



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
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ARLINGTON, TEXAS 76011-4125

September 24, 2008

D. J. Bannister
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 TRIENNIAL FIRE PROTECTION
INSPECTION REPORT 05000285/2008009

Dear Mr. Bannister:

On August 15, 2008, the Nuclear Regulatory Commission (NRC) completed a fire protection program inspection at your Fort Calhoun Station. The enclosed report documents the inspection findings, which the team discussed on August 15, 2008, with you and other members of your staff.

During this triennial fire protection inspection, the inspection team examined activities conducted under your license related to safety and compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of selected examination of procedures and records, observations of activities and installed plant systems, and interviews with personnel.

Based on the results of this inspection, the NRC has identified two violations of your approved fire protection program related to inadequate corrective actions that were evaluated under the risk significance determination process as having very low safety significance (Green). These violations are being treated as noncited violations consistent with Section VI.A of the Enforcement Policy, as described in the subject inspection report. In addition, one licensee-identified violation that had very low safety significance is listed in this report. If you contest these noncited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, 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 DC 20555 0001; and the NRC Resident Inspector at the Fort Calhoun Station.

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Sincerely,

/RA/

Neil O'Keefe, Chief
Engineering Branch 2
Division of Reactor Safety

Docket: 50-285
License: DPR-40

Enclosure:
NRC Inspection Report 05000285/2008009
w/Attachment: Supplemental Information

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ENCLOSURE

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

Docket: 50-285

License: DPR-40

Report: 05000285/2008009

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: July 28 through August 15, 2008

Team Leader: G. Pick, Senior Reactor Inspector, Engineering Branch 2

Inspectors: J. Mateychick, Senior Reactor Inspector, Engineering Branch 2
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Accompanying Personnel: K. Sullivan, Consultant, Brookhaven National Laboratory

Approved By: Neil O'Keefe, Chief
Engineering Branch 2
Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000285/2008009; 07/28 - 08/15/2008; Omaha Public Power District; Fort Calhoun Station; Fire Protection (Triennial); Problem Identification and Resolution

The NRC conducted an inspection with a team of three region-based reactor inspectors and one contractor. The inspection identified two Green noncited violations. The significance of most findings is indicated by their color (Green, White, Yellow, 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 and Self Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a noncited violation of License Condition 2.D and the Quality Assurance Plan for failure to implement timely corrective actions to address a degraded fire water supply system. Despite determining that the system was degraded and taking compensatory actions to assure the system remained functional in 2006, the licensee failed to correct the condition prior to completing the next outage. Using the guidance of Regulatory Issue Summary 2005-20, Revision 1, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," the team determined the corrective actions were untimely and subject to enforcement. The fire water supply system piping continued to degrade because of corrosion. The licensee documented this deficiency in Condition Report 200805319.

The failure to correct the degraded fire water supply system in a timely manner was a performance deficiency. This deficiency was more than minor because if left uncorrected the finding would become a more significant safety concern, as a result of ongoing corrosion. The team evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." Because the fire water supply system met its design functions so long as both pumps and all pipe segments remained in service and the licensee established appropriate compensatory measures, the team 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 has a crosscutting aspect in the area of human performance, specifically the resources attribute (H.2(a)), in that the licensee failed to promptly correct degraded fire water supply system and minimize the longstanding condition.

- Green. The team identified a noncited violation of License Condition 2.D and the Quality Assurance Plan for failure to take adequate corrective action for a condition adverse to fire protection. Specifically, the licensee had included steps to open the breakers for the reactor coolant gas vent system valves in response to Noncited Violation 05000285/2005008-07; however, the licensee failed to identify, proceduralize and train operators to identify the instruments needed to implement this action. Spurious actuation of the valves because of fire damage could result in uncontrolled loss of reactor coolant inventory. The licensee documented this deficiency in Condition Report 200805325.

