

Wolf Creek 1

3Q/2006 Plant Inspection Findings

Initiating Events

Significance:  Apr 07, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to provide adequate fire detection in the diesel generator rooms

An NRC identified Green noncited violation of Facility Operating License Condition 2.C.5, Fire Protection, was identified for inadequate fire detection in the emergency diesel generator rooms. The infrared detectors' view of some combustibles in the rooms was blocked by temporary scaffolding and permanent plant equipment, which could delay the detection of fires and the fire brigade response. Wolf Creek Fire Hazard Analysis E-19905 Sections D.1.7.1 and D.2.7.1 state that the diesel generator rooms early warning fire detection is by infrared detectors, which will readily detect the type of fire caused by the burning of fuel and lube oils. Wolf Creek Updated Safety Analysis Report Section 9.5.1.2.3 states that these detectors respond directly to infrared radiation emanating from a flickering flame. However, with solid objects in between the detectors and the combustibles, the infrared light from the flame would not be sensed by the infrared detectors. The control room would still be alerted to the fire, but only if the fire spread to a part of the room visible to the infrared detectors or the heat from the fire reached thermal fire detectors also installed in the room.

The failure to provide adequate fire detection in the emergency diesel generator rooms was a performance deficiency. The inspectors determined that the inadequate fire detection in the diesel generator rooms was more than minor because it potentially affected diesel generator availability due to fire under the mitigating systems cornerstone. The inspectors used Inspection Manual Chapter 0609, Appendix F, Fire Protection Significance Determination Process, to determine the significance of the finding. The finding is of very low safety significance because a postulated fire in a diesel room would still be detected and extinguished before it affected any other safe shutdown equipment. The inspectors assigned a low degradation rating to the finding in the significance determination process because the fire detection would have nearly the same level of effectiveness and reliability with the degradation. Therefore, the significance determination process screens the finding as very low safety significance.

Inspection Report# : [2006002\(pdf\)](#)

Significance:  Apr 07, 2006

Identified By: Self-Revealing

Item Type: FIN Finding

INADEQUATE PROCEDURE FOR THE OPERATION OF LIMITORQUE MOTOR-OPERATED VALVES

A self-revealing Green finding was identified for the failure to provide adequate instructions for the operation of Limitorque motor-operated valves. The instructions were inadequate because they failed to provide guidance on declutching Limitorque motor-operated valves, such that the valve operators are not damaged. The inadequate guidance resulted in the degraded operation of a Limitorque motor-operated valve in the circulating water system. During maintenance activities on November 30, 2005, a Limitorque motor-operated valve would not stay declutched without an operator hanging onto the declutch lever. The declutch mechanism had become misaligned from previous improper manual operation of the Limitorque operator. The inability of the operators to promptly close the valve resulted in lowering the condenser vacuum which approached the turbine trip/reactor trip setpoint before the valve was closed. This finding had crosscutting aspects of human performance. The licensee had not provided adequate instructions for manual operation of the Limitorque motor-operated valve, which subsequently resulted in damage to the declutch mechanism.

The failure to provide adequate instructions for the operation of Limitorque motor-operated valves was a performance deficiency. This finding is more than minor because it affected the initiating events cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions and affected the cornerstone attribute of procedural quality because an inadequate procedure increased the probability of an initiating event. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the issue was determined to have very

low safety significance because the finding did not contribute to both the likelihood of a reactor trip and loss of mitigation equipment (power conversion system would have remained available), nor increase the likelihood of fire or flooding.
Inspection Report# : [2006002\(pdf\)](#)

Mitigating Systems

Significance:  Jun 23, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow System Operating Procedure

An NRC-identified noncited violation of Technical Specification 5.4.1 was identified for failing to follow system operating procedures for the Class 1E electrical equipment air conditioning units. On May 4, 2006, a planned maintenance evolution was scheduled to be performed that required shut down of safety-related Class 1E electrical equipment air conditioning Unit A (SGK05A); however, the operator incorrectly secured Class 1E electrical equipment air conditioning Unit B (SGK05B) and used steps that had been previously marked N/A. While later performing additional steps, the operator returned to the same incorrect Unit SGK05B and secured the unit a second time. However, the planned work had previously tripped the correct unit (SGK05A). This resulted in both trains being inoperable. The control room was notified, immediately declared both trains inoperable, and entered Technical Specification 3.0.3, which requires the plant to be in Mode 3 in 7 hours. The control room instructed operators to return Unit SGK05B to service and approximately 2 minutes later exited Technical Specification 3.0.3.

