



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005**

February 1, 2006

Rick A. Muench, President and  
Chief Executive Officer  
Wolf Creek Nuclear Operating Corporation  
P.O. Box 411  
Burlington, KS 66839 Wolf Creek Nuclear Operating Corporation

**SUBJECT: WOLF CREEK GENERATING STATION - INSPECTION REPORT  
05000482/2005008**

Dear Mr. Muench:

On December 29, 2005, the Nuclear Regulatory Commission (NRC) completed an inspection at the Wolf Creek Generating Station. The enclosed report documents the inspection findings, which were discussed in a debrief meeting at the end of the onsite inspection on December 2, 2005, with you and other members of your staff and again in an exit meeting conducted via conference call on December 29, 2005.

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.

During the inspection, two apparent violations related to compliance with the requirements of the approved Fire Protection Program were identified. These findings involved analysis and procedure inadequacies related to fire damage induced spurious actuations of components. These circuit vulnerabilities, could, under certain postulated fire scenarios, adversely affect the ability to achieve and maintain safe shutdown of the facility. It is the NRC's understanding that you do not consider these vulnerabilities to be violations of NRC requirements. In order to allow the industry to develop an acceptable approach to resolving this issue, that the NRC can endorse, the NRC will defer any enforcement action relative to these matters while the staff evaluates NEI's proposed resolution methodology for circuit vulnerabilities and you have time to implement the resolution methodology, once approved, provided you take adequate compensatory measures for the identified vulnerabilities.

Based on the results of this inspection, the NRC has also identified two findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has determined that these findings involve violations of NRC requirements. These violations are being treated as noncited violations, consistent with Section VI.A of the Enforcement Policy. These noncited violations are described in the subject inspection report. If you contest the violations or their significance, you should provide a

Wolf Creek Nuclear Operating Corporation -2-

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, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Wolf Creek facility.

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

Sincerely,

**//RA//**

Linda Joy Smith, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket: 50-482  
License: NPF-42

Enclosure:  
NRC Inspection Report 05000482/2005008  
w/attachment: Supplemental Information

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION IV

Docket: 50-482  
License: NPF-42  
Report: 05000482/2005008  
Licensee: Wolf Creek Nuclear Operating Corporation  
Wolf Creek Generating Station  
Location: 1550 Oxen Lane NE  
Burlington, Kansas  
Dates: October 24 through December 29, 2005  
Team Leader J. M. Mateychick, Senior Reactor Inspector, Engineering Branch 2  
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Approved By: Linda Joy Smith, Chief  
Engineering Branch 2  
Division of Reactor Safety

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## SUMMARY OF FINDINGS

IR 500482/2005008; 10/24/05 - 12/29/05; Wolf Creek Nuclear Operating Corporation; Wolf Creek Generating Station; Fire Protection (Triennial)

The NRC conducted an inspection with a team of four regional inspectors and one contractor. The inspection identified two apparent violations, two Green noncited violations (NCV) and two unresolved items (URI). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using MC 0609 "Significance Determination Process" (SDP). Findings for which the significance determination process does not apply may be Green or may be assigned a severity level after NRC management review. The NRC describes its program for overseeing the safe operation of commercial nuclear power reactors in NUREG-1649, "Reactor Oversight Process", Revision 3, dated July 2000.

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

Cornerstone: Mitigating Systems

- C Green. The team identified a noncited violation (NCV) for failure to comply with Technical Specification 5.4, "Procedures", in that a procedure required for post-fire safe shutdown was found to be inadequate. Procedure OFN RP-014, "Hot Standby to Cold Shutdown from Outside the Control Room", was inadequate because it did not provide a method to provide sufficiently borated water to the reactor coolant system so that cold shutdown could be achieved and maintained within 72 hours after a control room fire. Procedure OFN RP-014 requires monitoring of the boron concentration in the reactor and, if necessary, starting the acid transfer pumps to draw borated water from the boric acid tanks. However, this procedure did not include sufficient instructions for refilling and borating the Refueling Water Storage Tank for a potential loss of offsite power or fire induced damage to circuits related to the pumps.

This finding is greater than minor because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences (i.e., core damage). The inspectors evaluated the finding using MC 0609, Appendix F, and determined that it screens as very low safety significance (Green) because it is related to the ability to achieve and maintain cold shutdown. (Section 1R05.1.b.(1))

- C TBD. The team identified an Apparent Violation of Wolf Creek License Condition 2.C.(5)(a) concerning an inadequate alternative shutdown analysis. The licensee's alternative shutdown analysis was inadequate in that it used an acceptance criteria which was inconsistent with and less conservative than that required by the approved Fire Protection Program. The licensee developed Calculation Number AN-02-021, Revision 0, "OFN RP-017, 'Control Room Evacuation,' Consequence Evaluation", to demonstrate alternative shutdown capability for Wolf Creek in response to NRC-identified Noncited Violation 2002008-01, Inadequate alternative shutdown procedure. The calculation predicted that during an alternative shutdown, the reactor coolant system subcooling margin would not be maintained, significant voiding would occur in the core, and a steam void would form in the reactor

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vessel head. The licensee found the results of the calculation to be acceptable since it demonstrated that the void formation would be limited, natural circulation in the reactor coolant system would be maintained, sufficient decay heat removal would be maintained, and no fuel damage would occur. This is not consistent with the license condition to meet the technical requirements of 10 CFR Part 50, Appendix R. Section III.L of 10 CFR Part 50, Appendix R, "Alternative and dedicated shutdown capability", that states in part, "During the postfire shutdown, the reactor process variables shall be maintained within those predicted for a loss of normal a.c. power."

This finding is greater than minor because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences (i.e., core damage). It is the NRC's understanding that the licensee does not consider these circuit vulnerabilities to be violations of NRC requirements. The licensee considers the spurious operation of multiple components to be outside of the plant licensing basis for the Fire Protection Program. Specifically, in this case, both pressurizer power-operated relief valves are assumed to spuriously open because of fire induced circuit damage. The NRC staff and the industry are currently working on developing a resolution methodology to address these types of potential fire induced circuit failures. The team concluded that this violation meets the criteria of the NRC Enforcement Manual Section 8.1.7.1 for deferring enforcement actions for postulated fire induced circuit failures. (Section 1R05.1.b.(2))

- C Green. The team identified a noncited violation of License Condition 2.C.(5), Fire Protection (Section 9.5.1, SER; Section 9.5.1.8, SSER #5), for failure to ensure that redundant trains of safe shutdown systems in the same fire area were free of fire damage. The licensee credited manual actions to mitigate the effects of fire damage in lieu of providing the physical protection required by 10 CFR Part 50, Appendix R, Section III.G.2.