The failure to ensure that procedure steps instructed operators how to recognize the need to close spuriously opened reactor coolant gas system vent valves was a performance deficiency. This deficiency was more than minor in that it had the potential to affect the procedure quality attribute of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (fire). The team evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." Because of the design of the vent system valves (i.e., three spurious actuations needed to exceed charging pump capability), the 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 training, the team 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 has a crosscutting aspect in the area of human performance, specifically the resources attribute (H.2(c)), in that the licensee failed to ensure that operators had complete, accurate and up-to-date procedures providing sufficient guidance to correct spurious reactor coolant gas vent system valve operation.

B. Licensee-Identified Violations

A violation of very low safety significance, identified by the licensee, was reviewed by the team. The team verified that the licensee entered into their corrective action program actions needed to address the violation. The violation and corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

1 REACTOR SAFETY

1R05 Fire Protection

The team evaluated the fire protection program for the Fort Calhoun Station in selected risk significant areas. The team emphasized verifying the ability of the licensee to maintain post-fire safe shutdown capability. The team used a risk-informed approach for selecting the fire areas and the attributes for inspection in accordance with the NRC regulatory oversight process. The risk informed approach taken relied on the risk rankings of fire areas in the Fort Calhoun Station external events fire probabilistic safety analysis, potential ignition sources, configuration/characteristics of combustible materials and fire fighting capability, combined with considerations related to the number of manual actions required for a fire in each fire area.

On June 9, 2008, the licensee committed to transition to a risk informed performance based fire protection program in accordance with 10 CFR 50.48(c). The licensee specified their intent in Letter LIC-08-0069, "Letter of Intent to Adopt NFPA 805, 'Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants,' 2001 Edition." The team performed the inspection in accordance with Inspection Procedure 71111.05TTP, "Fire Protection – NFPA 805 Transition Period (Triennial)." The team selected the following risk significant fire areas for detailed inspection and review:

- Fire Area 6, Auxiliary Building Personnel Corridor 4
- Fire Area 10, Charging Pump Room
- Fire Area 34B, Upper Electrical Penetration Room
- Fire Area 36A, East Switchgear Room

For each of these fire areas, the team focused on fire protection features, systems and equipment necessary to achieve and maintain post-fire safe shutdown conditions and related licensing basis commitments. The team completed four inspection samples.

The team reviewed the documents listed in the attachment.

.1 Shutdown From Outside The Main Control Room

a. Inspection Scope

In the event of fire in the main control room (Fire Area 42) or the cable spreading room (Fire Area 41), operators may have to abandon the main control room and implement an alternative shutdown capability. As part of this inspection, the team reviewed licensee documentation describing the methodology for achieving and maintaining post-fire safe shutdown conditions from outside the main control room. The principal sources of this information included:

- Updated Safety Analysis Report, Section 9.11, "Fire Protection System," Revision 17;
- Engineering Analysis EA-FC-89-055, "10 CFR 50 Appendix R Safe Shutdown Analysis," Revision 13;
- Engineering Analysis EA-FC-97-001, "Fire Hazards Analysis (FHA) Manual," Revision 14;
- Engineering Analysis EA-FC-97-043, "Fire Safe Shutdown for Control Room Evacuation Design Basis Analysis," Revision 1;
- Engineering Analysis EA-FC-98-022, "Plant Specific Analysis to Support 10 CFR 50, Appendix R, Transient Analysis for FCS," Revision 2; and
- Calculation FC06355, "10 CFR 50, Appendix R, Functional Requirements and Component Selection," Revision 13.

The team verified that the credited method for accomplishing required post-fire safe shutdown functions would remain available in the event of a fire. The objectives of this evaluation were to:

- a) Verify that the post-fire safe shutdown methodology correctly identified the components and systems necessary to achieve and maintain a post-fire safe shutdown condition; and
- b) Verify that operators can achieve and maintain post-fire safe shutdown with or without the availability of off site power.

To assure the licensee had properly identified the components and systems necessary to achieve and maintain post-fire safe shutdown conditions, the team reviewed piping and instrumentation diagrams and compared the components in the flow paths to the list of post-fire safe shutdown equipment documented in the post-fire safe shutdown analysis and the referenced supporting calculations. In addition, the team reviewed plant drawings, operating procedures, operator lesson plans, and other relevant documents to verify the flow paths and operational characteristics of systems relied on to accomplish required post-fire safe shutdown functions. The team focused on the following functions that must be available to achieve and maintain post-fire safe shutdown conditions:

- Reactivity control capable of achieving and maintaining cold shutdown reactivity conditions,
- Reactor coolant makeup capable of maintaining the reactor coolant inventory,
- Reactor heat removal capable of achieving and maintaining decay heat removal, and

- Support systems capable of providing other services necessary to permit extended operation of equipment necessary to achieve and maintain hot shutdown conditions.

