet 2	Automatic Switch Company Buletin 905 – 908 Automatic Transfer Switch	July 31, 1961
GE 177B2371, Sheet 441	Motor Control Center 4A1 Unit C05	1
GHDR 11405-E-73, Sheet 2	Switchgear Diesel Generator & Electrical Penetration Area Tray & Conduit Layout Plan Elevation 1011'-0" & 1013'-0"	28
GHDR 11405-E-73, Sheet 3	Switchgear Diesel Generator & Electrical Penetration Area Tray & Conduit Layout Plan Elevation 1011'-0" & 1013'-0"	20
GHDR 11405-E-30, Sheet 6	Stored Energy System & Miscellaneous Systems S.C. & I.	21
2C6288	Fort Calhoun Station D.C. Distribution Schematic EE-8F (Cuttler-Hammer Drawing)	November 29, 1994
2C6289	Fort Calhoun Station D.C. Distribution Schematic EE-8G (Cuttler-Hammer Drawing)	November 29, 1994
3-368, Sheet 1	Halon System For Switchgear Room	6
3-368, Sheet 2	Halon System For Switchgear Room	6
8-4250, Sheet 30	Cable Block Diagram HCV-150	2
117C3250	Switches-AI-30A, AI-30B	2
136B2431, Sheet 70	Elementary Diagram Electrical Control Valves & Pumps	20
136B2431, Sheet 80	Elementary Diagram Electrical Control Valves & Pumps	20
136B2431, Sheet 92	Elementary Diagram Electrical Control Valves & Pumps	21
136B2431, Sheet 93	Elementary Diagram Electrical Control Valves & Pumps	22
136B2432, Sheet 9	Elementary Diagram Switch Development	1
136B2432, Sheet 50	Elementary Diagram Switch Developments	18
136B2432, Sheet 51	Elementary Diagram Switch Developments	21
136B3219, Sheet 30	Elementary Diagram Electrical Control Valves & Pumps	10
136B3219, Sheet 31	Elementary Diagram Electrical Control Valves & Pumps	10
161F570	Connection Diagram, Panel CB-1.2.3, SH NO 15	65
161F570	Connection Diagram, Panel CB-1.2.3, SH NO 23	79
161F598, Sheet 6	Elementary Diagram AI-30B	19
161F598, Sheet 7	Elementary Diagram AI-30B	13
11405-A-6	Primary Plant Ground Floor Plan P & ID	87
11405-E-1	Main Oneline Diagram P & ID	49
11405-E-3	4.16 KV Auxiliary Power One Line Diagram P & ID	23
11405-E-4, Sheet 1	480 Volt Auxiliary Power One Line Diagram P & ID	31



## DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
11405-E-5, Sheet 2	480 Volt Auxiliary Power One Line Diagram P & ID	66
11405-E-6, Sheet 1	480 Volt Primary Plant Motor Control Center One Line Diagram P & ID	78
11405-E-7 Sheet 2B	480 Volt Primary Plant Motor Control Center One Line Diagram P & ID	30
11405-E-8 Sheet 1	125 Volt DC Miscellaneous Power Distribution Diagram P & ID	62
11405-E-9 Sheet 1	120 Volt AC Instrument Buses One Line Diagrams P & ID	47
11405-E-9 Sheet 2	120 Volt AC Instrument Buses One Line Diagrams P & ID	18
11405-E-9 Sheet 3	120 Volt AC Instrument Buses One Line Diagrams P & ID	35
11405-E-9 Sheet 4	120 volt instrument bus 3 one line diagram P & ID	7
11405-E-10 Sheet 1	480/120/208 Vac Miscellaneous Power Distribution Diagram (Primary Plant) P & ID	45
11405-E-32, Sheet 2	Pressurizer & Reactor Coolant System, I&C MOV Elementary Terminal Block	25
11405-E-42, Sheet 9	Safety Injection and Chemical Volume Control Systems Schematic Control & Instrumentation	22
11405-E-51, Sheet 3	Pressurizer RC-4, Relief Isolation Valves HCV-150 & HCV-151 Schematic Diagram	33
11405-E-67, Sheet 6	Cable Tray Sections	3
11405-E-72	Air Compressor Bay & Electrical Penetration Area Tray & Conduit Layout Plan Elevation 989'-0"	23
11405-E-76	Switchgear Diesel Generator Electrical Penetration Area & Containment Building Penetr. Outside – Section & Details SHEET*2	61
11405-E-78, Sheet 2	Cable Room Tray & Conduit Layout Plan Elevation 1025'-0"	33
11405-E-92, Sheet 2	Containment Building Tray & Conduit Layout Plan Elevation 994'-0"	4
11405-E-93, Sheet 2	Containment Building Tray & Conduit Layout Plan Elev. 1013'-0"	13
11405-E-98	Containment Building Penetrations Inside	26
11405-E-120 Sheet 6	LP-5 Panel Schedule	11
11405-E-120 Sheet 61	ELP-1 Panel Schedule	3
11405-E-120 Sheet 62	ELP-2 Panel Schedule	5
11405-E-253, Sheet	Secondary Plant 480 Volt Motor Control Center One	68

## DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
1	Line Diagram P & ID	
11405-E-254	Secondary Plant 480 Volt Motor Control Center One Line Diagram P & ID	84
11405-E-308	Turbine Room Lighting Plan Elevation 1011'-0" AND 1023'-6"	33
11405-E-348 Sheet 1	345 And 161 KV Switchyard Junction Cabinet "1E" and Kirk Interlock Diagrams	13
11405-M-253, Sheet 1	Composite Flow Diagram Steam Generator Feedwater and Blowdown	48
11405-M-253, Sheet 3	Composite Flow Diagram Steam Generator Feedwater and Blowdown	48
11405-M-253, Sheet 4	Composite Flow Diagram Steam Generator Feedwater and Blowdown	39
11405-M-254, Sheet 4	Flow Diagram Condensate	30
11405-M-266, Sheet 1	Fire Protection Flow Diagram P&ID	90
11405-M-266, Sheet 1A	Fire Protection Flow Diagram P&ID	28
11405-M-266, Sheet 1B	Fire Protection Flow Diagram P&ID	29
11405-M-266, Sheet 10	Halon Piping System Switchgear Room, Cable Spread Room, Control Room & Q.A. Vault	2
FIG 8.1-1	Simplified One Line Diagram Plant Electrical System P & ID	142

### Drawing Markups to Show Post-Fire Safe Shutdown Equipment

#### Drawing Markups to Show Post-Fire Safe Shutdown Equipment

<u>Number</u>	<u>Title</u>
11405-E-8, Sheet 1	125 Vdc Miscellaneous Power Distribution Diagram
11405-E-9, Sheet 2	120 Vac Instrument Buses One Line Diagram
11405-M-10, Sheet 1	Flow Diagram Auxiliary Coolant Component Cooling System
11405-M-10, Sheet 3	Flow Diagram Auxiliary Coolant Component Cooling System
11405-M-10, Sheet 4	Flow Diagram Auxiliary Coolant Component Cooling System
11405-M-40, Sheet 1	Flow Diagram Auxiliary Coolant Component Cooling System
11405-M-100	Flow Diagram Raw Water
11405-M-252, Sheet 1	Flow Diagram Steam
11405-M-253, Sheet 1	Flow Diagram Steam Generator Feedwater and Blowdown
11405-M-253, Sheet 3	Flow Diagram Steam Generator Feedwater and Blowdown

### Drawing Markups to Show Post-Fire Safe Shutdown Equipment

<u>Number</u>	<u>Title</u>
11405-M-253, Sheet 4	Flow Diagram Steam Generator Feedwater and Blowdown
11405-M-254, Sheet 2	Flow Diagram Condensate
11405-M-254, Sheet 4	Flow Diagram Condensate
11405-M-262, Sheet 1	Flow Diagram Fuel Oil
11405-M-266, Sheet 1	Flow Diagram Fire Protection
11405-M-266, Sheet 1A	Flow Diagram Fire Protection
11405-M-266, Sheet 1B	Flow Diagram Fire Protection
D-4078	Flow Diagram Reactor Coolant Gas Vent System
E-23866-210-110, Sheet 1	Flow Diagram Reactor Coolant System
E-23866-210-110, Sheet 1A	Flow Diagram Reactor Coolant System
E-23866-210-120, Sheet 1	Flow Diagram Chemical and Volume Control System
E-23866-210-120, Sheet 1A	Flow Diagram Chemical and Volume Control System
E-23866-210-121, Sheet 1	Flow Diagram Chemical and Volume Control System
E-23866-210-121, Sheet 2	Flow Diagram Chemical and Volume Control System
E-23866-210-130, Sheet 1	Flow Diagram Safety Injection and Containment Spray System
E-23866-210-130, Sheet 2	Flow Diagram Safety Injection and Containment Spray System
E-23866-210-130, Sheet 2A	Flow Diagram Safety Injection and Containment Spray System
E-23866-210-130, Sheet 2B	Flow Diagram Safety Injection and Containment Spray System
E-23866-210-130, Sheet 3	Flow Diagram Safety Injection and Containment Spray System