SNUPPS FSAR Appendix 9.5E provided the design comparison between the plant's fire protection program and 10 CFR Part 50, Appendix R. The comparison to Section III.G, Fire Protection of Safe Shutdown Capability, states, "Redundant trains of systems required to achieve and maintain hot standby are separated by 3-hour-rated fire barriers, or the equivalent provided by III.G.2, or else a diverse means of providing the safe shutdown capability exists that is unaffected by the fire." Wolf Creek has interpreted "diverse means" as by any reasonable means including local valve and breaker operations as long as they are within the scope of normal operator duties. The team disagrees with this interpretation. The NRC staff does not recognize the use of manual actions as meeting the technical requirements of Appendix R, Section III.G.2. The components being operated are identified as required for operation of safe shutdown systems or are subject to potential spurious operation impacting the shutdown. The local manual actions are being performed because of fire damage to electrical cables related to those components and are meant to compensate for damage or maloperation of safe shutdown equipment caused by fire.

This finding is greater than minor because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences (i.e., core damage). The team found that the manual operator actions implemented to mitigate the effects of fire damage were reasonable (as defined in Enclosure 2 of NRC Inspection Procedure 71111.05T, "Fire Protection (Triennial)"), and could be performed within the analyzed time limits. Therefore, in accordance with Enclosure 2 of NRC Inspection Procedure 71111.05T, the finding was determined to be of very low safety significance (Green), and the significance determination process was not entered. (Section 1R05.2)

- C. TBD. The team identified an Apparent Violation of Technical Specification 5.4, Procedures, due to an inadequate alternative shutdown procedure that is required for implementation of the Fire Protection Program. The team found that some time critical actions required to safely shutdown the plant following a control room fire could not be accomplished within the required time periods. Specifically, the team found that the recommendations by Westinghouse Owners Group for assuring reactor coolant pump seal reliability and avoiding component cooling water thermal barrier water hammer concerns would not be met if the operators had to respond to multiple spurious operations. The procedure was developed and verified based on a time line assuming operators only have to respond to one spurious operation from the fire induced damage during the scenario. The team disagrees with this limitation of potential spurious operations.

This finding is greater than minor because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences (i.e., core damage). It is the NRC's understanding that the licensee does not consider these circuit vulnerabilities to be violations of NRC requirements. The licensee considers the spurious operation of multiple components to be outside of the plant licensing basis for the Fire Protection Program. The NRC staff and the industry are currently working on developing a resolution methodology to address these types of potential fire induced circuit failures. The team concluded that this violation meets the criteria of the NRC Enforcement Manual Section 8.1.7.1 for deferring enforcement actions for postulated fire induced circuit failures. (Section 1R05.6.b.(2))

- B. Licensee-Identified Violations

None



## REPORT DETAILS

### 1 REACTOR SAFETY

#### 1R05 Fire Protection

The purpose of this inspection was to review the Wolf Creek Generating Station's fire protection program for selected risk-significant fire areas. Emphasis was placed on verification of the post-fire safe shutdown capability. The inspection was performed in accordance with the NRC regulatory oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The team used the Individual Plant Examination for External Events for the Wolf Creek Generating Station to choose risk-significant areas for detailed inspection and review. Inspection Procedure 71111.05T, "Fire Protection (Triennial)," requires selecting three to five fire areas for review. The four areas reviewed during this inspection were:

Fire Area A-8:	Auxiliary Building - 2000' Elevation, General Area
Fire Area A-18:	Auxiliary Building - 2026' Elevation, Electrical Penetration Room (North)
Fire Area A-27:	Auxiliary Building - 2026' Elevation, Reactor Trip Switchgear Room
Fire Area C-9:	Control Building Elevation - 2000', ESF Switchgear Room (North)

For each of these fire areas, the inspection focused on fire protection features, systems and equipment necessary to achieve and maintain safe shutdown conditions, and licensing basis commitments.

Documents reviewed by the team are listed in the attachment.

#### .1 Shutdown From Outside Main Control Room

##### a. Inspection Scope

The team reviewed the functional requirements identified by the licensee as necessary for achieving and maintaining hot shutdown conditions to ensure that at least one post-fire safe shutdown success path was available in the event of fire in each of the selected areas and alternative shutdown for the case of control room evacuation. The team reviewed piping and instrumentation diagrams of systems credited in accomplishing safe shutdown functions to independently verify whether the shutdown methodology had properly identified the required components. The team focused on the following functions that must be available to achieve and maintain safe shutdown conditions:

Reactivity control capable of achieving and maintaining cold shutdown reactivity conditions;

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Reactor coolant makeup capable of maintaining the reactor coolant inventory;

Reactor heat removal capable of achieving and maintaining decay heat removal;

Supporting systems capable of providing other services necessary to permit extended operation of equipment necessary to achieve and maintain hot shutdown conditions; and

Verification that a safe shutdown can be achieved and maintained with and without off-site power.

A review was also conducted to ensure that all required components in the selected systems were included in the safe shutdown analysis. The team identified the systems required for each of the primary safety functions necessary to achieve and maintain shutdown conditions. These systems were then evaluated to identify the systems that interfaced with the selected fire areas and were the most risk significant systems required for reaching hot shutdown conditions.

b. Findings

(1) Failure to Provide Adequate Post-Fire Shutdown Procedures

Introduction. The team identified a Green noncited violation (NCV) for failure to comply with Technical Specification 5.4, Procedures. Procedure OFN RP-014, "Hot Standby to Cold Shutdown from Outside the Control Room," was inadequate because it did not provide a method to provide sufficiently borated water to the reactor coolant system so that cold shutdown could be achieved and maintained within 72 hours after a control room fire.

Description. Wolf Creek utilizes Procedure OFN RP-014, "Hot Standby to Cold Shutdown from Outside the Control Room", to satisfy the fire protection program requirement to achieve and maintain cold shutdown within 72 hours after a control room fire. Following the fire, borated water must be injected into the reactor coolant system to make up for reactor coolant pump seal leakage, control reactor coolant system inventory during the cooldown and maintain cold shutdown reactivity conditions.

Procedure OFN RP-017, "Control Room Evacuation", provides instructions for performing an alternative shutdown from outside of the control room to establish stable hot shutdown conditions. Procedure OFN RP-017 includes steps to mitigate potential spurious actuations that could divert required inventory of borated water from the Reactor Water Storage Tank. For example, operation of the containment spray system would divert water to the containment until the spuriously operating pump was secured.

The team identified that in this case the Reactor Water Storage Tank would not contain enough borated water to maintain reactivity less than 0.99 for the required 72 hours assuming that the containment spray system spuriously operates along with the assumed loss of offsite power during a control room fire. Procedure OFN RP-014 requires monitoring of the boron concentration in the reactor and, if necessary, starting

the boric acid transfer pumps to draw borated water from the boric acid tanks. However, this procedure did not include any instructions under the "Response Not Obtained" column should the operation not be accomplished because of a loss of offsite power or fire induced damage to circuits related to the pumps.

Analysis. The inspectors referred to the guidance of MC 0612 and determined that the finding is greater than minor in that it affected the ability to makeup borated water to the reactor coolant system following a control room fire and a spurious operation of the containment spray system. This finding is associated with the Mitigating Systems cornerstone and the respective attribute of procedure quality. This finding impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences. The inspectors evaluated the finding using MC 0609, Appendix F, and determined that it screens as very low safety significance (Green) because it is related to the ability to achieve and maintain cold shutdown. The licensee documented the team's concern in PIR 2005-3033. The licensee has revised Procedure OFN RP-014 to include steps to use the diesel driven fire pump to refill the Reactor Water Storage Tank as needed and detailed instructions how to isolate boric transfer pump circuits from the control room and restore operability. The licensee has also pre-staged the required electrical jumpers and fuses.