The team verified that the design ensured that required post-fire safe shutdown functions remained adequately isolated from the main control room and capable of operator control from the remote shutdown panel. As part of this review, the team confirmed the capability to transfer control from the main control room to the remote shutdown panel and verified that the isolation transfer scheme provided an adequate level of electrical isolation so that required post-fire safe shutdown functions would experience no adverse affect because of fire damage in the main control room.

b. Findings

No findings of significance were identified.

.2 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed piping and instrumentation diagrams, post-fire safe shutdown equipment list, post-fire safe shutdown design basis documents, and the post-fire safe shutdown analysis to verify whether the licensee had properly identified the components and systems necessary to achieve and maintain post-fire safe shutdown conditions for equipment in the fire areas selected for review. The team also reviewed and observed walk downs of the procedures for achieving and maintaining safe shutdown in the event of a fire to verify that the operators properly implemented the post-fire safe shutdown analysis provisions.

For the sample fire areas, the team reviewed the adequacy of separation and protection provided for redundant trains of cables and equipment required to achieve and maintain hot shutdown conditions. The team evaluated whether the protection methodology met the requirements of 10 CFR 50.48, as described in the approved fire protection program. The team examined the adequacy of physical separation and fire protection features.

b. Findings

No findings of significance were identified.

.3 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the team evaluated the adequacy of fire area barriers, penetration seals, fire doors, electrical raceway fire barriers, and fire rated electrical cables. The team observed the material condition and configuration of the installed

barriers, seals, doors and cables. The team compared the installed configurations to the approved construction details and supporting fire tests. The team reviewed licensee documentation, such as NRC safety evaluation reports, exemptions from NRC regulations and deviations from the National Fire Protection Association codes, to verify that fire protection features met license commitments.

b. Findings

No findings of significance were identified.

.4 Active Fire Protection

a. Inspection Scope

For the selected fire areas, the team evaluated the adequacy of fire suppression and detection systems. The team reviewed the material condition, operational configuration and design of the installed fire detection and suppression systems. The team verified that the licensee had installed, tested and maintained the automatic and manual suppression and detection systems in accordance with the National Fire Protection Association code. In addition, the team evaluated the capability of and the maintenance performed on the smoke removal equipment. The team reviewed licensing basis documentation, such as NRC safety evaluation reports, and deviations from NRC regulations and the National Fire Protection Association codes to verify that fire suppression and detection systems met license commitments.

The team observed an unannounced fire drill and the subsequent drill critique using the guidance in Inspection Procedure 71111.05AQ, "Fire Protection Annual/Quarterly." Team members observed the fire department simulate fire-fighting activities in the turbine building basement seal oil cooler room. During the drill critique, the team evaluated whether the licensee staff identified deficiencies, openly discussed deficiencies in a self critical manner, and initiated appropriate corrective actions. During the drill, the team evaluated whether fire brigade members effectively performed the following: (1) donning of turnout gear and self contained breathing apparatus; (2) use and layout of fire hoses; (3) employment of fire fighting techniques; (4) staging of fire fighting equipment at the scene; (5) fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives.

b. Findings

Degradation of Fire Protection System Water Supply Piping

Introduction. The team identified a Green noncited violation of License Condition 2.D and the Quality Assurance Plan for failure to implement timely corrective actions to address a degraded fire water supply system. Despite determining that the system was degraded and taking compensatory actions to assure the system remained functional in 2006, the licensee failed to correct the condition prior to completing the next outage.

The fire water supply system piping continued to degrade because of corrosion. The licensee documented this deficiency in Condition Report 200805319.

