

Wolf Creek 1

1Q/2008 Plant Inspection Findings

Initiating Events

Significance:  Dec 31, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

Inadequate work instructions resulted in condensate pump trip

A self-revealing finding was identified for inadequate work instructions and poor work practices associated with trip circuit verification on the Central Chiller B resulted in the Condensate Pump B trip and steam generator level transient. Procedure RNM C-1301, "Miscellaneous Relay and Meter equipment," Revision 6, step 8.3.2.8.h of RNM C-1301 required in part that a jumper be installed from Terminals 3 to 4 on Relay 194 at Breaker PB00402 for the Central Chiller B (wire C280 and C281) which resulted in Condensate Pump B trip. However, this step was copied from a previous work order and not verified as appropriate for the testing being conducted. Step 8.3.2.8.h should have read in part to install jumpers from Terminals 7 to 8 (wire C284 and C285). Licensee reviews and walkdowns were inadequate to identify the incorrect instructions due to workload, interruptions and distractions during the review process. The evaluation also identified Performance Improvement Request 2002-1664 which discussed a similar event where copied information in a work order was incorrect and not identified in reviews. Corrective actions for this event included adding sign-off sections in RNM C-1301 for walkdowns/reviews to ensure work instructions were reviewed before work was performed.

The failure to provide adequate work instructions is a performance deficiency. This finding was more than minor because it is associated with the procedure quality attribute of the Initiating Events cornerstone and it affected the cornerstone objective to limit the likelihood of those events that upset plant stability. This finding also affected the procedure quality attribute for the Mitigating Systems Cornerstone and it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Because two cornerstones were affected a Phase 2 analysis was required. The consequences were assessed using the Phase 2 pre-solved tables with the assistance of a Region IV Senior Reactor Analyst. Although the likelihood of a trip was increased and the capability of the normal heat sink was reduced, the exposure time for this condition was less than 3 days and all other mitigation capabilities were maintained. Consequently, the finding was determined to be of very low safety significance. The cause of the finding has human performance crosscutting aspects in the area associated with work practices because the licensee failed to ensure that human error prevention techniques such as self/peer-checking and proper documentation of activities were used in the review of work activities such that they are performed safely (H.4(a)).

Inspection Report# : [2007005 \(pdf\)](#)

Significance:  Jul 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify Cause of Component Cooling Water Valve Closures

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Conditions Adverse to Quality," involving Wolf Creek's failure to identify and correct the cause of the reactor coolant pump (RCP) thermal barrier component cooling water heat exchanger outlet valves stroking closed on high flow. Specifically, between 2001 and 2007, Wolf Creek experienced repeated cases of the RCP thermal barrier component cooling water heat exchanger outlet valves stroking closed when two component cooling water pumps are started during train swaps. Wolf Creek evaluated the issue after inspector questioning but did not review the impact of the valves stroking closed during design basis events or accidents and the operators' ability to open them given the valves circuit breakers opening. Wolf Creek has further condition reports open on this finding.

The failure to identify and correct the condition adverse to quality of ensuring RCP seal cooling as described in the Updated Safety Analysis Report is a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute for the Initiating Events Cornerstone; and, it affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during

shutdown as well as power operations. The finding is of very low safety significance because the finding would not result in exceeding the Technical Specification limit for identified reactor coolant system leakage and would not have affected other mitigation systems resulting in a total loss of their safety function. The cause of the finding has problem identification and resolution crosscutting aspects in the area of corrective action because Wolf Creek did not thoroughly evaluate the issue such that the resolution addressed the extent of conditions given multiple opportunities documented in the corrective action program (P.1(c)).

Inspection Report# : [2007003](#) (pdf)

Significance:  Jul 07, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

Inadequate Inspections of Circulating Water Pump Auto Transformers

A self-revealing finding for failing to identify degraded circulating water pump auto transformers during inspections in April 2007. Specifically, Wolf Creek failed to adequately inspect and identify signs of overheating and degradation during inspection of the excitation auto transformers for the circulating water pumps. Consequently, the unidentified degraded condition resulted in the circulating water Pump A tripping and an automatic turbine load reduction on May 25, 2007. Wolf Creek has replaced the failed auto transformer and is planning a modification to increase the size of the transformers to reduce overheating.

The failure to perform adequate inspections of the circulating water Pump A excitation auto transformer was considered a performance deficiency. The finding is more than minor because it is associated with the Initiating Events Cornerstone because the deficiency affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was determined to be of very low safety significance because the issue did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The cause of the finding has human performance crosscutting aspects in the area of work practices because Wolf Creek did not follow maintenance procedures and did not ensure oversight of work activities such that nuclear safety was supported (H.4(b)).

Inspection Report# : [2007003](#) (pdf)

Mitigating Systems

Significance:  Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Vent ECCS Piping Every 31 days

The team identified two examples of a noncited violation of Technical Specification Surveillance Requirements 3.5.3.4 for the failure to vent emergency core cooling system discharge piping. In the first example, the licensee had inappropriately concluded that inaccessible vents included all those vents located in posted high radiation areas, but either no high radiation field existed in the area or personnel would not be exposed to high radiation dose. The second example involved the failure to perform the surveillance in accordance with the 31 days required frequency. When the surveillance was conducted, gas was observed coming from a SI system hot leg injection line vent.

Both violation examples were more than minor because they were similar to non-minor examples 4.m from NRC Inspection Manual Chapter 0612, Appendix E. "Examples of Minor Issues," in that, when the surveillances were completed, unexpected amounts of gas were found the piping systems. Some sections were totally voided. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessment." The finding had a crosscutting aspect in the Human Performance, Resources component, because the licensee failed to have an adequate surveillance procedure that included all necessary ECCS vent values. These findings were indicative of current performance because operators, who are familiar with the TS requirements and Bases commitments, could have questioned, at any time, the practice of eliminating accessible values from the venting program.

G

Significance: Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Promptly Identify and Correct Voiding in the Safety Injection System

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI (Corrective Actions), with five examples, for the failure to promptly identify and correct voids in safety injection system. In some cases, significant changes in the safety injection tank leakage rates went unnoticed. Safety injection tank leakage can be a key indicator that voids are forming in lower pressure systems. In other examples, unexpected amounts of gas came from safety injection piping vents but operators and engineers failed to take meaningful actions to investigate or to address the occurrences. Contributors to the violation included: (1) the failure to properly address two pieces of related operating experience, (2) management's failure to follow site procedures and ensure that operating experience reviews were adequate, (3) the emergency core cooling system monthly venting procedure contained inadequate acceptance criteria, and (4) engineers were not adequately monitoring safety injection tank leakage.