Enforcement. Wolf Creek Technical Specifications, Section 5.4.1 states, in part, "Written Procedures shall be established, implemented, and maintained covering the following activities:.... d. Fire Protection Program implementation." License Condition 2.C.(5)(a) states, "The Operating Corporation shall maintain in effect all provisions of the approved fire protection program as described in the SNUPPS Final Safety Analysis Report for the facility through Revision 17, the Wolf Creek site addendum through Revision 15, and as approved in the SER through Supplement 5, subject to provisions b & c below." Safety Evaluation Report, Section 9.5.1.7, "Appendix R Statement," states, "The staff will condition the operating license to require the applicant to meet the technical requirements of Appendix R to 10 CFR Part 50, or provide equivalent protection." Section III.L.3 of Appendix R states, "The shutdown capability for specific fire areas may be unique for each such area, or it may be one unique combination of systems for all such areas. In either case, the alternative shutdown capability shall be independent of the specific fire area(s) and shall accommodate postfire conditions where offsite power is available and where offsite power is not available for 72 hours. Procedures shall be in effect to implement this capability."

Contrary to the above, Procedure OFN RP-014 did not contain adequate instructions to assure an adequate supply of borated water. Because this finding is of very low safety significance and the licensee has already completed corrective actions, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000482/2005008-01, Failure to Provide Adequate Post-Fire Shutdown Procedures.

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(2) Failure to Maintain Reactor Coolant System Subcooling During the Alternative Shutdown

Introduction. The team identified an Apparent Violation of License Condition 2.C.(5)(a) concerning an inadequate alternative shutdown analysis. The alternative shutdown analysis was inadequate in that it used acceptance criteria which was inconsistent with and less conservative than that required by the approved Fire Protection Program.

Description. The licensee developed Calculation Number AN-02-021, Revision 0, "OFN RP-017, 'Control Room Evacuation,' Consequence Evaluation," to demonstrate alternative shutdown capability for Wolf Creek in response to NRC-identified Noncited Violation 2002008-01, Inadequate alternative shutdown procedure. The original basis for the time critical actions in Procedure OFN RP-017 was the phased procedural approach outlined in Licensee Letter SLNRC 84-0109, dated August 23, 1984. This alternative shutdown methodology was found acceptable by the NRC as documented in Supplemental Safety Evaluation Report 5. No detailed thermal-hydraulic analysis of the plant response during the alternative shutdown had been performed at that time. In developing Calculation Number AN-02-021, the licensee used no fuel damage as an acceptance criteria. The calculation predicted that during an alternative shutdown, the reactor coolant system subcooling margin would not be maintained, significant voiding would occur in the core, and a steam void would form in the reactor vessel head. The licensee found the results of the calculation to be acceptable since it demonstrated that the void formation would be limited, natural circulation in the reactor coolant system would be maintained, sufficient decay heat removal would be maintained, and no fuel damage would occur.

The team's review of the approved Fire Protection Program noted that the plant must meet the technical requirements of 10 CFR Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979." Section III.L of 10 CFR Part 50 Appendix R, "Alternative and dedicated shutdown capability," states in part, "During the postfire shutdown, the reactor process variables shall be maintained within those predicted for a loss of normal a.c. power." The predicted plant response documented in Wolf Creek UFSAR, Chapter 15, Section 15.2.6, "Loss of non-emergency AC power to the station auxiliaries (blackout)," maintains reactor coolant system subcooling margin and no void formation in the reactor vessel head occurs. Therefore, the team considered the acceptance criteria used in Calculation Number AN-02-021 to not be in compliance with the approved Fire Protection Program.

Analysis. The inspectors referred to the guidance of MC 0612 and determined that the finding is greater than minor in that it affected the ability to achieve and maintain hot shutdown following a control room fire. This finding is associated with the Mitigating Systems cornerstone and the respective attribute of protection against external factors (e.g., fire). This finding impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences.

During the inspection, the licensee contended that the evaluation was overly conservative in that it assumed multiple fire induced spurious operations, while their

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licensing basis only required one worst case spurious operation for the design of alternative shutdown capability. Calculation Number AN-02-021 assumed the spurious operation of both pressurizer power-operated relief valves. However, the licensee initiated compensatory measures consisting of stationing additional fire watch personnel in the control room to increase surveillance for potential fire hazards and fires in the incipient stage. The team did not enter the Significance Determination Process at this time because the enforcement is being deferred as discussed below and the licensee has established adequate compensatory measures. Therefore, the significance will be determined after the NRC endorses a path to resolution for fire induced circuit failures.

Enforcement. License Condition 2.C.(5)(a) states, "The Operating Corporation shall maintain in effect all provisions of the approved fire protection program as described in the SNUPPS Final Safety Analysis Report for the facility through Revision 17, the Wolf Creek site addendum through Revision 15, and as approved in the SER through Supplement 5, subject to provisions b & c below." The Safety Evaluation Report, Section 9.5.1.7, "Appendix R Statement," states, "The staff will condition the operating license to require the applicant to meet the technical requirements fo Appendix R to 10 CFR 50, or provide equivalent protection." Wolf Creek SER, Supplement 3 states, "Based on our review, the staff concludes that the alternative shutdown capability for the control room meets the requirements of Appendix R, Section III.L, and is therefore acceptable." Title 10 CFR Part 50, Appendix R, Section III.L. 1 specifies, in part, that during alternative post-fire shutdown, "the reactor coolant system process variables shall be maintained within those predicted for a loss of normal a.c. power."

Contrary to the above, the alternative shutdown methodology in Procedure OFN RP-017 as evaluated in Calculation Number AN-02-021 fails to maintain reactor coolant process variables (e.g., pressure, temperature, and subcooling margin) within those predicted for a normal loss of AC power. It is the NRC's understanding that the licensee does not consider these vulnerabilities to be violations of NRC requirements. The licensee considers the spurious operation of multiple components to be outside of the plant licensing basis for the Fire Protection Program. Specifically, in this case, both pressurizer power-operated relief valves are assumed to spuriously open because of fire induced circuit damage. The NRC staff and the industry are currently working on developing a resolution methodology to address these types of potential fire circuit failures. The team's review concluded that this violation meets the criteria of the NRC Enforcement Manual Section 8.1.7.1 for deferring enforcement actions for postulated fire induced circuit failures. This violation is being treated as an apparent violation: AV 05000482/2005008-02, Failure to Maintain Reactor Coolant System Subcooling During the Alternative Shutdown.