### ENGINEERING ANALYSIS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
EA 93-033	Evaluation of Fire Barriers to GL 92-08 and Evaluation of Miscellaneous Fire Barriers	4
EA 97-001	Fire Hazards Analysis (FHA) Manual	16
EA-FC-93-047	Halon System Operability Evaluation	4
EA-FC-95-022	NFPA Code Compliance	4
EA-FC-01-013	Effects of Secondary Environment Resulting From a Fire Event	0
EAR 94-132	Evaluate Halon Enclosure Test Results	November 30, 1994

### FIRE IMPAIRMENTS

2006016            2010226            2919236

## PROCEDURES

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
AOP-06	Fire Emergency	May 16, 2011
AOP-06-01	Fire Emergency Auxiliary Building Radiation Controlled Areas and Containment	May 23, 2008
AOP-06-02	Fire Emergency Uncontrolled Areas of Auxiliary Building	January 19, 2012
AOP-06-03	Fire Emergency Miscellaneous Areas	1
EOP/AOP Attachment 2	Reactor Coolant System Pressure – Temperature Limits for 40 Effective Full Power Years	32
EOP/AOP Attachment 6	Minimizing Direct Current Loads	32
EM-ST-EE-0011	Annual Testing Of Emergency Lighting Panels	9
EM-ST-EE-0014	Battery Powered Emergency Lighting Discharge Performance Test (8-Hour)	5
EM-ST-FP-0011	Visual Inspection of Fire Detection Zone Eleven	13
EM-ST-FP-0012	Inspection and Functional Test Of Fire Detection Zone Twelve	12
EM-ST-FP-0013	Calibration and Functional Test Of Auxiliary Building, Elevation 1025' Fire Detection	11
EM-ST-FP-0017	Inspection of Fire Detection Zone Seventeen	13
EM-ST-FP-0018	Inspection of Fire Detection Zone Eighteen	13
EM-ST-FP-0021	Inspection of Fire Detection Zone Twenty-One	10
EM-ST-FP-0022	Calibration and Functional Test of Containment Purge Discharge Fans (VA-32A/VA-32B) and Supply Fans (VA-24A/VA-24B) Fire Detectors	14
EM-ST-FP-0035	Calibration and Functional Test of Auxiliary Building, DG-2 (Room 64) Fire Detectors	11
EM-ST-FP-0036	Calibration and Functional Test of Auxiliary Building, DG-1 (Room 63) Fire Detectors	13
EM-ST-FP-0043	Calibration and Functional Test of Switchgear Room Halon Fire Detection Zones Five and Six	12
EM-ST-FP-0044	Calibration and Functional Test of Switchgear Room Halon Fire Detection Zones Seven and Eight	11
GM-RR-FP-0502	Firedoor Replacement	8
GM-ST-FP-0005	Semi-Annual Switchgear Rooms Halon Cylinders Weight and Pressure Test	21
MM-RR-FP-1006A	Application of Carbolite Company "Pyrocrete 241" Fireproofing	0
OP-ST-FP-0003	Fire Protection System Diesel Generator Rooms Sprinkler Functional Test	15
PE-RR-FP-0400	Resetting of Dry Pipe Deluge Valve, FP-513	9

## PROCEDURES

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
PE-ST-FP-0001	Fire Protection System Halon System Air Flow Test	11
SE-ST-FP-0002	Fire Protection System Motor Driven Fire Pump Full Flow Test	19, 20 & 21
SE-ST-FP-0003	Fire Protection System Diesel Driven Fire Pump Full Flow Test	22, 24 & 25
SE-ST-FP-0005	Fire Barrier and Penetration Seals Eighteen Month Inspection	15
SE-ST-FP-0011	Fire Barrier and Penetration Seals Outage Inspection	2
SO-G-28	Station Fire Plan	82
SO-O-41	Control of Operator Aids and Emergency Equipment	130
SO-G-58	Control of Fire Protection System Impairments	37
SO-G-91	Control and Transportation of Combustible Materials	27
SO-G-102	Fire Protection Program Plan	11
SO-G-103	Fire Protection Operability and Surveillance Requirements	25

## MISCELLANEOUS DOCUMENTS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
FBTPMP	Fire Brigade Training Program Master Plan	18
FHA-EA97-001	Fire Hazards Analysis (FHA) Manual	16
Figure 8.1-1	Marked Up Simplified One Line Diagram That Demonstrates the Electrical Configuration After Implementing the Alternate Shutdown Procedure	
Lesson Plan AOP-06	Emergency Fire Procedure	19
Lesson Plan 1061-01	Incident Command	
Lesson Plan 1064-11	Live Fire Practical	
LIC-84-411	Letter from R. L. Andrews (OPPD) to J. R. Miller (NRC)	December 3, 1984
LIC-85-037	Letter from R. L. Andrews (OPPD) to J. R. Miller (NRC)	March 8, 1985
LIC-86-118	Letter from R. L. Andrews (OPPD) to A. C. Thadani (NRC)	April 9, 1986
LIC-11-0099	License Amendment Request 10-07, Proposed Changes to Adopt NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition) at Fort Calhoun	September 28, 2011
NFPA 600	Standard on Industrial Fire Brigades	1992
NOD-QP-34	Ongoing Commitment Program (Evaluation For Not Moving Spent Fuel Into The Preferred Pattern Within 60-Days)	June 9, 2011