The inspectors determined that the failure to follow station procedures was a performance deficiency. The finding was greater than minor because it affected the mitigating systems cornerstone attribute of support equipment that ensures the availability of equipment that responds to initiating events. Using the Significance Determination Process Phase 1 Worksheet in Inspection Manual Chapter 0609, the inspectors determined that this finding is of very low safety significance because the finding did not result in a loss of safety function per Generic Letter 91-18. This finding had crosscutting aspects of human performance because personnel did not follow established procedures and did not use appropriate human error prevention techniques, such as self- and peer-checking.

Inspection Report# : [2006003\(pdf\)](#)

Significance:  May 10, 2006

Identified By: NRC

Item Type: FIN Finding

Inadequate Procedure to Address a 10 CFR Part 21 Notification of a Potential Safety-Related Component Defect

The team identified a finding for the licensee's failure to establish appropriate testing procedures for the operation of the turbine-driven auxiliary feedwater pump following notification (10 CFR Part 21 report issued April 12, 2005) of a component defect, which could substantially and adversely affect turbine-driven auxiliary feedwater pump operation. Specifically, the licensee did not adequately address appropriate testing, acceptance criteria, and test frequency to assure that the turbine-driven auxiliary feedwater governor operability remained unaffected by a potential null voltage shift that could prevent the fail safe mode of operation of the governor, as described in the 10 CFR Part 21 report. Since there were no indications of drifting of the null voltage for the past two surveillances, the licensee concluded that no additional actions were required to address the 10 CFR Part 21 report. Contrary to the vendor recommended actions, the licensee did not establish a monitoring frequency in accordance with recommended actions. This finding had crosscutting aspects associated with problem evaluation.

The failure to establish appropriate testing, acceptance criteria, and test frequency for the operation of the turbine-driven auxiliary feedwater pump was considered a performance deficiency. The finding was more than minor because if left uncorrected, the finding could become a more significant safety concern and affected the mitigating system cornerstone objectives of ensuring the availability, reliability, and capability of systems that respond to events to prevent undesirable consequences. The finding was determined to be of very low safety significance because it did not result in a loss of function in accordance with Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," Revision 1.

Inspection Report# : [2006010\(pdf\)](#)

Significance:  May 10, 2006

Identified By: NRC

Item Type: FIN Finding

Inadequate procedure for long-standing component cooling water pump problems

The team identified a finding for the failure to establish appropriate procedures for the operation of the component cooling water pump. Specifically, the licensee did not establish procedures to include appropriate acceptance criteria for component cooling water pump axial shaft movement that has existed for approximately 18 years. The licensee's procedure did not contain any vendor acceptance criteria to ensure axial shaft movement did not result in a failure of the pump during a postulated accident. The licensee did not evaluate the long-term impact from wear to the bearing fit surfaces, wear particles in oil samples, or long-term cyclic fatigue to adjacent piping and other components. This issue had crosscutting aspects associated with problem evaluation.

The failure to establish a procedure with appropriate acceptance criteria was considered a performance deficiency. The finding was more than minor because it affected the mitigating systems cornerstone attribute of procedure quality and affected the cornerstone objective of ensuring availability, reliability and capability of systems to respond to events. The finding was of very low safety significance because, despite the fact that the condition was not properly evaluated, the affected equipment remained operable consistent with Generic Letter 91-18, Revision 1.

Inspection Report# : [2006010\(pdf\)](#)

Significance:  May 10, 2006

Identified By: NRC

Item Type: FIN Finding

Inadequate procedure to address industry operating experience regarding submerged cables

The team identified a finding for the failure to establish appropriate procedures for the inspection of buried safety-related electrical cables. Specifically, the licensee did not establish procedures to include acceptance criteria to determine if buried safety-related electrical cables were subject to the degradation described in NRC Information Notice 2002-12, "Submerged Safety-Related Electrical Cables." The licensee did not develop a maintenance activity to inspect the underground cables for degraded or damaged jacketing, contrary to industry operating experience, which provided examples of visual inspections that discovered degraded cable jacketing. This issue had crosscutting aspects associated with problem evaluation.

The failure to establish a maintenance activity with appropriate acceptance criteria was considered a performance deficiency. The finding was more than minor because if left uncorrected the finding could become a more significant safety concern and it affected the mitigating system cornerstone objectives of ensuring the availability, reliability, and capability of systems that respond to events to prevent undesirable consequences. The finding was determined to be of very low safety significance because it did not result in a loss of function in accordance with Generic Letter 91-18, Revision 1.

Inspection Report# : [2006010\(pdf\)](#)

Significance:  Dec 31, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Manipulation of Plant Component Without Proper Authorization Results in Inoperable

A self-revealing noncited violation of a Technical Specification 5.4.1a occurred when station personnel failed to follow Procedure AP 21E-001, "Clearance Orders," and operated a temporary component that had been established within a fire protection suppression water system clearance boundary without instructions and authorization. Specifically, personnel started a temporary fire pump which had been connected to the station's fire protection system causing water to spray from a tagged open vent valve. The water spray wetted the control panel for the diesel driven fire pump which resulted in the pump becoming inoperable for approximately 4 hours. This issue involved human performance crosscutting aspects associated with station personnel not following a station procedure.