.2 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the piping and instrumentation diagrams, safe shutdown equipment list, safe shutdown design basis documents, and the post-fire safe shutdown analysis to verify whether the shutdown methodology had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for equipment in the fire areas selected for review. The team also reviewed and observed walkdowns of the procedures for achieving and maintaining safe shutdown in the event of a fire to verify that the safe shutdown analysis provisions were properly implemented. The team focused on the following functions that must be ensured to achieve and maintain post-fire safe shutdown conditions: (1) reactivity control capable of achieving and maintaining cold shutdown reactivity conditions, (2) reactor coolant makeup capable of maintaining the reactor coolant level within the level indication in the pressurizer, (3) reactor heat removal capable of achieving and maintaining decay heat removal, (4) supporting systems capable of providing all other services necessary to permit extended operation of equipment necessary to achieving and maintaining hot shutdown conditions, and (5) process monitoring capable of providing direct readings to perform and control the above functions.

The team reviewed the separation of safe shutdown cables, equipment, and components within the same fire areas, and reviewed the methodology for meeting the requirements of 10 CFR 50.48, Appendix A to Branch Technical Position 9.5-1 and 10 CFR Part 50, Appendix R, Section III.G. Specifically, this was to determine whether at least one post-fire safe shutdown success path was free of fire damage in the event of a fire in the selected areas. The evaluation focused on the cabling of selected components for the chemical and volume control system, high pressure safety injection system, and the auxiliary feedwater system. A sample of components was selected whose inadvertent operation could significantly affect the shutdown capability credited in the safe shutdown analysis. The specific components selected are listed in the attachment. In addition, the team reviewed license documentation, such as NRC safety evaluation reports, the Wolf Creek Updated Final Safety Analysis Report, submittals made to the NRC by the licensee in support of the NRC's review of their fire protection program, and deviations from NRC regulations to verify that the licensee met license commitments.

b. Findings

Introduction. The team identified a noncited violation of License Condition 2.C.(5), Fire Protection (Section 9.5.1, SER; Section 9.5.1.8, SSER #5), for failure to ensure that redundant trains of safe shutdown systems in the same fire area were free of fire damage. The licensee credited manual actions to mitigate the effects of fire damage in lieu of providing the physical protection required by 10 CFR Part 50, Appendix R, Section III.G.2. The team determined that the violation was of very low safety significance (Green).

Description. License Condition 2.C.(5)(a) states, "The Operating Corporation shall maintain in effect all provisions of the approved fire protection program as described in the SNUPPS Final Safety Analysis Report for the facility through Revision 17, the Wolf Creek site addendum through Revision 15, and as approved in the SER through Supplement 5, subject to provisions b & c below." SER Section 9.5.1.7, Appendix R Statement, states, "The staff will condition the operating license to require the applicant to meet the technical requirements fo Appendix R to 10 CFR 50, or provide equivalent protection." Section III.G.2 of 10 CFR Part 50, Appendix R, describes three acceptable methods for protecting at least one safe shutdown train when redundant trains are located in the same fire area. The Section III.G.2 requirements are based on the combination of physical barriers, spacial separation, fire detection and automatic suppression systems.

SNUPPS FSAR Appendix 9.5E provided the design comparison between the plant's fire protection program and 10 CFR Part 50, Appendix R. The comparison to Section III.G, Fire Protection of Safe Shutdown Capability, states, "Redundant trains of systems required to achieve and maintain hot standby are separated by 3-hour-rated fire barriers, or the equivalent provided by III.G.2, or else a diverse means of providing the safe shutdown capability exists that is unaffected by the fire." Wolf Creek has interpreted "diverse means" to mean by any reasonable means including local valve and breaker operations as long as they are within the scope of normal operator duties. The team disagrees with this interpretation. The NRC staff does not recognize the use of manual actions as meeting the technical requirements of Appendix R. The components being operated are identified as required for operation of safe shutdown systems or are subject to potential spurious operation impacting the shutdown. The local manual actions are being performed because of fire damage to electrical cables related to those components and are meant to compensate for damage or maloperation of safe shutdown equipment caused by fire. Manual actions are not a method of satisfying Appendix R, Section III.G.2 requirements. Plant specific manual actions may be acceptable based on detailed specific exemptions or deviations for each case identified.

Analysis. This finding is of greater than minor safety significance because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences. The team reviewed Procedure OFN KC-016, "Fire Response," and stepped through the manual actions directed in the procedure with licensee operations personnel. The team found that the manual operator actions were reasonable (as defined in Enclosure 2 of Inspection Procedure 71111.05T), and could be performed within the analyzed time limits. Since the manual operator actions were considered reasonable, the significance determination process was not entered. The team determined that this finding is of very low safety significance (Green) in accordance with the guidance in Enclosure 2 to Inspection Procedure 71111.05T.

Enforcement. The Fire Hazard Analysis states that it will comply with the technical requirements of Appendix R or utilize a diverse means to do so. Appendix R, Section III.G.2 to 10 CFR Part 50 requires that cables whose fire damage could prevent the operation or cause maloperation of safe shutdown functions be physically protected

from fire damage. Contrary to this requirement, the licensee implemented a methodology that utilized manual operator actions as a diverse means to mitigate the effects of fire damage in lieu of providing physical protection from fire damage. This is a violation of License Condition 2.C.(5)(a) for failing to meet the technical requirements of 10 CFR Part 50, Appendix R, as required by SER Section 9.5.1.7. Because this finding is of very low safety significance, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy:  
NCV 05000482/2005008-03, Failure to Ensure Redundant Safe Shutdown Systems Located In the Same Fire Area Are Free of Fire Damage.

.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 as-installed configurations to the approved construction details and supporting fire tests. In addition, the team reviewed license documentation, such as NRC safety evaluation reports, and deviations from NRC regulations and the National Fire Protection Association code 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 observed the material condition and configuration of the installed fire detection and suppression systems. The team reviewed design documents and supporting calculations. In addition, the team reviewed license 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 also observed an announced site fire brigade drill and the subsequent drill critique using the guidance in Inspection Procedure 71111.05AQ. Team members observed the fire brigade simulate fire fighting activities in plant Fire Area T-4 (Lube Oil Storage Room). The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took 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

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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 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

No findings of significance were identified.

.5 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

For the sample 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 auxiliary shutdown panel and alternative shutdown locations. The team focused on the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring and support system functions. The team verified that hot and cold shutdown from outside the control room could be achieved and maintained with offsite power available or not available. The team verified that the transfer of control from the control room to the alternative locations was not affected by fire induced circuit faults by reviewing the provision of separate fuses for alternative shutdown control circuits.

The team also reviewed the operational implementation of the alternative shutdown methodology. Team members observed a walk-through of the control room evacuation procedures with that days watchstanders consisting of both licensed reactor and senior reactor operators. The team observed operators simulate performing the steps of Procedure OFN RP-017 that provided instructions for performing an alternative shutdown from the auxiliary shutdown panel and for manipulating equipment in the plant. The team verified that the minimum number of available 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 team verified that

procedures, tools, dosimetry, keys, lighting, and communications equipment were available and adequate to support successfully performing the procedure as intended. The team also reviewed records for operator training conducted on this procedure.

b. Findings

(1) Lack of Evaluations of Changes to The Approved Fire Protection Program

Introduction. The team identified an unresolved item related to unanalyzed changes to approved Wolf Creek Generating Station fire protection program. Specifically, the team identified that the licensee had revised Procedure OFN RP-017 without documentation demonstrating that the changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. This will be treated as an unresolved item pending further evaluation by the license. NRC inspection of the results of the license's evaluations and determination of safety significance.