Description. During a review of the April 24, 2006 fire water supply system surveillance results, the team determined that the fire protection system water supply piping had degraded flow rates, which had resulted in failure of the surveillance results to meet the acceptance criteria for the Diesel Generator 2 room. The licensee performed Procedure SE-ST-FP-0008, "Fire Protection Water Suppression System Flow Test," every 3 years to demonstrate that the fire protection water supply system remained capable of supplying water to the various fire areas under design conditions. From a review of the 1995, 1998 and 2002 surveillance results, the team determined that the differential pressure trend increased and exceeded the acceptance criteria indicating reduced flow. Pipe Segments 11, 13 and 14 had experienced the worst degradation. The licensee performed a functional assessment for the degraded flows and increased pressure drops in these segments in Condition Report 200601697. The licensee concluded that the fire water supply system was degraded but operable provided both pumps remained operable and all fire water supply system piping remained in service. The licensee had previously documented degraded flow and differential pressure conditions in Condition Report 200202512 after completing Procedure SE-ST-FP-0008 in 2002.

Because the system was degraded, the licensee issued Fire Protection Impairment Permit 2006-135 for Diesel Generator 2 room. Compensatory measures for this degraded condition required that, any time the licensee removed a fire water supply pipe or a fire pump from service, the operators establish a fire watch in the diesel generator rooms and contact design engineering to determine if the fire watch had to be maintained.

Corrective action for the degraded condition included initiating Engineering Change 37738 in 2006 to replace approximately 900 feet of degraded 5-inch piping. The licensee had planned to replace the piping in 2007. At the time of this inspection, the licensee had only approved a preliminary design and cost estimate. The team determined that the licensee had several indications that timely corrective actions had not occurred:

- Quality Assurance identified in August 2006 that the hydraulic performance of the fire suppression water supply system had been a concern for several years.
- On April 11, 2007, Condition Report 200701634 documented that personnel had closed Condition Report 2000601690 in November 2006 without completing Engineering Change 37738 or creating new actions to track the modification to completion. Further, the licensee determined that the engineer assigned responsibility for developing the modification remained unaware of this responsibility.
- On August 25, 2007, Condition Report 200703448 documented that low margin existed in the fire water supply system and placed the system on the Top 10 Low Margin list for development of the modification.

- In November 2007, Quality Assurance issued Condition Report 200704281 because the line organization had not modified the fire water supply system. The licensee identified actions that would result in the pipe replacement while on line by the end of Calendar Year 2008.

Regulatory Information Summary 2005-20, Revision 1, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," provides guidance related to performing operability and functionality assessments. The guidance specifies in Section 7.2 that, if the licensee does not resolve the degraded or nonconforming condition at the first available opportunity or does not appropriately justify a longer completion schedule, the staff would conclude that corrective action has not been timely and would consider taking enforcement action. Further, Section 7.3 describes that NRC expects that conditions calling for compensatory measures to restore structure, system or component operability will be more quickly resolved than conditions that do not rely on compensatory measures to restore operability.

Procedure SO-R-2, "Condition Reporting and Corrective Action," Revision 40, Section 5.10, requires the licensee to complete corrective actions at the first available opportunity based upon the safety significance of the condition. The procedure further specifies that degraded conditions that depend on compensatory measures should be resolved more expeditiously than conditions that do not rely upon compensatory measures since these measures indicate a greater degree of degradation.

The team determined that the licensee had completed Refueling Outage 24 in June 2008 without performing a justification for a longer completion schedule. The licensee had recognized that the fire water supply system continued to degrade; however, the licensee had not conducted any testing to ensure the basis for concluding that the fire water supply system remained operable was valid. In response to the team's concern, the licensee completed a flow test on August 21, 2008, in accordance with Procedure SE-ST-FP-0008. The test results indicated that fire water supply for the Diesel Generator 2 room remained degraded and that sufficient margin remained in the system so long as both pumps and all line segments remained in service. The licensee issued a new Fire Protection Program Impairment 2008-478 that required an hourly fire watch for the Diesel Generator 2 room until the next performance of Procedure ST-SE-FP-0008 in 2009.

Using the guidance of Regulatory Information Summary 2005-20, Revision 1 and Procedure SO-R-2, the inspectors determined the licensee's corrective actions were untimely and subject to enforcement.