The failure to follow station procedures is a performance deficiency. The finding was determined to be more than minor because if affected the mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the finding was determined to degrade the fire protection system suppression and was evaluated using Appendix F, Fire Protection Significance Determination Process and screened to a Phase 3. The Phase 3 evaluation determined the finding was of very low safety significance. The licensee entered this finding into their corrective action program as PIR 2005-2142.

Inspection Report# : [2005004\(pdf\)](#)



Significance: Dec 29, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Provide Adequate Post-Fire Shutdown Procedures

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.

Inspection Report# : [2005008\(pdf\)](#)

Significance: TBD Dec 29, 2005

Identified By: NRC

Item Type: AV Apparent Violation

Failure to Maintain Reactor Coolant System Subcooling During the Alternative Shutdown

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 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.

Inspection Report# : [2005008\(pdf\)](#)

Significance: TBD Dec 29, 2005

Identified By: NRC

Item Type: AV Apparent Violation

Failure to Ensure Redundant Safe Shutdown Systems Located in the Same Fire Area Are Free of Fire Damage

The team identified an Apparent Violation of License Condition 2.C.(5), Fire Protection (Section 9.5.1, Safety Evaluation Report (SER); Section 9.5.1.8, SSER 5), concerning failure to assure safe shutdown systems are protected in accordance with the provisions of the approved fire protection program. The licensee credited manual actions to mitigate the effects of fire damage in lieu of providing the physical separation, physical protection, or an appropriate diverse means of accomplishing the safe shutdown function, which adversely affected the ability to achieve and maintain safe shutdown in the event of a fire. Standardized Nuclear Unit Power Plant System Final Safety Analysis Report, 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."

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 for the sample fire areas selected for inspection. The team found that the manual operator actions were reasonable (as defined in Enclosure 2 of Inspection Procedure 71111.05T), could be performed within the analyzed time limits assuming prompt recognition of the condition by control room operators and could be credited as part of or in whole as a compensatory measure. Since the manual operator actions were considered reasonable as interim compensatory measures, the significance determination process was not entered.

Inspection Report# : [2005008\(pdf\)](#)

Significance: TBD Dec 29, 2005

Identified By: NRC

Item Type: AV Apparent Violation

Inadequate Alternataive Shutdown Procedure

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.

Inspection Report# : [2005008\(pdf\)](#)

Significance:  Dec 08, 2005

Identified By: NRC

Item Type: FIN Finding

Failure to Adequately Implement Station Procedures for Cold Weather Operations.

The inspectors identified a finding of very low safety significance for the licensee's failure to adequately prepare for cold weather prior to the onset of frazil ice conditions on December 8, 2005. Specifically, the licensee failed to ensure essential service water air compressors were ready for use prior to lake temperature reaching 35 degrees in accordance with established procedures. The licensee entered this issue into their corrective action program as Performance Improvement Request 2006-006.

The inspectors determined that the failure to have the air compressors ready at the time the procedure provided for their being placed into service was a performance deficiency. The finding was more than minor because, if left uncorrected, it would become a more significant safety concern. The finding also affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems to respond to initiating events to prevent undesirable consequences. Utilizing the Phase 1 Screening Worksheet in Inspection Manual Chapter 0609, "Significance Determination Process," this finding was determined to have very low safety significance because it did not represent a loss of a safety function and is not potentially risk significant because of the plant conditions that would be impacted by external events with warming flow established. The cause of this finding is related to the crosscutting element of human performance for the failure to ensure the air compressors were in place and available at the time conditions existed when they should be placed into service.

Inspection Report# : [2005005\(pdf\)](#)

Barrier Integrity

Significance:  May 10, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate corrective actions to address spent fuel pool foreign material.

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to take adequate corrective actions to address spent fuel pool foreign material issues. Specifically, the licensee did not determine the source of the foreign material and prevent it from entering the spent fuel pool on multiple occasions. The spent fuel pool is considered a foreign material exclusion zone in which no foreign material is allowed. Although it was considered a low probability event, foreign material in the spent fuel pool could cause problems with spent fuel pool cooling equipment or could be carried into the core during refueling and result in degradation of the fuel assembly cladding. As such, the introduction of foreign material into the spent fuel pool was considered a significant condition adverse to quality. This issue had crosscutting aspects associated with problem evaluation and resolution.