Description. In Letter SLNRC 84-0109, the licensee made time commitments for specific items required to achieve and maintain hot shutdown conditions from outside the control room that would be completed in six "phases." Phase A items would be completed in 5 minutes. Phase B items would be completed in 10 minutes. Phase C items would be completed in 20 minutes. Phase D items would be completed in 30 minutes. Phase E items would be completed in 60 minutes. Phase F items would be completed in 7 hours. These phased time commitments were approved by the NRC staff in SER Supplement 5.

Future revisions to OFN RP-017 consolidated the approved number of phases from six to four. Phases B and C were consolidated into a new Phase B with an item completion time of 20 minutes. Phases D and E were consolidated into a new Phase C with an item completion time of 60 minutes. Review of the procedure revisions identified changes that resulted in actions having allowable completion times longer than the approved time commitments per SLNRC 84-0109. The changes of concern allowed:

- a. An item with a 5 minute commitment per Letter SLNRC 84-0109 to become a 10 minute action. The step to verify EDG running (Step C10) was initially a Phase A item, which per Letter SLNRC 84-0109, allowed 5 minutes for completion. Step C10 is now a Phase B item, which per the current revision of the procedure, allows 20 minutes for completion. The actual step was performed in 7 minutes and 25 seconds when the response not obtained column was invoked.
- b. Six items that were initially Phase B items, which per Letter SLNRC 84-0109, allowed 10 minutes for completion, are now allowed longer completion times. Steps B10, C18, C21, and C22 are all currently Phase B items, which per the current revision of the procedure, allows 20 minutes for completion. Timed walkthroughs of the procedure confirmed that completion of these steps would require more than 10 minutes. Step B10 to isolate RHR Pump A was completed at time 10:45. Step C18 to ensure room cooling for EDG room was completed at

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time 11:18. Step C21 to ensure room cooling for ESW room was completed at time 12:24. Step C22 to isolate 'B' RHR pump was completed at time 12:40. Steps C30 and D10 are currently Phase C items, which per the current revision of the procedure, allows 60 minutes for completion. Step C30 to ensure 'A' containment spray pump stopped was completed at time 18:46. Step D10 to ensure room cooling for the electrical penetration room was completed at time 22:15.

Analysis. This finding is unresolved pending the completion of further inspection and completion of a significance determination. The license must complete a records search for any documentation evaluating the changes to Procedure OFN RP-017 described above. The license must perform evaluations for changes where no previous evaluations can be identified. The NRC will review the results of the license's efforts. This finding is of greater than minor safety significance because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences. Specifically, the license did not evaluate all changes to the approved fire protection program to assure that the changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

Enforcement. License Condition 2.C(5)(b) states, "The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire." However, the team could not identify evaluations showing that changes to OFN RP-017 would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. Pending completion of further inspection of the impact of these changes and a significance determination, this finding is identified as URI 05000482/2005008-04, Lack of Evaluations of Changes to The Approved Fire Protection Program.

(2) Inadequate Alternative Shutdown Procedure

Introduction. The team identified an Apparent Violation of Technical Specification 5.4, Procedures, because of an inadequate alternative shutdown procedure which is required for implementation of the Fire Protection Program. The team found that some time critical actions required to safely shutdown the plant following a control room fire could not be accomplished within the planned time periods.

Description. Wolf Creek utilized Procedure OFN RP-017 to satisfy the fire protection program requirement to be able to achieve and maintain hot standby in the case of a control room fire. During the procedure, the operators must respond to a loss of reactor coolant pump seal injection, and a loss of component cooling water thermal barrier cooling.

The Westinghouse Owners Group released the "Assessment of RCP Operation During Loss of Seal Cooling" for members in February 2000. The assessment states that if reactor coolant pump seal injection is lost and then restored, it should be restored in a

short period of time. If seal injection is restored after the seals have heated, there is a possibility that the seals will leak reactor coolant excessively. Also, the letter states a concern that when flow is stopped to the component cooling water thermal barrier in the reactor coolant pump, that voiding may occur in the component cooling water system, and if flow is re-established, then it could cause a water hammer leading to system damage.

The licensee timed a practice run of the control room evacuation and concluded that they met the recommendations by Westinghouse for assuring reactor coolant pump seal reliability and avoiding component cooling water thermal barrier water hammer concerns. However, the team found that the methodology assumed only one spurious operation from the fire during the scenario. This method minimized the number of spurious operations the operators had to respond to and correspondingly minimized the procedure completion time.

The team performed an independent timed walkthrough of the control room evacuation procedure during the inspection. The team asked the operators to mitigate almost all of the spurious operations that might be caused by the fire, including manually opening motor operated valves and starting the emergency diesel generator. This lengthened the operator's response times significantly, such that the Westinghouse recommendations were no longer being met for the steps in the procedure addressing the reactor coolant pump seals and the thermal barrier.

Analysis. The inspectors referred to MC 0612 and determined that the finding is greater than minor in that it affected the ability to achieve and maintain hot shutdown following a control room fire. This finding is associated with the Mitigating Systems cornerstone and the respective attribute of protection against external factors (e.g., fire). This finding impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences.

The licensee recognized that the assumption of multiple spurious actuations would affect the validity of their previous timing results. However, the licensee's position is that their licensing basis only requires one spurious operation to be assumed during a control room fire. However, the licensee did initiate compensatory measures consisting of stationing additional fire watch personnel in the control room to increase surveillance for potential fire hazards and fires in the incipient stage. The team did not enter the Significance Determination Process at this time because the enforcement is being deferred as discussed below and the licensee has established adequate compensatory measures. Therefore, the significance will be determined after the NRC endorses a path to resolution for fire induced circuit failures.

Enforcement. Technical Specification 5.4.1 states, in part, "Written Procedures shall be established, implemented, and maintained covering the following activities:.... d. Fire Protection Program implementation." License Condition 2.C.(5)(a) states "The Operating Corporation shall maintain in effect all provisions of the approved fire protection program as described in the SNUPPS Final Safety Analysis Report for the

facility through Revision 17, the Wolf Creek site addendum through Revision 15, and as approved in the SER through Supplement 5, subject to provisions b & c below.” Safety Evaluation Report, Section 9.5.1.7, “Appendix R Statement,” states “The staff will condition the operating license to require the applicant to meet the technical requirements fo Appendix R to 10 CFR Part 50, or provide equivalent protection.” Appendix R, Section III.L.7, states “The safe shutdown equipment and systems for each fire area shall be known to be isolated from associated non-safety circuits in the fire area so that hot shorts, open circuits, or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment. The separation and barriers between trays and conduits containing associated circuits of one safe shutdown division and trays and conduits containing associated circuits or safe shutdown cables from the redundant division, or the isolation of these associated circuits from the safe shutdown equipment, shall be such that a postulated fire involving associated circuits will not prevent safe shutdown.”