This finding was more than minor because it was similar to non-minor example 3.j from NRC Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that there was a reasonable doubt on the operability of the Train A safety injection system and the steam generators. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." The finding had a crosscutting aspect in the Problem Identification and Resolution area, Operating Experience component, because the site had not institutionalized operating experience. This finding was indicative of current plant performance because the weaknesses in the operating experience program that permitted the inadequate review of operating experience were still in place at the time of this inspection.

G

Significance: Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Promptly Identify and Correct Voids in ECCS Suction Piping

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI (Corrective Actions), with five examples, for the failure to promptly identify and correct voids in safety injection system. In some cases, significant changes in the safety injection tank leakage rates went unnoticed. Safety injection tank leakage can be a key indicator that voids are forming in lower pressure systems. In other examples, unexpected amounts of gas came from safety injection piping vents but operators and engineers failed to take meaningful actions to investigate or to address the occurrences. Contributors to the violation included: (1) the failure to properly address two pieces of related operating experience, (2) management's failure to follow site procedures and ensure that operating experience reviews were adequate, (3) the emergency core cooling system monthly venting procedure contained inadequate acceptance criteria, and (4) engineers were not adequately monitoring safety injection tank leakage.

This finding was more than minor because it was similar to non-minor example 3.j from NRC Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that there was a reasonable doubt on the operability of the Train A safety injection system and the steam generators. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." The finding had a crosscutting aspect in the Problem Identification and Resolution area, Operating Experience component, because the site had not institutionalized operating experience. This finding was indicative of current plant performance because the weaknesses in the operating experience program that permitted the inadequate review of operating experience were still in place at the time of this inspection.

Significance:  Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate RHR and CS Void Calculations

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III (Design Control), for an inadequate calculation involving previously identified voids in the residual heat removal and containment spray containment suction piping. A contract engineer relied solely on engineering judgment to determine that the void stream, up to 11 percent, would have no affect on pump performance. Test data from an NRC NUREG, that the licensee had also used, contradicted the contractor's assessment. A contributor to this violation was the licensee's poor understanding of information contained in the NUREG.

This finding was more than minor because it was similar to non-minor example 3.j from NRC Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that there was a reasonable doubt on the operability of the residual heat removal and containment spray pumps. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss of operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." The finding had a crosscutting aspect in the Problem Identification and Resolution area, Corrective Action Program component, because the site failed to perform an adequate engineering evaluation for a nonconforming condition [P.1(c)].

Inspection Report# : [2008007](#) (pdf)

Significance:  Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Adequately Correct Voiding Design Control Violation

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI (Corrective Actions), because the licensee took inadequate corrective measures to address NRC identified deficiencies involving the calculation for voids in the residual heat removal and containment spray sump piping. The licensee's assessment failed to address the expected change in net-positive-suction-head required for the pumps. NRC issued guidance informed the licensee that this term would need adjustment.

This finding was more than minor because, if left uncorrected, could become a more significant safety concern. For example, the net positive suction head calculations for residual heat removal pumps shows that the pumps have very little design margin. The failure to properly address the voids may lead engineers to believe that there is margin available for plant modifications (such as the containment sump modification), when there is not. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss of operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." The finding had a crosscutting aspect in the Problem Identification and Resolution area, Corrective Action Program component, because the site failed to perform an adequate engineering evaluation for a performance deficiency [P.1(c)].

Inspection Report# : [2008007](#) (pdf)

Significance:  Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Approve Engineering Calculations Prior to Use at Wolf Creek and Inadequate Work Instructions

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III (Design Control), with two examples for: (1) the failure to implement engineering procedures and approve a third party calculation prior to use at Wolf Creek, and (2) the failure to properly translate licensing and design basis information into instructions. Following identification of the first example, the licensee approved the subject calculation for use at Wolf Creek.

However, the calculation had an inadequate basis for the acceptance of a 5 percent void fraction in suction piping and a 20 percent void fraction in discharge piping. Specifically, the calculation failed to consider the impact of voids on natural circulation operations and was inconsistent with Technical Specifications, the Updated Final Safety Analysis Report, and net positive suction head calculations. All had assumed that Wolf Creek piping was water solid.

The finding was more than minor because, if left uncorrected, could result in a more significant safety concern. Specifically, the existence of 5 percent void fraction on the suction side of the pumps and 20 percent on the discharge side are still unanalyzed conditions and could adversely impact design basis accident analysis results. The licensee's operability assessment provided a reasonable expectation that design limits would not be exceeded. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." The finding had a crosscutting aspect in the Problem Identification and Resolution area, Corrective Action Program component, because the site failed to perform an adequate engineering evaluation [P.1(c)].

Inspection Report# : [2008007](#) (pdf)

Significance:  Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Piping Design Procedure and ASME Code Requirements

The team identified a noncited violation of 10 CFR 50, Appendix B, Criterion V (Procedures), for the failure to implement piping design procedure requirements. The procedure required that piping systems be designed for normal component service (filling and venting) as well as routine operational surveillance (monthly emergency core cooling system venting). The piping systems were actually designed with some sections that could not be totally filled. The licensee also failed to design the piping in accordance with the ASME Code, which required vents at all piping high points.

The finding was more than minor because, if left uncorrected, it could result in a more significant safety concern. Specifically, the performance of emergency core cooling system systems with voids is not totally understood and could result in adverse systems response such as degraded pump performance or adversely impact natural circulation operations. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss of operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments."

Inspection Report# : [2008007](#) (pdf)

Significance:  Mar 13, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Root Cause Assessment

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, because the licensee failed to follow the site procedure when performing a root cause assessment for the emergency core cooling system voiding issues and, subsequently, completed an inadequate root cause assessment. The licensee came to the erroneous conclusion that operating experience evaluations were thorough, but actually drew broad conclusions based on unverified and incorrect information, and had failed to identify significant contributors to the events.

The finding was more than minor because, if left uncorrected, it could result in a more significant safety concern. Specifically, the NRC relies heavily on the licensee's ability to find and correct their own safety issues. The licensee's reliance on unvalidated (and incorrect) information and the crafting of corrective measures to fit erroneous conclusions provides an unacceptable level of confidence that the licensee can consistently correct its own problems without NRC involvement. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." The finding had a

crosscutting aspect in the Problem Identification and Resolution area, Corrective Action Program component, because the site failed to perform an adequate engineering evaluation.

