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

May 6, 2013

Matthew W. Sunseri, President
and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION – NRC INSPECTION PROCEDURE 95001 SUPPLEMENTAL INSPECTION REPORT 05000482/2013009

Dear Mr. Sunseri:

On April 29, 2013, the U.S. Nuclear Regulatory Commission (NRC) staff completed a supplemental inspection pursuant to Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," at Wolf Creek Generating Station. The enclosed inspection report documents the inspection results, which were discussed on April 29, 2013, with you and other members of your staff.

The objectives of this supplemental inspection were to provide assurance that: (1) the root causes and contributing causes for the risk significant issues were understood; (2) the extent-of-condition and extent-of-cause of the issues were identified; and (3) to provide assurance that the corrective actions for risk significant performance issues are sufficient to address the root causes and contributing causes and to prevent recurrence. The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel.

The inspection concluded that your evaluations and corrective actions for the three failures and one forced outage that contributed to the White performance indicator, "Mitigating Systems Performance Index, Emergency AC Power Systems," were consistent with the evaluation criteria in Inspection procedure 95001. Your evaluations identified causes involving inadequate plant design, inadequate work management and maintenance activities, failures of the corrective action program (CAP), and inadequate management oversight. Wolf Creek has taken, or plans to take, corrective actions in these areas. Your staff also performed an extent of condition and extent of cause review and identified other challenges.

One NRC-identified finding and one licensee-identified finding of very low safety significance (Green) were identified during this inspection. Both of these findings were determined to involve violations of NRC requirements.

If you contest the non-cited violation (NCV), you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Wolf Creek Generating Station.

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

Prior to the completion of this inspection, an additional failure occurred for emergency diesel generator B on March 13, 2013. The NRC reviewed the results of your evaluation of the cause and the potential impact to the performance indicator results prior to completing this inspection. Since this inspection noted acceptable performance in addressing the White performance indicator, “Mitigating Systems Performance Index, Emergency AC Power Systems,” and the performance indicator has already been White for at least four quarters, the performance indicator will only continue to be assessed in accordance with the guidance in Inspection Manual Chapter 0305, “Operating Reactor Assessment Program,” until the results return to Green status. Inspectors will review the licensee’s implementation of corrective actions during a future inspection.

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

Sincerely,

/RA/

Neil O’Keefe, Chief
Project Branch B
Division of Reactor Projects

Docket No.: 50-482
License No.: NPF-42

Enclosures: Inspection Report 05000482/2013009

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000482
License:	NPF-42
Report:	05000482/2013009
Licensee:	Wolf Creek Nuclear Operating Corporation
Facility:	Wolf Creek Generating Station
Location:	1550 Oxen Lane NE, Burlington, KS
Dates:	March 4 through April 28, 2013
Inspector:	R. Kumana, Project Engineer, Project Branch C
Approved By:	Neil O'Keefe, Chief Project Branch B Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000482/2013009; 3/4/2013 – 3/8/2013; Wolf Creek Generating Station; Supplemental Inspection – Inspection Procedure 95001

This report covered a five-day period of inspection followed by in-office review by a region-based inspector. One Green non-cited violation (NCV) and one licensee-identified violation were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." The cross-cutting aspect is determined using Inspection Manual Chapter 0310, "Components Within the Cross Cutting Areas." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

The NRC staff performed this supplemental inspection in accordance with IP 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area," to assess the licensee's evaluation associated with the White performance indicator for Mitigating Systems Performance Indicator – Emergency AC system. During this supplemental inspection, the inspectors determined that the licensee performed a comprehensive evaluation of the three emergency diesel generator (EDG) failures contributing to the White performance indicator. The licensee identified causes involving inadequate plant design, inadequate work management and maintenance activities, failures of the CAP, and inadequate management oversight. Wolf Creek has taken, or plans to take, corrective actions to address each of the causes.

Prior to the completion of this inspection, an additional failure occurred for emergency diesel generator B on March 13, 2013. The NRC reviewed the results of your evaluation of the cause and the potential impact to the performance indicator results prior to completing this inspection. Given the licensee's acceptable performance in addressing the White performance indicator, "Mitigating Systems Performance Index, Emergency AC Power Systems," and that at least four quarters have passed since the performance indicator turned White, the performance indicator will only continue to be assessed in accordance with the guidance in Inspection Manual Chapter 0305, "Operating Reactor Assessment Program," until the results return to Green status. Inspectors will review the licensee's implementation of corrective actions during a future inspection.