Contrary to the above, the licensee could not perform some time critical actions required for safe shutdown following a control room fire within the required time periods using Procedure OFN RP-017. The licensee considers the spurious operation of multiple components to be outside of the plant licensing basis for the Fire Protection Program. The licensee’s position is that the original procedure timing method with one spurious operation is valid and the team’s assumption of multiple spurious operations is overly conservative and an increase in regulatory requirements. The NRC staff and the industry are currently working on developing a resolution methodology to address these types of potential fire induced circuit failures. The team’s review concluded that this violation met the criteria of the NRC Enforcement Manual Section 8.1.7.1 for deferring enforcement actions for postulated fire induced circuit failures. This violation is being treated as an apparent violation: AV 05000482/2005008-05, Inadequate Alternative Shutdown Procedure.

.7 Circuit Analyses

a. Inspection Scope

The team reviewed the post-fire safe shutdown analysis to verify that the licensee had identified circuits that may impact safe shutdown. On a sample basis, the team verified those cables for equipment required to achieve and maintain hot shutdown conditions in the event of fire in selected fire zones had been properly identified. The evaluation focused on the cabling of selected components for the chemical and volume control system, high pressure safety injection system, and the auxiliary feedwater system. Included in this evaluation were a sample of components whose inadvertent operation could significantly affect the shutdown capability credited in the safe shutdown analysis. In addition, the team verified that these cables had either been adequately protected from the potentially adverse effects of fire damage, mitigated with approved manual operator actions, or analyzed to show that fire induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. In order to accomplish this, the team reviewed electrical schematics and cable routing data for power and control cables associated with each of the selected components.

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In addition, the team verified, on a sample basis, that circuit breaker coordination and fuse protection have been analyzed, and are acceptable as means of protecting the power source of the designated redundant or alternative safe shutdown component. For the selected fire areas, the team also reviewed the location and installation of diagnostic instrumentation that was necessary for achieving and maintaining safe shutdown conditions to ensure that in the event of a fire, this instrumentation would remain functional.

b. Findings

No findings of significance were identified.

.8 Communications

a. Inspection Scope

The team reviewed the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire brigade duties. The team verified that phones were available for use and maintained in working order. 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 fire area.

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 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 locations and positioning of emergency lights were observed during a walkthrough of the control room evacuation procedure.

b. Findings

No findings of significance were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed Procedure OFN RP-014 to determine whether repairs were required to achieve cold shutdown. The team also verified that the repair material was available on the site.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

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

The team reviewed AP 10-103, "Fire Protection Impairment Control," Revision 19 to determine 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). The team also walked down compensatory measures in effect at the time of the inspection.

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team reviewed a sample of Problem Identification Reports to verify that the licensee was identifying fire protection-related issues at an appropriate threshold and entering those issues into the corrective action program. A listing of Problem Identification Reports reviewed is provided in the attachment to this report.

b. Findings

Introduction. The team identified an unresolved item related to the evaluation of conditions adverse to fire protection, which is a provision of the Wolf Creek Generating Station fire protection program. This will be treated as an unresolved item pending further inspection of the extent of condition and determination of safety significance.

Description. The NRC issued Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire," on February 28, 1992, to all holders of operating licenses. This notice was issued to alert licensees to conditions found at several reactors that could result in the loss of capability to maintain the reactor in a safe shutdown condition because of a control room fire that caused operators to evacuate the control room. A fire in the control room could cause hot short circuits between control wiring and power sources, for certain motor-operated valves needed for safe shutdown. If a fire in the control room forces operators to leave the control room, these motor-operated valves can be operated from the remote/alternative shutdown panel. However, hot short circuits combined with the absence of thermal overload, torque switch and limit switch protection, could cause valve damage before the operator shifted control of the valves to the remote/alternative shutdown panel.

The licensee evaluated Information Notice 92-18 via Industry Technical Information Program (ITIP)1906 on April 15, 1992, and determined that the notice was not applicable to Wolf Creek. The disposition and closure of ITIP 1906 relied upon evaluations performed during initial licensing as discussed in documents from 1984 and 1985. The documents referenced in the ITIP are Letter SLNRC 84-0108, dated August 24 1985; Letter SLNRC 84-0109, dated August 10, 1984; and Safety Evaluation Report, NUREG 0881, Supplement 5. Based upon the NRC's acceptance of the response plan to spurious actuations resulting from control room fires, as discussed in the referenced documents, the licensee deemed the information contained in Information Notice 92-18 as having previously been evaluated.

The licensee subsequently reevaluated their position in regard to Information Notice 92-18 in 1999 based upon questions raised by the NRC during an inspection at the Callaway Plant. The licensee initiated Performance Improvement Request 99-1245 on April 4, 1999, to validate their position as described in ITIP 1906. The performance improvement request stated that engineering had compiled a list of motor-operated valves which are susceptible to inadvertent failure because of a control room fire, and could potentially jeopardize plant safe shutdown. It also stated that further evaluation and investigation was being done to narrow down the list of valves requiring modifications. Performance Improvement Request 99-1245 was closed based on an NRC/industry initiative in place at the time to address dealing with multiple hot shorts in associated circuits resulting in spurious actuations. The NRC temporarily suspended the associated circuit portion of the triennial fire protection inspection in November 2000, but restarted the inspections in January 2005.

At the time of the inspection, the licensee had not determined which motor-operated valves could be susceptible to mechanistic damage because of having the torque and limit switches, and the thermal overloads bypassed because of fire induced short circuits. The inspectors reviewed a sample of valves and determined that they could have their protection bypassed. Four motor operated valves was selected from control room evacuation Procedure OFN RP-017 for review of Information Notice 92-18 applicability. The four valves, BN-LCV112E, EM-HV8803B, EM-HV8801A, and BN-HV8812A, were all found to be susceptible to having their torque and limit switch protection bypassed as a result of a control room fire. All four valves were also required

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by Procedure OFN RP-017 to be positioned after a control room fire. However, the inspectors could not determine whether damage could occur to the valves rendering them inoperable.

Analysis. This finding is unresolved pending the completion of further inspection of the extent of condition and completion of a significance determination. The licensee must evaluate the motor operated valves relied upon during a post-fire shutdown outside of the control room. The licensee must review control circuits to identify any valves which could spuriously operate because of fire damage with the normal protective devices bypassed. The licensee must determine if any such valves would be susceptible to damage which would prevent the planned electrical or manual operation of the valve during the shutdown from outside of the control room. This finding is of greater than minor safety significance because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (such as fire) to prevent undesirable consequences. Specifically, the licensee did not perform a timely or technically adequate evaluation to determine if the Wolf Creek configurations were subject to the potential loss of capability to maintain the reactor in a safe shutdown condition following a control room fire described in NRC Information Notice 92-18.