Inspection Report# : [2008007 \(pdf\)](#)

Significance:  Feb 29, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Twenty one examples of failure to follow seismic requirements of scaffolding procedure

The team identified a noncited violation of 10 CFR 50 Appendix B Criterion V, in which 21 scaffolds in 10 plant areas that were in contact with or closer to plant equipment than procedure allowed. The procedure required engineering evaluations which did not contain any technical bases as to the acceptability of as built scaffolds.

Subsequent engineering evaluation of each of the incorrect scaffolding installations confirmed that the configurations did not challenge operability. The NRC identified previous concerns with the erection of scaffolds, yet the licensee failed to take action to correct this issue.

The team evaluated the significance of this finding using Phase 1 of Inspection Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," and determined that the finding was of very low safety significance because the issue resulted in 21 unevaluated scaffolds which are likely not to challenge the ability of the plant to safely shutdown after an earthquake. As such, under Phase 1 screening, the deficiency is not related to a qualification or design deficiency, it did not represent a loss of safety function for a train or system as defined in the plant specific risk-informed inspection notebook, and did not screen as risk significant for seismic external events, because the affected systems were considered degraded, but operable. Using these inputs, the performance deficiency screened to Green. The team determined that the finding had a human performance crosscutting aspect in the area associated with decision making because the licensee failed to adopt a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that the proposed action is safe in order to disapprove the action. Specifically, Wolf Creek Generating Station did not conduct any review of engineering decisions to verify the validity of the underlying assumption that equipment and scaffolding could be in contact or closer than the established limit (H.1(b)).

Inspection Report# : [2008006 \(pdf\)](#)

Significance:  Feb 29, 2008

Identified By: NRC

Item Type: FIN Finding

Failure to take Corrective Action For Missed Compensatory Measures

The team identified a finding because the licensee failed to take timely corrective actions to address a previously identified NRC finding. FIN 2007002-04 was issued because the licensee had failed to establish compensatory actions in response to the failure of all Main Annunciator Board alarms. Failure to have compensatory measures inhibited the licensee in their efforts to determine the cause of the alarm failures. Corrective actions repaired the equipment that caused of the annunciator failure, but were unrelated to the failure to follow procedures and take compensatory measures.

The team determined that this was a performance deficiency because the licensee had committed to take corrective actions in response to the previous NCV but failed to do so in a timely manner. The inspectors determined that this violation was greater than minor because it met the intent of MC 0612 Appendix E Example 4.a. in that there were several examples of the licensee failing to take corrective actions in response to NRC identified NCVs and findings, indicating that "The licensee routinely failed to perform engineering evaluations on similar issues." The inspectors performed a Phase I SDP evaluation and determined that the violation was screened as being very low safety significance, Green, because all of the answers to the Phase I Worksheet Mitigating Systems Column were "no". The team also determined that this finding has crosscutting aspects in the problem identification and resolution area associated with the corrective action program in that the licensee failed to implement timely or effective corrective actions. (P.1(d)).

Inspection Report# : [2008006 \(pdf\)](#)

Significance:  Feb 29, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to take corrective action for missed operability evaluation compensatory measures

The team identified a violation of 10CFR50 Appendix B Criterion XVI because the licensee failed to take timely corrective actions to address a previously identified NCV. NCV 2007003-05 was issued because the licensee had failed to perform an operability evaluation following bearing replacement on the Train B emergency exhaust system fan. Corrective actions were not related to the missed performance of the operability evaluation, but the equipment failure.

The team determined that this was a performance deficiency because the licensee had committed to take corrective actions in response to the previous NCV but failed to do so in a timely manner. The inspectors determined that this violation was greater than minor because it met the intent of MC 0612 Appendix E Example 4.a. in that there were several examples of the licensee failing to take corrective actions in response to NRC identified NCVs and findings, indicating that “The licensee routinely failed to perform engineering evaluations on similar issues.” The inspectors performed a Phase I SDP evaluation and determined that the violation was screened as being very low safety significance, Green, because all of the answers to the Phase I Worksheet Mitigating Systems Column were “no”. The team also determined that this finding has crosscutting aspects in the problem identification and resolution area associated with the corrective action program in that the licensee failed to implement timely or effective corrective actions. (P.1(d)).

Inspection Report# : [2008006](#) (*pdf*)

Significance:  Feb 29, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to take timely corrective action to establish monitoring frequency of AFW pump governor null drift

The team identified a violation of 10 CFR 50 Appendix B Criterion XVI because the licensee failed to take timely corrective actions to address a previously identified finding. Finding 2006010 was issued because the licensee had failed to establish an acceptable monitoring frequency on their Turbine Driven Auxiliary Feedwater Pump speed governor null-drift as recommended by a Part 21 report from Engine Systems, Inc. The corrective actions to establish the monitoring for the null-drift were not implemented.

The team determined that this was a performance deficiency because the licensee had committed to take corrective actions in response to the previous NCV but failed to do so in a timely manner. The team determined that this violation was greater than minor because it met the intent of MC 0612 Appendix E Example 4.a. in that there were several examples of the licensee failing to take corrective actions in response to NRC identified NCVs and findings, indicating that “The licensee routinely failed to perform engineering evaluations on similar issues.” The team performed a Phase I SDP evaluation and determined that the violation was screened as being very low safety significance, Green, because all of the answers to the Phase I Worksheet Mitigating Systems Column were “no.” The team also determined that this finding has crosscutting aspects in the problem identification and resolution area associated with the corrective action program in that the licensee failed to implement timely or effective corrective actions (P.1(d)).

Inspection Report# : [2008006](#) (*pdf*)

Significance:  Feb 29, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to take timely corrective action to correct Barton transmitter defects

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, regarding the failure to identify and correct conditions adverse quality associated with NRC NCV 2006-004-02 documented in Inspection Report 2006-004. Specifically, the licensee did not address in the apparent cause evaluation and corrective actions the failure to follow procedures resulting in an inadequate inspection of installed Barton pressure transmitters for known potential manufacturing defects which resulted in a previous violation of Administrative Procedure AP 28-011, “Resolving Deficiencies Impacting SSC’s,” Revision 1. The licensee inappropriately credited transmitter inspections

that occurred several years prior to receipt of the vendor recommendation as sufficient to resolve this issue.

This finding was more than minor because it could reasonably be viewed a precursor to a significant event and affected the equipment performance attribute of the mitigating systems cornerstone and the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheets, the inspectors determined that the finding is of very low significance because it did not represent an actual loss of a safety function or operability and was not potentially risk significant due to external events. The inspectors also determined that this finding has crosscutting aspects in the problem identification and resolution area associated with the corrective action program in that the licensee failed to identify the issue completely and thoroughly evaluate the problem such that the problem was resolved (P.1(a), P.1(c)).