Analysis. The failure to correct the degraded fire water supply system in a timely manner was a performance deficiency. This deficiency was more than minor because if left uncorrected the finding would become a more significant safety concern because of ongoing corrosion. The team evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process."

During the Phase 1 evaluation, the team determined that this deficiency affected the fixed fire protection systems. Because the fire water supply system met its design functions so long as both pumps and all pipe segments remained in service and the licensee established appropriate compensatory measures, the team 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 has a crosscutting aspect in the area of human performance, specifically the resources attribute (H.2(a)), in that the licensee failed to promptly correct the degraded fire water supply system and minimize the longstanding condition.

Enforcement. License Condition 2.D specifies that Omaha Public Power District 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. The Updated Safety Analysis Report, Section 9.11.1, specifies that the design basis for the fire protection systems includes a commitment to Branch Technical Position 9.5 1, Appendix A, May 1, 1976.

The Fire Hazards Analysis Manual, Appendix A, "Comparison Matrix Guidelines of Appendix A to APCS 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. Quality Assurance Plan Appendix F, Section 1 specifies that the Fire Protection Quality Assurance Plan include all fire pumps, valves, piping, and water-based fire suppression systems and equipment.

Procedure SO-R-2, Section 5.10, requires the licensee to complete corrective actions at the first available opportunity based upon the safety significance of the condition (i.e., effects on operability or functionality and significance of degradation) and by what is necessary to implement the corrective actions. The procedure further specifies that degraded conditions that depend on compensatory measures should be resolved more expeditiously than conditions that do not rely upon compensatory measures.

Contrary to the above, between April 26, 2006, and August 15, 2008, the licensee failed to implement and maintain in effect all provisions of License Condition 2.D and the Updated Safety Analysis Report. Specifically, the licensee failed to implement timely corrective actions for degraded flow in the fire water supply system piping affecting fire suppression capability in the Diesel Generator 2 room prior to completing the first outage following identification even though they had established compensatory measures. Because the violation was of very low safety significance and the licensee entered the finding into their corrective action program (Condition Report 200805319), this violation is being treated as a noncited violation consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000285/2008009-01, Untimely corrective actions for degraded fire protection water supply system.

.5 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

For the selected fire areas, the team verified that redundant trains of systems required for hot shutdown were not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems including the effects of flooding.

b. Findings

No findings of significance were identified.

.6 Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the alternative shutdown methodology to determine if the licensee properly identified the components, systems, and instrumentation necessary to achieve and maintain safe shutdown conditions from the remote shutdown panel and alternative shutdown locations. The review focused on the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring and support system functions. The performance evaluation verified that operators could achieve and maintain hot and cold shutdown from outside the control room with or without offsite power available. The team verified that fire induced circuit faults did not prevent the transfer of control functions from the control room to the remote shutdown panel by reviewing the provision of transfer switches for alternative shutdown control circuits.

The team reviewed the operational implementation of the alternative shutdown methodology. Team members observed: (1) a timed walk through of the control room evacuation procedures with watch standers consisting of both licensed and non-licensed operators and (2) operators simulate performing the steps in Procedure AOP-06, "Fire Emergency," Revision 21, that provided instructions for performing an alternative shutdown from the remote shutdown panel and for manipulating equipment in the plant. The team verified that the minimum number of required operators, exclusive of those required for the fire brigade, could reasonably be expected to perform the procedural actions within the applicable plant shutdown time requirements and that equipment labeling was consistent with the procedure. Also, the inspection confirmed that procedures, tools, dosimetry, keys, lighting, and communications equipment remained available and adequate to support successfully performing the procedure as intended. The team also reviewed records for operator training conducted on this procedure.

The team reviewed the time critical manual actions identified by the licensee needed to support alternate shutdown from outside the control room, including the calculations and analyses that provided the bases for these critical times. The review compared the

simulated completion times recorded during the procedure walk through to the analytical values to verify that the operators could implement the procedure as intended.

b. Findings

No findings of significance were identified.

.7 Circuit Analyses

Because the licensee committed to transition to NFPA 805, the team did not evaluate this area.