Enforcement. License Condition 2.c(5) of the Wolf Creek Generating Station Operating License states that the Operating Corporation shall maintain in effect all provisions of the approved fire protection program as described in the SNUPPS Final Safety Analysis Report. The Wolf Creek Generating Station Updated Safety Analysis Report, Appendix 9.5A, Section 8, states that failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and nonconformances which affect fire protection are promptly identified, reported, evaluated and corrected. However, the team found that the licensee failed to evaluate the potential for fire induced damage to motor operated valves relied upon for safe shutdown following a control room evacuation as described in NRC Information Notice 92-18. The licensee entered this finding in their corrective action program as Performance Improvement Request 2005-3314. Pending completion of further inspection for extent of condition and a significance determination, this finding is identified as URI 05000482/2005008-06, Failure to Adequately Evaluate Fire Protection Program Deficiencies

#### 4OA6 Management Meetings

##### Debrief Meeting Summary

The team leader presented the inspection results to Mr. Rick A. Muench, President and Chief Executive Officer, and other members of licensee management at the conclusion of the onsite inspection on December 2, 2005.

During this meeting, the team leader confirmed to the licensee management that materials considered to be proprietary had been examined during the inspection and had been returned to the licensee.

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Exit Meeting Summary

The team leader presented the inspection results to members of licensee management at the conclusion of the inspection in a conference call on December 29, 2005.

## KEY POINTS OF CONTACT

### Licensee

T. M. Anselmi, Manager Design Engineering  
W. Aregood, Fire Protection  
R. Badenhamer, Operations  
T. Card, Supervisor Support Engineering  
D. Dixon, Design Engineering - Electrical  
R. D. Flannigan, Manager Nuclear Engineering  
K. Fredrickson, Regulatory Affairs  
S. Hedges, VP Operations & Plant Manager  
S. A. Henry, Superintend of Operations  
P. Herrmann, Fire Protection  
D. M. Hooper, Regulatory Affairs  
W. Ketchum, Probabilistic Risk Analysis  
T. Krause, Manager Quality  
J. B. Makar, Manager Systems Engineering  
K. J. Moles, Manager Regulatory Affairs  
R. A. Muench, President & CEO  
W. Muilenburg, Regulatory Affairs  
G. L. Pendergrass, Manager Support  
D. Phelps, Owner Company Representative  
L. Ratzlaff, Fire Protection  
E. A. Ray, Manager Operations  
W. Selbe, Design Engineering  
M.W.Sunseri, VP Oversight  
J. Suter, Fire Protection  
W. Wagner, Safety Analysis

### NRC

S. Cochrum, Senior Resident Inspector

## ITEMS OPENED AND CLOSED

### Opened

05000482/2005008-02	AV	Failure to Maintain Reactor Coolant System Subcooling During the Alternative Shutdown (Section 1R05.1.b(2))
05000482/2005008-04	URI	Lack of Evaluations of Changes to The Approved Fire Protection Program (Section 1R05.6.b(1))
05000482/2005008-05	AV	Inadequate Alternative Shutdown Procedure (Section 1R05.6.b(2))
05000482/2005008-06	URI	Failure to Adequately Evaluate Fire Protection Program Deficiencies (Section 4OA2)

### Opened and Closed

05000482/2005008-01	NCV	Failure to Provide Adequate Post-Fire Shutdown Procedures (Section 1R05.1.b(1))
05000482/2005008-03	NCV	Failure to Ensure Redundant Safe Shutdown Systems Located In the Same Fire Area Are Free of Fire Damage (Section 1R05.2)

### Closed

None

### Discussed

None

## LIST OF DOCUMENTS REVIEWED

The following documents were selected and reviewed by the team to accomplish the objectives and scope of the inspection.

### COMPONENTS SELECTED FOR REVIEW

<u>Component</u>	<u>Description</u>
ALHV0030 ALHV0031 ALHV0032 ALHV0033 ALHV0034 ALHV0035 ALHV0036	Auxiliary Feedwater Pump Suction Isolation Valves
DPAL01A	Auxiliary Feedwater Pump A
DPAL01B	Auxiliary Feedwater Pump B
BGLCV112B BGLCV112C	Volume Control Tank Outlet Valves
BGHV8110	Centrifugal Charging Pump A Mini-Flow Isolation Valve
BGHV8111	Centrifugal Charging Pump B Mini-Flow Isolation Valve
BNHV8812A BNHV8812B	Refueling Water Storage Tank To Residual Heat Removal Suction Isolation Valves
DPBG05A	Centrifugal Charging Pump A
DPBG05B	Centrifugal Charging Pump B
DPEF01A	Essential Service Water Pump A
DPEF01B	Essential Service Water Pump B
EFHV0023 EFHV0024 EFHV0025 EFHV0026	Service Water To Essential Service Water Loop Isolation Valves
EGHV0058 EGHV0071 EGHV0126 EGHV0127	Component Cooling Water To Reactor Coolant Pump Isolation Valves
EJHV8701A EJHV8701B	Residual Heat Removal Suction Isolation Valves

EJH8811A  
EJHV8811B

Containment Sump Isolation Valves

CALCULATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AN-02-021	OFN RP-017 "Control Room Evacuation" Consequence Evaluation	0
E-H-8	System NB Protective Relays	5
FL-03	Flooding of Individual Aux Bldg Rooms	0
FL-08	Control Building Flooding	0
LE-M-004	Flooding In Class 1E Switchgear Rooms 3301 & 3302 and Battery Room # 2 (3411) & Battery Room # 3 (3413)	00
XX-E-013	Post-Fire Safe Shutdown (PFSSD) Analysis	0

DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-1F9910	Post-Fire Safe Shutdown Fire Area Analysis	0
E-1R1441(Q)	Raceway Plan - Auxiliary Building Area-4 EL. 2026'-0"	6
E-1R1443A	Exposed Conduit - Auxiliary Building Area-4 EL. 2026'-6"	7
E-1R1443B	Exposed Conduit - Auxiliary Building Area-4 EL. 2026'-0"	11
E-1R1443C	Exposed Conduit - Auxiliary Building Area-4 EL. 2026'-0"	9
E-1R1444A	Exposed Conduit - Auxiliary Building Partial Plan Area-4 EL. 2026'-0"	4
E-1R1444B	Exposed Conduit - Auxiliary Building Partial Plan Area-4 EL. 2026'-0"	7
E-1R1444C	Exposed Conduit - Auxiliary Building Partial Plan Area-4 EL. 2026'-0"	12
E-11NG01	Low Voltage System Class IE 480 V. Single Line Meter & Relay Diagram	9