Inspection Report# : [2008006](#) (pdf)

Significance:  Feb 29, 2008

Identified By: NRC

Item Type: FIN Finding

Failure to take timely corrective action to correct annunciator feed configuration deficiencies.

The team identified a green finding for failure to implement corrective action for abandoned in place annunciator feed wiring deficiencies. CR 2005-003275 was initiated because Cables ST-009 and ST-019 were field-spliced together to prevent electrical shocks such that the system configuration did not match the system drawing. Work Order (WO) 07-292004-000 was initiated to correct this condition but was closed as unworkable. CR 2005-003275 was closed to this closed work order even though the condition was not corrected, leaving the system in a condition not reflected in drawings or design documents. This configuration could result in further shocks, and further configuration control issues. The main annunciator system and its feeds are not safety-related, and therefore this performance deficiency is not a violation of NRC requirements.

The failure to implement corrective actions for an identified configuration control issue is a performance deficiency. This item affects the mitigating systems cornerstone. The team determined that this violation was greater than minor because it met the intent of MC 0612 Appendix E Example 4.a. in that there were several examples of the licensee failing to take corrective actions in response to findings, indicating that "The licensee routinely failed to perform engineering evaluations on similar issues." The team performed a Phase I SDP evaluation and determined that the violation was screened as being very low safety significance, Green, because all of the answers to the Phase I Worksheet Mitigating Systems Column were "no." The team also determined that this finding has crosscutting aspects in the problem identification and resolution area associated with the corrective action program in that the licensee failed to implement timely or effective corrective actions. (P.1(d)).

Inspection Report# : [2008006](#) (pdf)

Significance:  Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to evaluate ESW valve corrosion

The inspectors identified a noncited violation (NCV) of 10 CFR Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to follow a procedure which required an evaluation of the Train B of ESW traveling screen wash valve and identical valves in the system after the Train A ESW screen wash valve had failed. Wolf Creek declined to enter its operability process but did tag Valve EF HV-92 open on September 13, 2007. An operability evaluation was produced on September 27, after EF HV-92 was disassembled and found to have unacceptable disc material loss due to corrosion. Corrective actions from the September 27 evaluation include a disassembly of an identical valve in the essential service water system that shows degrading but operable performance.

The failure to follow Procedure AP 26C-004, "Technical Specification Operability," which required an evaluation of Valve EF HV-92, is a performance deficiency. The finding is more than minor because if left uncorrected the valve discs corrosion would become a more significant safety concern. The finding was of very low safety significance because the issue resulted in Valve EF HV 92 being degraded, but did open even with significant material and is not related to a qualification or design deficiency, did not result in the loss of safety function for greater than 24 hours, and was not related to external events such as fires and floods. The cause of the finding had problem identification and

resolution crosscutting aspects in the area associated with the corrective action program because the licensee failed to evaluate the failure mechanism completely, accurately, and in a timely manner commensurate with its safety significance (P.1(a)).

Inspection Report# : [2007005](#) (pdf)

G

Significance: Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate evaluation of EDG for common cause failure

The inspectors identified a noncited violation of Technical Specification 3.8.1 for failure to perform an adequate common cause evaluation within 24 hours to demonstrate no common cause failure mechanism existed between the emergency diesel generators. Wolf Creek's common cause evaluation stated that the "Hypothesis" was that the EDG A digital reference unit (DRU) had not been refurbished as recommended in a April 21, 2004, 10 CFR Part 21 notification from Fairbanks Morse which stated that Wolf Creek's DRUs were affected by an integrated circuit contamination problem. Inspectors reviewed the April 21 notification and found that the slow start rpm ramp function was affected, however, The inspectors reviewed operating experience and other generic correspondence and found a 10 CFR Part 21 notification dated January 23, 2006, from Engine Systems, Inc. (ESI), who is a vendor for DRUs. The ESI notification describes a DRU deficiency in which an integrated circuit manufacturing defect can cause failure of the engine load raise and lower signals to the electronic governor controller. The inspectors noted this failure mechanism was similar to Wolf Creeks observed failure on November 1, 2007. Both EDGs were found to be affected by the ESI notification.

The inspectors determined that the failure to demonstrate, per TS 3.8.1 required actions B.3.1 or B.3.2, that no common cause failure existed for the EDGs is a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute for the Mitigating Systems Cornerstone; and, it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding was of very low safety significance because the issue resulted in the EDG being degraded, but likely to start even with an intermittent failure and did not result in the loss of safety function for greater than 24 hours, and was not related to external events such as fires and floods. The cause of the finding had problem identification and resolution crosscutting aspects in the area associated with the corrective action program because the licensee failed to evaluate the failure mechanism completely, accurately, and in a timely manner commensurate with its safety significance (P.1(a)).

Inspection Report# : [2007005](#) (pdf)

G

Significance: Dec 31, 2007

Identified By: NRC

Item Type: FIN Finding

Failure to enter and evaluate EDG operating experience in CAP

The inspectors identified a finding for failure to enter into corrective action program evaluate relevant emergency diesel generator operating experience which allowed a manufacturing defect to exist resulting in a testing failure. Procedure AP 20E-001, Step 4.1.1, in part, directs the screening and review of operating experience from sources such as vendors, the NRC, other utilities, and INPO. Although, the inspectors found that Wolf Creek was not specifically listed as affected in the ESI Part 21, they had procured DRUs that were listed by serial number on the ESI notification. The inspectors also found a Woodward service bulletin dated January 2006 that Wolf Creek had not reviewed addressing the same issue that listed DRU serial numbers affected which included Wolf Creeks DRUs.

The failure to enter into corrective action program evaluate publicly available operating experience directly applicable to Wolf Creek's emergency diesel generators is a performance deficiency. This finding was more than minor because it is associated with the equipment performance attribute for the Mitigating Systems Cornerstone; and, it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding is of very low safety significance because the issue resulted in the EDG being degraded, but likely to start even with an intermittent failure and is not related to a qualification or design deficiency, did not result in the loss of safety function for greater than 24 hours, and was not related to external events such as fires and floods. The cause of the finding has a problem identification and resolution crosscutting aspect in the area associated with the operating experience program because the licensee's operating experience process did not use operating experience information, including vendor recommendations, to support plant safety. Specifically, the licensee did not systematically collect, evaluate, and communicate relevant external operating

experience to affected internal stakeholders in a timely manner (P.2(a)).
Inspection Report# : [2007005 \(pdf\)](#)

Significance: **G** Dec 31, 2007

Identified By: NRC

Item Type: FIN Finding

Clogged drains cause circulating water roof loads to exceed design

The inspectors identified a Green finding for exceeding the calculated roof loading for the circulating water screen house. In May 2007, Wolf Creek received heavy rains and water leaks from the circulating water screen house roof were observed. On May 8, 2007, it was observed that the roof of the circulating water screen house had accumulated approximately eight inches of standing water and that the drains were blocked by debris. Subsequently on May 8, the drains were cleared and the roof was drained. A roof yield or collapse was assumed to result in the loss of both circulating water and normal service water.