Findings

- Green. The inspector identified a NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for failure to determine the cause of a significant condition adverse to quality and take corrective action to preclude repetition. On October 22, 2009, the plant received multiple alarms for the A EDG due to

actuation of speed control relays while in a standby condition. This condition would have prevented an automatic start of the A EDG. The licensee's handling of this issue had the following problems: the failure was entered into the CAP, but the licensee failed to recognize that this was a significant condition adverse to quality; the initial evaluation failed to identify that the cause of the failure was a circuit design error, and therefore the licensee failed to implement appropriate action to prevent recurrence; the extent of condition review failed to identifiy that the Turbine Driven Auxiliary Feedwater Pump (TDAFWP) was also affected; prior indications of the failure mechanism had not been entered into the CAP; and multiple examples of failure to follow the corrective action process contributed to not finding the actual cause sooner. This was entered into the licensee's CAP as CR 65323

The failure to determine the cause of a significant condition adverse to quality and take corrective action to preclude repetition was a performance deficiency. The performance deficiency was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective. Specifically, the failure to determine the cause and take effective corrective action for electrical noise that impacted the EDG speed switches resulted in the degraded condition continuing to exist for over two years after the initial failure. The inspector determined that the finding was of very low safety significance (Green) because the finding was a deficiency affecting the design or qualification of a mitigating structure, system, or component (SSC), but the corrective actions that were implemented were sufficient to ensure that the SSC maintained its operability and functionality. The NRC determined the finding had a cross cutting aspect in the human performance area associated with decision-making - systematic processes because the licensee did not make safety-significant or risk-significant decisions using a systematic process when they evaluated the cause of the diesel generator failure [H.1(a)].

REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 Supplemental Inspection (95001)

.1 Inspection Scope

The U.S. Nuclear Regulatory Commission performed this supplemental inspection in accordance with Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," to assess the licensee's evaluation of a White performance indicator for "Mitigating Systems Performance Index, Emergency AC Power Systems," which affected the mitigating systems cornerstone in the reactor safety strategic performance area. The objectives of this inspection were to:

- Provide assurance that the root and contributing causes of risk-significant performance issues were understood;

- Provide assurance that the extent-of-condition and extent-of-cause of risk-significant performance issues were identified;

- Provide assurance that the licensee's corrective actions for risk-significant performance issues were, or will be, sufficient to address the root and contributing causes and to preclude repetition.

The licensee entered the Regulatory Response Column of the NRC's Action Matrix in the first quarter of 2012 as a result of the subject performance indicator crossing the threshold from Green (very low safety significance) to White (low to moderate safety significance). The indicator change was associated with one EDG demand failure, two EDG run failures, and a failure to restore the EDG operability within a seven day maintenance window resulting in a technical specification required shutdown and increased EDG unavailability time.

The first failure was a demand failure: On October 22, 2009, the A EDG experienced a false speed switch actuation with the engine in normal standby condition. The false actuation created a logic condition that indicated the engine was running with no lube oil pressure, so a trip was generated which would have prevented the engine from starting.

The second failure was a run failure: On February 22, 2011, maintenance work performed on the A EDG by a vendor with station oversight in early December, 2010, was not performed correctly, introducing a latent condition affecting EDG operability which was not detected by post-maintenance testing. Workers failed to reinstall a retaining pin in a fuel rack linkage, and the linkage was later found to have partially backed out. This created the potential to cause a failure to run for the full mission time, as eventual separation of the linkage could lead to uncontrolled fuel injection on one cylinder. The error was identified during an EDG walkdown by the EDG System Engineer prior to a functional failure. Inoperability for the A EDG covered the time period of December 2, 2010, until February 23, 2011, when the condition was repaired. Station

Technical Specifications require that both EDGs are operable and capable of completing their mission when required unless in a NRC approved Technical Specification condition.