.8 Communications

a. Inspection Scope

The team 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 team evaluated the environmental impacts such as ambient noise levels, coverage patterns, and clarity of reception. The team 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 of significance were identified.

.9 Emergency Lighting

a. Inspection Scope

The team 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 capacity, (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 team 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.

b. Findings

No findings of significance were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed licensee procedures to determine whether repairs were required to achieve cold shutdown and to verify that the repair material was available on the site. The team verified that the licensee had pre staged equipment necessary to perform the repairs, as required by procedure. The team also evaluated whether operators could achieve cold shutdown within the required time using the established procedures and repair methods.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

.1 Out-of-Service Equipment

The team reviewed the program for implementing compensatory measures for out of service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems or features.

The team reviewed the applicable section of the Updated Final Safety Analysis Report, the fire impairment log and Procedure SO-G-58, "Control of Fire Protection System Impairments," Revision 35. The team evaluated whether the licensee implemented compensatory measures appropriate to the circumstances and in accordance with their licensing basis. The team evaluated whether the procedures adequately controlled compensatory measures for fire protection systems, equipment and features (e.g., detection and suppression systems and equipment, and passive fire barriers).

.2 Manual Actions

On June 9, 2008, the licensee committed to transition to National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, in accordance 10 CFR 50.48(c). The post-fire safe shutdown methodology includes the use of operator manual actions in place of compliance with the requirements of 10 CFR Part 50, Appendix R, Section III.G.2. Section III.G.2 establishes a combination of physical barriers, spatial separation, fire detection and automatic suppression systems to protect redundant trains of post-fire safe shutdown equipment located within the same fire area. The licensee implemented some operator manual actions because of their failure to comply with the requirements described in Section III.G.2. During the period of reanalysis and transition to a fire protection program based on NFPA 805,

manual actions may be acceptable as compensatory measures if they are feasible and reliable.

The team used the guidance in Inspection Procedure 71111.05TTP, Enclosure 2, to assess whether the licensee had established feasible manual actions that could be reliably completed. The team reviewed Procedures AOP-06-01, "Fire Emergency Auxiliary Building Radiation Controlled Areas and Containment," Revision 1; AOP-06-02, "Fire Emergency - Uncontrolled Areas of Auxiliary Building," Revision 0; and AOP-06-03, "Fire Emergency - Miscellaneous Areas," Revision 0. The team conducted walkthroughs with qualified plant operators of the manual actions specified for the selected fire areas. The team verified that the operators could perform all actions using the current plant procedures. The team also conducted a tabletop walkthrough with operators to review the interaction between the fire emergency procedures and the other procedures, which they would use during a plant shutdown following a fire.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team reviewed a sample of condition reports to verify that the licensee had identified fire protection related issues at an appropriate threshold and entered those issues into the corrective action program. As part of this review, the team reviewed the condition reports and other documents listed in the attachment to this report.

The team also reviewed licensee resolution to Quality Assurance findings documented in their annual audit reports. The team reviewed the licensee activities related to resolving the issues with the fire water supply system, which included the low margin available between the design conditions and the system capability and the large amount of corrosion that resulted in pinhole leaks.

b. Findings and Observations

.1 Review of Previously Identified Violations

Introduction. The team identified a Green noncited violation of License Condition 2.D and the Quality Assurance Plan for failure to take adequate corrective action for a condition adverse to fire protection. Specifically, the licensee had included steps to open the breakers for the reactor coolant gas vent system valves in response to Noncited Violation 05000285/2005008-07; however, the licensee failed to identify, proceduralize and train operators to identify the instruments need to implement this action. Spurious actuation of the valves because of fire damage could result in

uncontrolled loss of reactor coolant inventory. The licensee documented this deficiency in Condition Report 200805325.

Description. Inspection Report 05000285/2005008 documented a Green noncited violation (05000285/2005008-07) for 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 team determined that the post-fire safe shutdown analysis credits one charging pump to provide boration and inventory control. Spurious opening of any two reactor coolant gas vent system valves in series would open a single flow path from the reactor coolant system. However, each flow path contains an orifice limiting flow to 29 gpm, which remains within the 40 gpm makeup capability of a single charging pump. Spurious opening of certain combinations of three reactor coolant gas system vent valves (e.g., HCV-176, HCV-178 and HCV-180) would open two flow paths from the reactor coolant system resulting in an inventory loss of 58 gpm, which would exceed the makeup capability of single protected charging pump.