Exceeding the calculated allowable roof loading due to clogged drains is a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute for the Mitigating Systems Cornerstone; and, it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, this finding was more than minor because it is associated with the equipment performance attribute for the Initiating Events Cornerstone; and, it affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. This finding screened to a Phase 3 analysis because two or more cornerstones (Initiating Events and Mitigating Systems) were affected. The Senior Reactor Analyst performed the Phase 3 analysis and determined it to be of very low safety significance.

Inspection Report# : [2007005 \(pdf\)](#)

Significance: **G** Oct 06, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to implement transient combustible material control permit requirements

The inspectors identified a Green noncited violation of Technical Specification 5.4.1.d for failing to control combustible materials in an area of the plant that contained safety-related equipment. During a walkdown, inspectors noted that temporary scaffolding constructed of flame retardant treated wood installed in the emergency diesel generator rooms did not have a transient combustible materials permit. Following review of the procedure for control of combustibles, it was noted that the licensee inappropriately considered fire retardant treated wood as noncombustible material and exempted it from permit control. This could lead to the uncontrolled use of fire treated wood throughout the facility, even in excess of fire hazard analysis limits for fire loads.

The inspectors determined that the inadequate control of transient combustibles in the emergency diesel generator rooms was more than minor because, if left uncorrected, it would become a more significant safety concern and could potentially affect emergency diesel generator availability due to fire under the mitigating systems cornerstone. The finding was of very low safety significance because it involved the combustible controls program and was assigned a low degradation rating since the flame retardant treated wood is considered a high flashpoint material.

Inspection Report# : [2007004 \(pdf\)](#)

Significance: **G** Oct 06, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to collar EDG assembly procedure resulting in NOED

A self-revealing noncited violation was identified regarding failure to follow a procedure used to reassemble the intercooler and jacketwater pumps to the Train A emergency diesel generator resulting in the Emergency Diesel Generator A being inoperable. During reassembly of the Emergency Diesel Generator A on June 6, 2007, the stationary seals for the intercooler and jacketwater pumps were not correctly installed in their housings. On July 5, 2007, the Emergency Diesel Generator A failed its surveillance test because the intercooler pump leaked at a rate of 23.4 ml/min with an acceptability limit of 9.1 ml/min. Even with the leakage, Emergency Diesel Generator A was later determined to be capable of running for greater than 24 hours.

The failure to install the stationary seals in accordance with the approved work orders is a performance deficiency. The finding is more than minor because it is associated with the human performance attribute of the mitigating systems cornerstone; and, it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding is of very low safety significance because the issue does not represent a qualification or design deficiency, it did not represent a loss of safety function for a train or system as defined in the plant specific risk-informed inspection notebook, and was not related to external events such as fires and floods. The inspectors also determined that the finding has a human performance crosscutting aspect in the area associated with resources because the licensee failed to ensure that mechanics had adequate emergency diesel generator training to assure correct reassembly of the diesel auxiliaries as stated in Wolf Creek's root cause evaluation [H.2(b)].

Inspection Report# : [2007004](#) (pdf)

Significance:  Oct 06, 2007

Identified By: NRC

Item Type: FIN Finding

Failure to use appropriate guidance for valve operation

A self-revealing finding was identified when a nonlicensed plant operator failed to utilize appropriate guidance and used excessive torque on service water Valves 1WS0002A and 1WS0004 resulting in damage to the valves and unavailability of service water Pump 1WS01PA and the low-flow service water Pump 1WS002P. Valve 1WS0002A was repaired as emergent work and returned to service after approximately 42 hours of being unavailable and Valve 1WS0004 was repaired as corrective maintenance and returned to service after approximately 65 days of unavailability. This issue is captured in the licensee's corrective action program.

The finding was more than minor because it is associated with the equipment performance attribute for the mitigating systems cornerstone; and, it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors also determined that this finding was more than minor because it is associated with the equipment performance attribute for the initiating events cornerstone, and it affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. A Phase 3 evaluation was necessary since the finding involved concurrent multiple equipment degradations from a common cause. The Phase 3 evaluation concluded that the finding was of very low safety significance (Green). The inspectors also determined that the finding had a human performance crosscutting aspect in the area of work practices because the licensee failed to effectively communicate expectations regarding valve operations in accordance with procedural requirements [H.4(b)].

Inspection Report# : [2007004](#) (pdf)

Significance:  Jul 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Procedure for Restoration of the Emergency Diesel Generator Fuel Oil Transfer Pump Control Circuit Following a Fire Requiring Control Room Evacuation

The team identified a noncited violation of Technical Specification 5.4.1.a, for the licensee's inadequate procedure for remotely starting the emergency diesel generator fuel oil transfer pump following a fire in the control room.

Specifically, the governing procedure failed to include the necessary actions to replace the control power fuse in the associated motor control center, which would likely be blown as a result of the fire-induced circuit failures assumed in the licensee's analysis for the control room fire. In addition, the licensee had failed to specify and stage the control power fuse and fuse puller that could be required for timely restoration of the emergency diesel generator fuel oil transfer pump to service following the control room fire. This issue was entered into the licensee's corrective action program as Condition Report 2007-02790.

The finding was more than minor because it is associated with the mitigating systems cornerstone attribute of procedural quality and affected the associated cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," were used to conclude that analysis with Manual Chapter 0609, Appendix F, "Fire Protection Findings Significance Determination Process," was required because the issue involved a degradation in fire protection defense-in-depth strategies. A Phase 3 review was then performed by a senior reactor analyst who determined the finding to be of very low safety significance because of the low probability of a fire in relevant cabinets that would result in a control room evacuation.

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Design Control Associated with Vortexing Calculation

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that, the licensee did not ensure adequate suction submergence for the containment spray pumps by not properly translating vortex design parameters into calculations relative to the refueling water storage tank. Specifically, the licensee used a non-conservative method to calculate the level required to prevent pump vortexing in the refueling water storage tank. The licensee entered the issue into their corrective action program as Condition Report 2007-02597 and revised the affected calculations.