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-11NG02	Low Voltage System Class IE 480 V. Single Line Meter & Relay Diagram	8
E-11NG20	Motor Control Center Summary	234
E-11NK01	Class IE 125V DC System Meter & Relay Diagram	9
E-11NK02	Class IE 125V DC System Meter & Relay Diagram	7
E-13AB01	Schematic Diagram - Main Steam Supply Valve To Turbine Driven Aux Feedwater Pump	2
E-13AB18	Schematic Diagram - Main Steam High Pressure Trap Bypass Valves	0
E-13AL03A	Schematic Diagram - Auxiliary Feedwater Pumps, Discharge Control - Motor Operated Valves	4
E-13AL04B	Schematic Diagram - Supply From ESS Service Water System	8
E-13AL05A	Schematic Diagram - Auxiliary Feedwater Pumps, Discharge Control - Air Operated Valves	2
E-13BB04	Schematic Diagram - Seal Water Injection Isolation Valves	3
E-13BB12A	Schematic Diagram - RHR Loop 1 Inlet Isolation Valve	6
E-13BB12B	Schematic Diagram - RHR Loop 2 Inlet Isolation Valve	4
E-13BB30	Schematic Diagram - RCS Head Vent Valves	2
E-13BB39	Schematic Diagram - Pressurizer Relief Isolation Valves	8
E-13BB40	Schematic Diagram - Pressurizer Power Relief Valves	3
E-13BG01	Schematic Diagram - Centrifugal Charging Pump A	3
E-13BG01A	Schematic Diagram - Centrifugal Charging Pump B	1
E-13BG10	Schematic Diagram - Letdown Line Isolation Valves	3
E-13BG12	Schematic Diagram - Volume Control Tank Outlet Isolation Valve	3
E-13BG12A	Schematic Diagram - Volume Control Tank Outlet Isolation Valve	4

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-13BG48	Schematic Diagram - Excess Letdown Line Isolation Valves	1
E-13BN01	Schematic Diagram - Refueling Water Storage Tank To Charging Pump MOV	3
E-13BN03	Schematic Diagram - Refueling Water Storage Tank To RHR Pump MOV	7
E-13EG09	Schematic Diagram - Component Cooling Water Containment Isolation Valve	4
E-13EG18	Schematic Diagram - Component Cooling Water Containment Isolation Valves	7
E-13EJ05A	Schematic Diagram - RHR Loop 1 Inlet isolation Valve	4
E-13EJ06A	Schematic Diagram - Sump To No. 1 Residual Heat Removal Pump	6
E-13EJ06B	Schematic Diagram - Sump To No. 2 Residual Heat Removal Pump	7
KD-7496	One Line Diagram	27
M-12AB01	P&ID - Main Steam System	10
M-12AB02	P&ID - Main Steam System	9
M-12AB03	P&ID - Main Steam System	18
M-12AL01	P&ID - Auxiliary Feedwater System	10
M-12BB01	P&ID - Reactor Coolant System	24
M-12BB02	P&ID - Reactor Coolant System	14
M-12BB03	P&ID - Reactor Coolant System	9
M-12BB04	P&ID - Reactor Coolant System	10
M-12BG01	P&ID - Chemical and Volume Control System	12
M-12BG03	P&ID - Chemical & Volume Control System	36
M-12BN01	P&ID - Borated Refueling Water Storage System	12
M-12EF01	P&ID - Essential Service Water System	19
M-12EF02	P&ID - Essential Service Water System	22
M-12EG01	P&ID - Component Cooling Water System	14



<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-12EG02	P&ID - Component Cooling Water System	17
M-12EG03	P&ID - Component Cooling Water System	8
M-12EJ01	P&ID - Residual Heat Removal System	31
M-K2EF01	P&ID - Essential Service Water System	48

PERFORMANCE IMPROVEMENT REQUESTS (PIRs)

99-1245	20010046	20053025*	20053176*	20053314*	20053331*
20003699	20010210	20053033*	20053209*	20053317*	20053333*
20010045	20052757	20053054*	20053305*	20053319*	

\*PIR written as a result of inspection activities

PROCEDURES

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AP 10-100	Fire Protection Program	9
AP 10-103	Fire Protection Impairment Control	19
AP 10-105	Fire Protection Training and Drills	9
AP 21-003	Operations	7A
OFN KC-016	Fire Response	13
OFN KJ-032	Local Emergency Diesel Startup	6
OFN RP-013	Control Room Not Habitable	10A
OFN RP-014	Hot standby to Cold Shutdown From Outside the Control Room	8
OFN RP-017	Control Room Evacuation	21
STN GP-009	Emergency Radio and Equipment Check and Inventory	41
STN FP-206	Spray and Sprinkler System Functional Testing	9
STN FP-207	Visual Inspection of Pipe Headers and Nozzle/Sprinkler Areas	2
STN FP-400B	Halon Sys/North Pene Rm (KC-244)	5
STN FP-452	Fire Barrier Penetration Seals Inspection	4

STN FP-817F	Trip Act. Device Oper. Test for Bechtel Zones 306, 307 and 314-317	6
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MISCELLANEOUS DOCUMENTS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AP 10-106	Fire Preplans	4
APF 10-105-02	Fire Drill Scenario and Critique Report	1
E-1F9905	Fire Hazards Analysis	0
E-1F9910	Post-Fire Safe Shutdown Area Analysis	0
ITIP No. 01906	Industry Technical Information Program Report - NRC Information Notice 92-18: Potential For Loss Of Remote Shutdown Capability During A Control Room Fire	4/15/92
LER 42146	Potential Failure to Meet Required Response Times For Shutdown Outside Control Room	11/16/05
License No. NPF-42	Facility Operating License, Wolf Creek Generating Station, Unit No. 1	Amendment No. 151
M-663-00017	Penetration Seal Typical Details	W20
M-663-00017A	Fire Protection Evaluations For Unique or Unbounded Fire Barrier Configurations	W01
Self Assessment SEL 01-027	NFPA Code Compliance	0
SLNRC 84-0109	SNUPPS Letter to H. R. Denton From N. A. Petrick - Subject: Fire Protection Review	8/23/1984
Specification No. 16577-M-658	Technical Specification For Contract For Furnishing, Installing, and Testing Halogenated Agent Extinguishing System for The Standardized Nuclear Unit Power Plant System (SNUPPS) Wolf Creek Only	7
NUREG 0881, Volume 1	Safety Evaluation Report Related to the Operation of Wolf Creek Generating Station Unit No. 1	April 1982
NUREG 0881, Supplement No. 3	Safety Evaluation Report Related to the Operation of Wolf Creek Generating Station Unit No. 1	August 1983
NUREG 0881, Supplement No. 5	Safety Evaluation Report Related to the Operation of Wolf Creek Generating Station Unit No. 1	March 1985
PIR 1998-0600	NFPA Code Deficiency Tracking Sheet	09/21-2005

USAR - 7.4	Updated Safety Analysis Report - Section 7.4 - Systems Required For Safe Shutdown	16
USAR - 9.5.1	Updated Safety Analysis Report - Section 9.5.1 - Fire Protection System	16
USAR - 15.2.6	Updated Safety Analysis Report - Section 15.2.6 - Loss of Non-Emergency AC Power to the Station Auxiliaries (Blackout)	16
WCNOC-76	Design Guide for Medium and Low Voltage AC and Low Voltage DC Overcurrent Protection Coordination for Wolf Creek Generating Station	2
	Cable Routing Data for Various Components and Fire Areas	
	WCGS Approved Fuse List	7
	Wolf Creek Fire Protection Program Regulatory Bases	1
	Time - Current Curves for Various 480Vac and 125Vdc Components	

MODIFICATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
DCP 011038	Install Fire Wrap on Raceway in Fire Areas A-1 & A-18	4

WORK ORDERS

04-258679-000      04-258728-000      04-263755-000      05-270020-000