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. The team 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. During discussions with the licensee, the team determined that the licensee had not proceduralized and trained operators to use specific indications to identify the need to take these actions. The team concluded that operators could not be expected to reliably perform the procedure steps as written and, therefore, the licensee had implemented inadequate corrective actions.

Analysis. The failure to ensure that procedure steps instructed operators how to recognize the need to open breakers to close spuriously opened reactor coolant gas system vent valves was a performance deficiency. This deficiency was more than minor in that it had the potential to affect the procedure quality attribute of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (fire). The team evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process."

During the Phase 1 evaluation, the team 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 team 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 has a crosscutting aspect in the area of human performance, specifically the resources attribute (H.2(c)), in that the licensee failed to ensure that operators had complete, accurate and up-to-date procedures providing sufficient guidance to correct spurious reactor coolant gas vent system valve operation.

Enforcement. License Condition 2.D specifies that Omaha Public Power District 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. The Updated Safety Analysis Report, Section 9.11.1, specifies that the design basis of the fire protection systems includes commitment to Branch Technical Position 9.5 1, Appendix A, May 1, 1976.

Fire Hazards Analysis Manual, Appendix A, "Comparison Matrix Guidelines of Appendix A to APCSB 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, as of August 15, 2008, the licensee failed to implement and maintain in effect the requirements of License Condition 2.D and the Updated Safety Analysis Report. Specifically, the licensee failed to implement adequate corrective actions to address Noncited Violation 05000285/2005008-07. The licensee failed to identify, proceduralize and train operators to identify the instruments need to implement this action. The licensee documented this deficiency in Condition Report 200805325. 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 noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000285/2008009-02, Inadequate corrective actions related to revising a post-fire safe shutdown procedure.

.2 Evaluation of Longstanding Issues

The team determined from a review of the 2005, 2006, and 2007 Quality Assurance audits that the licensee had challenges resolving longstanding issues. As documented in Section 4OA7, Quality Assurance identified that the organization failed to resolve findings from previous audits that resulted in repeat findings.

The team determined from a review of additional annual audits between 2000 and 2004 that the licensee took limited actions to address a degrading fire water supply system even though they were aware that the system had low design margins. Specifically, the audits had discussed the degrading condition of fire protection water supply system since the 2002 audit, the low margin between the design requirements and minimally acceptable performance of the fire pumps, and the need to install a system to chemically treat the fire water supply system because of corrosion and pipe leaks. This issue is documented in Section 1RO5.4.

4OA6 Meeting Summary, including Exit

The team leader presented the inspection results to Mr. D. Bannister, Vice President and Chief Nuclear Officer, and other licensee personnel at the conclusion of the inspection on August 15, 2008. The team returned all proprietary information reviewed during the inspection.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements that meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a noncited violation.

From review of the 2005, 2006 and 2007 Quality Assurance Audits, the team determined that Quality Assurance had identified repeat findings in the audits conducted the previous year. The repeat findings for each audit resulted from a different topic. Specifically, the 2005, 2006, and 2007 Audits identified repeat findings in establishing compensatory measures for impaired systems and equipment, security officers assigned to fire brigade duties did not have current fire brigade physicals, and corrective actions to address low water flow, respectively. License Condition 2.D and the Quality Assurance Plan, Section 10.4 require the licensee to promptly identify and correct conditions adverse to the fire protection program. Contrary to these requirements, the licensee failed to correct these deficiencies in a timely manner. The licensee had initiated Condition Report 200800411 to document a lack of responsiveness by site organizations to the Quality Assurance organization.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Bannister, Vice President and Chief Nuclear Officer
D. Buell, Fire Protection Engineer
R. Castro, Supervisor – Design Engineering
S. Chomos, Fire Protection Program Engineer
K. Erdman, Supervisor – Engineering Programs
M. Frans, Manager – System Engineering
J. Gasper, Manager – Design Engineering
J. Herman, Manager – Engineering Programs
E. Matzke, Compliance Engineer
D. Pier, Senior Reactor Operator
J. Reinhart, Site Vice President