The finding was more than minor because it is associated with the mitigating systems cornerstone attribute of design control and affected the associated cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding is determined to have very low safety significance because it was a design deficiency that did not result in a loss of operability. The finding had crosscutting aspects in the area of problem identification and resolution associated with the corrective action program (P.1(a)) because the licensee did not identify an issue in a timely manner, commensurate with its safety significance.

Inspection Report# : [2007006](#) (pdf)

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify and Correct Discolored Boric Acid Deposits

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the failure to identify and take timely corrective action to correct indications of material wastage at the base of the Refueling Water Storage Tank. Specifically, the licensee did not recognize and take actions to prevent recurring discolored boric acid deposits for approximately 9 years. This issue was entered into the licensee's corrective action program as Condition Report 2007-02742.

The finding was more than minor because if left uncorrected it would become a more significant safety concern in that continued wastage could impact component operability. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance because it did not result in a system or component being inoperable and it did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding had crosscutting aspects in the area of problem identification and resolution associated with the corrective action program (P.1(c)) because the licensee failed to thoroughly evaluate the problem such that the resolution addressed the cause and extent of condition.

Inspection Report# : [2007006](#) (pdf)

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Nonconservative Battery Intercell Connection Resistance Value Specified in Design Calculation

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure of the licensee to ensure that the 125 Vdc safety-related batteries would remain operable if all the intercell and terminal connections were at the resistance value of 150 micro-ohms as allowed by Technical Specification Surveillance Requirement 3.8.4.5. The licensee's design calculation used a non-conservative value. This issue was entered into the licensee's corrective action program as Condition Report 2007-02492.

The finding was more than minor because it is associated with the mitigating systems cornerstone attribute of design control and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. The finding had

crosscutting aspects in the area of problem identification and resolution associated with the corrective action program (P.1(a)) because the licensee did not implement a program with a low threshold for identifying this issue and the licensee did not identify the issue completely, accurately, and in a timely manner.

Inspection Report# : [2007006](#) (*pdf*)

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Battery Surfaces Not Cleaned as Required by Procedure

The team identified a noncited violation of Technical Specification 5.4.1.a, for the licensee's failure to clean electrolyte from the outside surfaces of the 125 Vdc safety-related batteries in accordance with procedures.

Specifically, surveillance procedures for the 125 Vdc batteries required appropriate cleaning of electrolyte on battery cell covers following specific gravity checks, however, maintenance personnel did not perform this cleaning. The licensee has entered this issue into their corrective action program as Condition Report 2007-02580.

The finding was more than minor because if left uncorrected the finding would become a more significant safety concern due to the corrosive effects of electrolyte on battery posts and terminal connections. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because it did not result in a design qualification deficiency or loss of function and it did not screen as risk significant due to external events. The finding had crosscutting aspects in the area of human performance associated with work practices (H.4(a)) because of insufficient communication of human error prevention techniques to maintenance personnel, specifically with respect to self and peer checking.

Inspection Report# : [2007006](#) (*pdf*)

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: FIN Finding

Normal Charging Pump Balance Line Crack

The team reviewed a self-revealing finding associated with the licensee's failure to correct normal charging pump balance line vibrations in a timely manner. Because the licensee did not address the extended time and periodically increased magnitude of the vibrations, the balance line cracked, rendering the pump inoperable. This issue was entered into the licensee's corrective action program as Condition Report 2007-02339.

The finding was more than minor because it is associated with the mitigating systems cornerstone attribute of equipment performance and affected the associated cornerstone objective ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because the finding did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding had crosscutting aspects in the area of problem identification and resolution associated with the corrective action program (P.1(d)) in that licensee personnel did not take corrective actions to address a safety issue in a timely manner, commensurate with its safety significance.

Inspection Report# : [2007006](#) (*pdf*)

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: FIN Finding

Inadequate Procedure for Maintaining Drains Capable of Functioning

The team identified a finding associated with the licensee's failure to maintain a procedure which ensured that control building room drains remained available to pass their design flows for postulated flooding events. As a result of the licensee's procedure and practices, debris and items were found in control building room drains. This issue was entered into the licensee's corrective action program as Condition Report 2007-02753.

The finding was more than minor because if left uncorrected it would become a more significant safety concern. This finding affected the mitigating systems cornerstone. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding is determined to have very low safety significance because the finding did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding had

crosscutting aspects in the area of human performance associated with work practices (H.4(b)) because the licensee did not define and effectively communicate expectations regarding procedural compliance and personnel following procedures.

Inspection Report# : [2007006](#) (pdf)

G

Significance: Jul 20, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Diesel Generator Frequency Variation Not Considered in Loading Calculations

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance for the licensee's failure to account for the effect of emergency diesel generator frequency variation in the diesel loading calculations. Specifically, emergency diesel generator loading was based on nominal 60 hertz operation of pumps and fans and did not account for the 2 percent variation allowed by Technical Specifications. The licensee has entered this issue into their corrective action program as Condition Report 2007-02683.

The finding was more than minor because it was associated with the mitigating systems cornerstone attribute of design control and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, based on preliminary calculations, the failure to account for frequency variations had more than a minimal effect on the outcome of the analysis in that the continuous load rating for the emergency diesel generators would have been exceeded in the recirculation phase of a loss-of-coolant accident with the assumed loads. The team determined that the finding screened as very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability.

Inspection Report# : [2007006](#) (pdf)

G

Significance: Jul 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Manual Actions

A noncited violation of 10 CFR 50.65(a)(4) was identified for failure to adequately assess and manage the increase in risk during observation of a scheduled emergency diesel generator surveillance. On January 4, 2007, inspectors observed the emergency diesel Generator A hot start surveillance test and questioned plant operators regarding operability in Modes 1 or 2 of the emergency diesel generator while paralleled with the grid based on operating experience. The inspectors noted that operations personnel did not have a written set of steps or procedures identified for restoration of the emergency diesel generator, and would have to diagnose what restoration activities would have to be taken at the time of an emergency start demand based upon the step of the surveillance procedure in effect at the time the emergency start demand occurred. The inspectors also identified that operations personnel were unaware of the limiting response time for operator manual actions specified in Amendment 154 that approved testing in Modes 1 or 2. Wolf Creek has developed manual actions for restoration of the emergency diesel generator during testing.

The failure to adequately assess and manage the increase in risk for the use of operator manual actions to ensure emergency diesel generator availability during surveillance testing was a performance deficiency. The finding is similar to the minor example 7(g) and is more than minor because it is associated with the Mitigating Systems cornerstone attribute of protection against external factors, and affected the cornerstone objective of ensuring the availability of systems that respond to initiating events to prevent undesirable consequences. The finding was of very low safety significance because the magnitude of the calculated risk deficit was less than 1×10^{-6} and other risk management actions were in place.