## MISCELLANEOUS DOCUMENTS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
NOD-QP-34	Ongoing Commitment Program (Evaluation For Moving Fire Truck And Trailer Mounted Pump Inside Protected Area)	June 9, 2011
NRC-85-0200	Letter from E. J. Butcher (NRC) to R. L. Andrews (OPPD)	July 3, 1985
NRC-86-0211	Letter from D. E. Sells (NRC) to R. L. Andrews (OPPD)	July 1, 1986
OE 2009-2418	IN09-29 Potential Failure of Fire Water Supply Pumps To Automatically Start Due To A Fire	December 1, 2009
PED-ESS-15	Electrical Standard Specification Stores Switchboard Wire/Cable Specification	4
Procedure Change Request EC 53257	For AOP-06, Fire Emergency, Revision 25	
QAP-10.4	Condition Reporting and Corrective Action	9
RA 2011-1290	Request For Training	October 28, 2011
RA 2011-1398	Request For Training	November 22, 2011
RA 2011-1419	Request For Training	November 23, 2011
RA 2012-0147	Request For Training	January 24, 2012
R11AD606	Fort Calhoun Systems Training Material, AOP-06 Fire Emergency	
System Training Manual Vol. 17	Emergency Lighting Systems	2
System Training Manual, Volume 21	Fire Protection System	29
TD G080.2400	Time-Current Curves For General Electric Molded Case Circuit Breaker E-100 Line Type TE, 10-100 Amperes (GES-6107C)	March 1, 1989
TD G080.2350	Renewal Parts For Panelboards Types NAB, NHB STYLE 3 (GEG-13611C)	March 1, 1989
07-0038	Lessons Learned on Multiple Spurious Operations	3
	Fire Protection Program Review Report	0

## MODIFICATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EC41428	Replace Charger For Room 81 Appendix R Emergency Lights	0

### System Training Manuals

<u>Number</u>	<u>Title</u>	<u>Revision</u>
Volume 2	Alternate Shutdown System	21
Volume 4	Auxiliary Feedwater System	48
Volume 12	Chemical and Volume Control System	45
Volume 21	Fire Protection	21

### TECHNICAL BASIS DOCUMENTS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
TBD-AOP-06	Fire Emergency	25
TBD-AOP-06-01	Fire Emergency Auxiliary Building Radiation Controlled Areas and Containment	2
TBD-AOP-06-02	Fire Emergency Uncontrolled Areas of Auxiliary Building	3
TBD-OCAG-1	Technical Basis Document – Operational Contingency Action Guide 1	1

### VENDOR MANUALS

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
TD C84.0070	Engineering Data for Crane Valves	1
TD A180.0050	Operation & Maintenance Instructions & Parts List for Allis-Chalmers Streamseal Butterfly Valves	3
TD C684.0020	Crane Steel Valve Installation & Maintenance Manual	1
TD A391.0090	Operating and Maintenance Manual for Anchor/Darling 20" Butterfly Valves with GH-Bettis T-316 SR Operator	0
TD A391.0310	Instruction Manual for Anchor Darling (Flowserve) Butterfly Valves	0
TD D243.0090	Instruction Manual for Installation and Maintenance of Consolidated Electromagnetic Relief Valve Type 31533VX-30 with Bellows	4
TD C684.0100	Condensed Valve Catalog for Older Model Crane Valves	0
TD T960.0020	Training Guide For Teledyne Big Beam S6 Series Seismic Rated Emergency Lights	January 23, 1998
TD T960.0030	Instructions For Teledyne Big Beam High Temperature Slide Out Charger Assembly	December 30, 2008

**WORK ORDERS**

00406926 01	00381962 01	00390794 01	00416235 01	00423873 01
00381066 01	00360701 01	00414364 01	00367228 01	00381961 01
00367230 01	00367231 01	00367233 01	00393485 01	00384431 01
00384432 01	00282634 01	00424910 01	00396921 01	00364699 01
00335617 01	00400199 01	00368409 01	00337901 01	00362753 01
00391282 01	00413473-01	00420801-01		