NRC Personnel

J. Hanna, Senior Resident Inspector
J. Kirkland, Resident Inspector

ITEMS OPENED AND CLOSED

Opened and Closed

05000285/2008009-01	NCV	Untimely corrective actions for degraded fire protection water supply system (Section 1RO5.4)
05000285/2008009-02	NCV	Inadequate corrective actions related to revising a post-fire safe shutdown procedure (Section 4OA2.1)

LIST OF DOCUMENTS REVIEWED

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Licensed Operator (RO & SRO) Training Program Instructor Handbook
Lesson Plan 7-17-6, "Emergency Fire Procedure," Revision 16
Systems Training Material RO6AD606 and RO8AD606, "AOP-6, 'Fire Emergency'"
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System Training Manual Volume 16, "Emergency Diesel Generator System," Revision 27
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GM-ST-FP-0004, "Semi Annual Control Room Halon Cylinders Weight and Pressure Test," dated November 8, 2007

GM-ST-FP-0004, "Semi Annual Control Room Halon Cylinders Weight and Pressure Test," dated May 21, 2007

GM-ST-FP-0004, "Semi Annual Control Room Halon Cylinders Weight and Pressure Test," dated January 4, 2007

GM-ST-FP-0004, "Semi Annual Control Room Halon Cylinders Weight and Pressure Test," dated June 20, 2006

GM-ST-FP-0005, "Semi Annual Switchgear Rooms Halon Cylinders Weight and Pressure Test," dated January 9, 2008

GM-ST-FP-0005, "Semi Annual Switchgear Rooms Halon Cylinders Weight and Pressure Test," dated June 20, 2007

GM-ST-FP-0005, "Semi Annual Switchgear Rooms Halon Cylinders Weight and Pressure Test," dated January 3, 2007

GM-ST-FP-0005, "Semi Annual Switchgear Rooms Halon Cylinders Weight and Pressure Test," dated June 23, 2006

MM-ST-FP-0001, "Inspection of Diesel Fire Pump Engine," dated October 5, 2007

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated December 20, 2007

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated December 18, 2007

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated August 14, 2007

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated August 13, 2007

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated September 9, 2006

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated November 8, 2005

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated August 25, 2004

OP-ST-FP-0003, "Fire Protection System Diesel Generator Rooms Sprinkler Functional Test," dated August 21, 2003

OP-ST-FP-0008, "Fire Protection System Auxiliary Building Sprinkler Functional Test," dated March 14, 2007

OP-ST-FP-0008, "Fire Protection System Auxiliary Building Sprinkler Functional Test," dated October 27, 2005

OP-ST-FP-0010, "Fire Protection System Sprinkler System Air Flow Test," dated August 1, 2005

PE-ST-FP-0001, "Fire Protection System Halon System Air Flow Test," dated March 16, 2006

SE-ST-FP-0002, "Fire Protection System Motor Driven Fire Pump Full Flow Test," dated August 5, 2008

SE-ST-FP-0002, "Fire Protection System Motor Driven Fire Pump Full Flow Test," dated September 10, 2007

SE-ST-FP-0002, "Fire Protection System Motor Driven Fire Pump Full Flow Test,"
dated July 11, 2006

SE-ST-FP-0003, "Fire Protection System Diesel Driven Fire Pump Full Flow Test,"
dated August 6, 2008

SE-ST-FP-0003, "Fire Protection System Diesel Driven Fire Pump Full Flow Test,"
dated September 10, 2007

SE-ST-FP-0003, "Fire Protection System Diesel Driven Fire Pump Full Flow Test,"
dated July 11, 2006

SE-ST-FP-0008, "Fire Protection Water Suppression System Full Flow Test,"
dated April 26, 2006

SE-ST-FP-0008, "Fire Protection Water Suppression System Full Flow Test,"
dated July 26, 2002

SE-ST-FP-0008, "Fire Protection Water Suppression System Full Flow Test,"
dated September 3, 1998