Inspection Report# : [2007003](#) (pdf)

G

Significance: Apr 07, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to implement fire protection impairment control permit requirements and compensatory measures

A self-revealing noncited violation of Technical Specification 5.4.1.d was identified for failure to implement fire protection impairment control permit requirements and compensatory measures when operators incorrectly disabled three fire detectors in the auxiliary building. The detectors in the auxiliary building were disabled without a proper fire impairment control permit and the required compensatory roving hourly fire watch for a period of approximately 5

hours as required by Administrative Procedure AP 10 103, "Fire Protection Impairment Control," Revision 21. This issue is captured in the licensee's corrective action program.

The failure to implement fire protection impairment control permit requirements and establish compensatory measures for the auxiliary building 1974' level was considered a performance deficiency. The inspectors determined that the finding was more than minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external factors and affected the cornerstone objective of ensuring the availability of systems that respond to initiating events to prevent undesirable consequences. The finding was of very low safety significance because it involved compensatory measures for the fixed fire protection system and was assigned a low degradation rating since less than 10 percent of the fire detectors in the area were disabled. This finding has a crosscutting aspect in the area of human performance associated with the work practices component because the licensee failed to apply appropriate human error prevention techniques such as self and peer-checking prior to removing the fire detectors from service (H.4(a)).

Inspection Report# : [2007002](#) (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)

Barrier Integrity

Significance:  Jul 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Establish an Adequate Preventive Maintenance Program

The inspectors identified a noncited violation of Technical Specification 5.4.1.a in which Wolf Creek did not implement a preventive maintenance procedure to mitigate Train B emergency exhaust system fan bearing vibrations which resulted in a degraded condition. Specifically, the vendor manual directs lubrication every 3 to 12 months (3 to 6 months for average conditions being room temperature and clean conditions) to prevent oxidation and breakdown of

the grease; however, the Wolf Creek recurring preventive maintenance was set to lubricate the bearings every three years. This recurring preventive maintenance was not sufficient to ensure the bearings remained adequately lubricated. It was not until NRC questioning that Wolf Creek generated a condition report to review the past condition of the bearings and the appropriateness of the recurring lubrication interval for the bearings.

The licensee's failure to implement preventive maintenance to ensure the fan bearings were adequately lubricated is a performance deficiency. The finding is more than minor because it is associated with the barrier performance attribute of the Barrier Integrity Cornerstone; and, it affected the cornerstone objective to maintain radiological barrier functionality of the auxiliary and fuel building. The finding is of very low safety significance because the issue only represents a degradation of the radiological barrier function provided for the auxiliary or fuel building barriers to mitigate airborne radionuclides from emergency core cooling system pump cubicles or a fuel handling accident, respectively. The cause of the finding has problem identification and resolution crosscutting aspects in the area of corrective action because Wolf Creek did not evaluate or resolve the causes of repeated bearing degradation by thoroughly evaluating problems such that the resolutions address causes and extent of the conditions (P.1(c)).

Inspection Report# : [2007003](#) (pdf)

G

Significance: Jul 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow Test Control Procedures to Demonstrate Operability

The inspectors identified a noncited violation of 10 CFR, Part 50, Appendix B, Criterion XI, "Test Control," in which Wolf Creek did not implement controlled testing of the Train B emergency exhaust system fan to demonstrate operability prior to returning the fan to service after bearing replacement. Specifically, on June 12, 2007, Wolf Creek restored the B emergency exhaust system fan to service without implementing the postmaintenance testing described in Procedure AP 16E-002, "Postmaintenance Testing Development," Revision 6A. Upon review of the postmaintenance testing, the fan failed the vibration portion of the testing and Wolf Creek did not perform an operability evaluation in accordance with Procedure AP 28-001, "Operability Evaluations." Based on inspector questioning, Wolf Creek performed the correct postmaintenance testing and an operability evaluation. These issues are under evaluation in the Wolf Creek corrective action program.

The failure to follow test control procedures for the safety-related B emergency exhaust system fan prior to declaring it operable is a performance deficiency. The finding is more than minor because it is associated with the Barrier performance attribute of the Barrier Integrity Cornerstone; and, it affected the cornerstone objective to maintain radiological barrier functionality of the auxiliary and fuel building. The finding is of very low safety significance because the issue represents a degradation of only the radiological barrier function provided for the auxiliary or fuel building barriers to mitigate airborne radionuclides from emergency core cooling system pump cubicles or a fuel handling accident. The cause of the finding has human performance crosscutting aspects in the area of decision making because Wolf Creek did not initially conduct an adequate test and then failed to question the failed postmaintenance test by making a safety-significant or risk-significant decision using proceduralized systematic processes, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained (H.1 (a))

Inspection Report# : [2007003](#) (pdf)

G

Significance: Apr 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to maintain steady state reactor power at or below the licensed thermal power limit

A noncited violation of Technical Specification 5.4.1.a occurred when operators did not take timely action to lower power below the licensed thermal limit of 3565 MWt. During an incore to excore neutron detector calibration, the power level exceeded the limit and the operating crew did not insert negative reactivity until after the neutron detector calibration was complete. During this evolution, the reactor exceeded licensed thermal power of 3565 MWt for approximately 58 minutes, peaking at 3566.5 MWt according to the plant computer's 10 minute calorimetric. After the neutron detector calibration was completed, operators added boron to the reactor coolant system to reduce power below 100 percent. Procedure GEN 00-004, "Power Operation," Attachment B, Step B.1.1 states, in part, that exceeding 3565 MWt is permitted only as a result of transients or computer point fluctuations. The inspectors judged that allowing reactor power to ascend above 100 percent for nearly an hour was not a transient. However, operators did not initiate action in accordance with Step B.1.1 when the 10 minute average exceeded 3565 MWt until approximately 40 minutes elapsed. This issue is entered into the corrective action program.

The failure to maintain steady state reactor power at or below the licensed thermal power limit is a performance deficiency. The finding was more than minor because it is associated with the configuration control attribute for the Barrier Integrity Cornerstone; and, it affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radio nuclide releases caused by accidents or events. The finding was of very low safety significance because the fuel cladding barrier was affected but did not affect the reactor coolant system or containment barriers. This finding has a crosscutting aspect in the area of human performance associated with the decision making component because the licensee did not ensure that licensed operators used conservative assumptions in their decision making when reactor power increased above the licensed limit for an extended period (H.1(b)).