The failure to take effective corrective actions to determine and correct the source of spent fuel pool foreign material was considered a performance deficiency. The finding was more than minor because it affected the barrier integrity cornerstone attribute of cladding performance and human performance (foreign material exclusion). This finding was of very low safety significance because it is associated with a fuel barrier concern and did not affect reactor coolant system barrier performance.

Inspection Report# : [2006010\(pdf\)](#)

Significance:  Apr 07, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to follow administrative procedure for operability determination

The inspectors identified a noncited violation of Technical Specification 5.4.1 for failure to follow Administrative Procedure AP28-011, "Resolving Deficiencies Impacting SSC's [structures, systems and components]," Revision 1. The inspectors identified a faulty evaluation of a containment spray system degraded condition. The degraded condition was caused by the potential for a 5 cubic foot void in both trains of the containment spray system. The licensee identified the condition and performed their evaluation in response to industry operating experience regarding voiding in safety-related fluid systems. The evaluation was faulty in its interpretation of the information provided in NUREG/CR-2792. Once aware of the faulty evaluation, the licensee failed to adhere to Procedure AP 28-011 in the following ways: (1) they failed to document the deficiency as soon as possible; (2) they failed to inform the shift manager immediately; (3) they failed to provide reasonable assurance of operability in a time frame commensurate with safety; and (4) they failed to provide a valid reasonable assurance of operability prior to completion of a prompt operability evaluation. This finding had crosscutting aspects associated with problem identification and resolution based on the fact that both the original evaluation of the industry operating experience and the engineering judgement used to provide reasonable assurance of operability were inadequate.

The failure to implement Procedure AP 28-011 following identification of a degraded condition was a performance deficiency. This finding is more than minor because, if left uncorrected, the failure to follow Procedure AP 28A-011 would become a more significant safety concern. Based on the results of a significance determination process Phase 1 evaluation, this finding was determined to have very low safety significance since the licensee was ultimately able to demonstrate operability of the affected equipment.

Inspection Report# : [2006002\(pdf\)](#)

Emergency Preparedness

Occupational Radiation Safety

Significance:  Apr 07, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to follow a station procedure for the operation of the incore detector drive system

The inspectors identified a noncited violation of Technical Specification 5.4.1(a) for the failure to follow licensee Procedure SYS SR-200, "Movable Incore Detector Operation," Revision 18. Contrary to this procedure, during troubleshooting activities on the incore detector drive system, an incore detector was moved with personnel in the area. This issue was determined to have crosscutting aspects regarding human performance.

The failure to follow the procedure for incore detector system operation was a performance deficiency. The finding is more than minor because it is associated with the occupational radiation safety cornerstone attribute regarding programs and processes and affected the cornerstone objective of ensuring the adequate protection of worker health and safety from exposure to radiation in that not following station procedure could increase personnel exposure. Using the occupational radiation safety determination process to analyze the significance of the finding, the inspectors concluded the issue was of very low safety significance because the inspection finding was not related to ALARA, did not involve an overexposure, and there was no substantial potential for overexposure.

Inspection Report# : [2006002\(pdf\)](#)

Public Radiation Safety

Physical Protection

[Physical Protection](#) information not publicly available.

Miscellaneous

Significance:  Jun 23, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow Station Procedures for Clearance Orders

An NRC-identified noncited violation of Technical Specifications 5.4.1 for failing to follow procedures was identified when electricians removed terminal leads that were still energized with 500 volt ac. During work under Clearance Orders C15-D-LF-005 and C15-D-LF-006 to replace two sump pump motors located in the radwaste tunnel, the electricians discovered that the terminals on the sump motors were still energized with 500 volt ac. The licensee's investigation discovered that the clearance orders written to isolate the sump motors did not include 120 volt ac breakers for moisture sensors located in the motor.

The inspectors determined that the failure to follow station procedures to establish appropriate administrative controls and verify components were de-energized prior to work was a performance deficiency. The inspectors concluded that the finding was greater than minor because, if left uncorrected, the failure to adhere to clearance order procedure requirements that are applicable to work on safety-related and mitigating equipment and the failure to ensure equipment is in a configuration where an unexpected response will not occur prior to work could result in a plant transient or effect mitigating equipment and become a more significant safety concern. This issue was reviewed using Manual Chapter 0609, Significance Determination Process, and determined that NRC management review for safety significance was appropriate. The safety significance was determined to be very low based on the fact that there was no impact on safety-related equipment and failure of the sump pumps would not initiate a plant transient. This finding had crosscutting aspects of problem identification and resolution for the failure to adequately address previous occurrences, specifically involving the sump pump motors, as well as human performance because the licensee failed to thoroughly evaluate a similar concern such that the cause was resolved and personnel did not follow established procedures.

Inspection Report# : [2006003\(pdf\)](#)

Last modified : December 21, 2006