Inspection Report# : [2007002 \(pdf\)](#)

Significance:  Apr 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to remove the correct containment radiation monitor from service

A self-revealing noncited violation of Technical Specification 5.4.1 occurred on February 20, 2007, when a chemistry technician inadvertently removed both containment purge radiation Monitors GTRE22 and GTRE33 from service at the same time. During planned maintenance on the safety-related GTRE33 containment purge radiation monitor, a chemistry technician inadvertently removed the incorrect containment purge radiation monitor from service. After contacting the control room, the shift chemist went to GTRE22 and incorrectly removed the radiation monitor from service. Instrumentation and controls personnel working at GTRE33 informed the shift chemist that the incorrect radiation monitor was removed from service. The shift chemist subsequently returned GTRE22 to service. Technical Specification 3.3.6, Condition A, was entered for having more than one train inoperable. The containment purge and supply dampers were immediately verified to be closed and remained closed with no containment purge in progress. This issue was entered into the licensee's corrective action program.

The inspectors determined that the failure to remove the correct containment radiation monitor from service was a performance deficiency. The finding was more than minor because it is associated with the configuration control attribute for the Barrier Integrity Cornerstone; and it affected the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radio nuclide releases caused by accidents for events. The finding was of very low safety significance because both trains of the radiation monitor protective functions (i.e., to stop a containment purge on a high radiation signal) were affected but did not result in an actual open pathway in the containment barrier. This finding has a crosscutting aspect in the area of human performance associated with the work practices component because the shift chemist failed to apply appropriate human error prevention techniques such as self and peer-checks (H.4(a)).

Inspection Report# : [2007002 \(pdf\)](#)

Emergency Preparedness

Occupational Radiation Safety

Significance:  Apr 07, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to perform an adequate survey in a high radiation area

The inspector reviewed a self-revealing noncited violation of 10 CFR 20.1501(a) because the licensee failed to perform an adequate survey in a high radiation area. On March 7, 2007, a health physics technician performed a survey of Floor Drain Tank Room 7126 in the radwaste building to support a task performed by two radwaste operators. The health physics technician surveyed the immediate work area and informed the operators that general work area dose rates were 10 millirem per hour. Based on this information, operators entered the posted high radiation area on a radiation work permit that had an electronic dosimeter dose rate set point of 50 millirem per hour. One of the

operators received a dose rate alarm while performing the task, the operators exited the area, and contacted health physics personnel. Subsequent investigation identified that a comprehensive survey of the entire room was not performed. Follow-up surveys indicated that dose rates in the room were as high as 150 millirem per hour at 30 centimeters from the floor drain tank. This issue has been entered into the licensee's corrective action program. The finding was greater than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute of Exposure Control, and affected the cornerstone objective because workers could have received additional radiation dose. The finding was processed through the Occupational Radiation Safety Significance Determination Process and determined to be of very low safety significance because it was not as low as is reasonably achievable finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised. Additionally, this finding has a crosscutting aspect in the area of human performance related to work controls because the failure to incorporate job site conditions impacted the margin of radiological safety provided by an adequate survey (H.3(a)).

Inspection Report# : [2007002](#) (pdf)

Public Radiation Safety

Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

Significance:  Apr 07, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to maintain sufficient records to furnish evidence of events significant to plant safety

A noncited violation of Technical Specification 5.4.1.a was identified for failure to maintain sufficient records (logs) to furnish evidence of events significant to plant safety. On January 26, 2007, electrical maintenance commenced a scheduled replacement of main control board Annunciator Power Supply E1PS5. During the power supply replacement, a loss of 8.7 percent of the annunciators was expected. However, during de-termination of the power supply leads, an unexpected loss of a significant number of the main control board annunciators occurred.

Subsequently, due to the large number of annunciator inputs that were lost, the plant computer became overloaded and stopped updating. Based on these indications, the control room operators would need to evaluate emergency action level and Technical Specification requirements. The inspectors discovered during interviews with the operations crew that was on watch during the event, that no information was recorded or kept during the event. Administrative Procedure AP 21-001, "Conduct of Operations," Revision 36A, requires operators to make plant log entries of potentially reportable occurrences, entries that could be useful in reconstructing events, and events significant to plant safety. However, the logs were not updated until several hours later based on verbal accounts provided to the oncoming crew. The inspectors noted that the 'after the fact' log entries still provided insufficient data to reconstruct the activities related to the loss of annunciators. This issue is captured in the licensee's corrective action program.

The failure to adequately document times and information for the loss of annunciators was considered to be a performance deficiency. This finding was more than minor because it could impact the operator's ability to accurately implement emergency action levels and Technical Specification action statements and if left uncorrected, this type of insufficient documentation could become a more significant safety concern. The finding required NRC management review and was determined to be of very low safety significance because the loss of annunciators challenged the emergency action level time requirements but was restored prior to exceeding any emergency action level or Technical Specification action time requirement. This finding has a crosscutting aspect in the area of human

performance associated with the work practices component because the licensee failed to effectively communicate expectations regarding plant operating log entries in accordance with procedural requirements (H.4(b)).

Inspection Report# : [2007002](#) (*pdf*)

Significance:  Apr 07, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

Failure to maintain drawings technically accurate

A self-revealing finding was identified regarding inadequate engineering drawings used as guidance to replace main control board annunciator power supplies resulting in a loss of all main control board annunciators. During determination of the power supply leads, an unexpected loss of a significant number of the annunciators occurred.

During the planning review of Work Order 06 280217 003, "Replace Power Supply RK045E1PS5," the electricians brought forth a concern about the daisy chaining of the leads associated with the main control board power supplies and not knowing what effect removing a power supply would have on additional annunciators. System engineering reviewed vendor drawings and determined that only the expected annunciators would be lost. The vendor drawings only consisted of discrete wire connections from the power supply to the logic bus and did not show interconnections with any other power supplies. Although, it was acknowledged by system engineering that there were numerous daisy chained connections not shown on the vendor drawings, no further reviews or research was conducted. The licensee's root cause analysis determined that the vendor drawings did not show the interconnecting wiring identifying point to point connections associated with the main control board power supplies. This issue is captured in the licensee's corrective action program.

The failure to maintain drawings technically accurate and reflect the as-built condition of the plant was considered to be a performance deficiency. The finding was more than minor because it impacted the maintenance technicians ability to accurately plan and implement work, resulting in the annunciator system being adversely affected and could be reasonably viewed as a precursor to a significant event. The finding required NRC management review and was determined to be of very low safety significance because the finding did not result in a loss of a system safety function or a loss of risk significant equipment for greater than 24 hours. This finding has a crosscutting aspect in the human performance area associated with the resources component because the licensee failed to maintain complete, accurate and up-to-date design documentation (H.2(c)).

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Last modified : June 05, 2008