The third failure was a run failure: On March 12, 2012, half way through a 24-hour surveillance test, the A EDG developed a 2-drop per minute (dpm) leak on the jacket water return tubing from the governor actuator oil cooler. This leak was coming from a Swagelok fitting on the south side of the cooler. After the leak was found, it was periodically monitored and found to be continually increasing with a peak value of 5.2 mL/min. The 24-hour run was successfully completed, and the leak rate was measured as 4.2 mL/min at no load. Following the replacement of the tubing, a visual examination identified the presence of a 180° circumferential hairline crack under the fitting ferrules. This was later evaluated as impacting the ability of the EDG to continue to run for its full mission time because the jacket water system had insufficient capacity to withstand a leak of that magnitude.

The forced outage that impacted the performance indicator occurred on December 6, 2010: On November 30, 2010, Wolf Creek removed the A EDG from service for planned maintenance and entered the appropriate technical specification action statements. The Technical Specifications required the EDG to be restored to operable status within 7 days. On December 6, 2010, the licensee determined that they would be unable to complete restoration of the A EDG within the required time due to issues with planning, work management, and resources. This resulted in a plant shutdown. Because the performance indicator reflects both availability and reliability, the time that the system was out of service in this case was a contributor to the White performance indicator.

The licensee performed a cause evaluation for each of the EDG failures and the forced outage, as well as a separate cause evaluation for the White performance indicator. In addition, the licensee performed an effectiveness review preceding this inspection in order to assess their readiness for the supplemental inspection.

On February 19, 2012, the licensee told the NRC staff of their readiness for a supplemental inspection per Inspection Procedure 95001.

The inspector reviewed the licensee's cause evaluations associated with the failures, plus other evaluations conducted in support of or as a result of these evaluations. The inspector reviewed corrective actions that were taken or planned to address the identified causes. The inspector also walked down the affected systems and interviewed licensee personnel. The inspector completed these activities to verify that the root and contributing causes and the contribution of safety culture components were understood, and that corrective actions taken or planned were appropriate to address the causes and preclude repetition.

.2 Evaluation of the Inspection Requirements

.2.1 Problem Identification

a. Inspection Procedure 95001 requires that the inspector determine that the licensee's evaluation documented who identified the issue (i.e., licensee-identified, self-revealing, or NRC-identified) and under what conditions the issue was identified.

The inspector confirmed that the 2009 failure of the A EDG was self-revealing. The failure was revealed by multiple control room alarms. The NRC documented a self-revealing violation in inspection report 2010006. The licensee also identified a violation of a 10 CFR 50 Appendix B, Criterion III, for failure to verify or check the adequacy of design of the EDG control circuit. The evaluation included this in the revision made as a result of the licensee's self-assessment performed in November 2012. This violation is documented in Section 4OA7 of this report.

The inspector confirmed that the increased unavailability time due to the forced outage was licensee identified. The licensee determined prior to the limiting condition of operation (LCO) expiration that the A EDG would not be restored within the LCO window. No violation of NRC requirements was identified.

The inspector confirmed that the 2011 failure of the A EDG was licensee-identified. The missing cotter pin was identified during a licensee walkdown of the system. This was documented as a licensee identified violation in inspection report 2012005.

The inspector confirmed that the 2012 failure of the A EDG was licensee-identified. The local operator identified the jacket water tubing leak during operation of the diesel generator. This was documented as a licensee-identified violation in inspection report 2012005.

The inspector confirmed the White performance indicator was self-revealing.

b. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documented how long the issue had existed and prior opportunities for identification.

The inspector determined that the licensee's evaluation of the issues adequately documented how long the issues had existed. However, problems were noted in the CAP documentation that reflected unrecognized prior opportunities to have identified the problems, failure to enter the issues into the CAP, and failure to recognize the significance and perform an appropriate level of cause evaluation. This is further discussed in Section 4OA4.2.2.f.

The inspector discovered that, contrary to the licensee procedure AP 28A-100, "Condition Reports," the licensee failed to complete the Corrective Action Review Board

(CARB) approval of the Apparent Cause Evaluation (ACE) for condition report (CR) 27908 following its initial rejection. Had this review and approval been completed, the licensee would have had an additional opportunity to identify the actual cause of the 2009 failure. This is documented in Section 4OA4.2.2.f of this report.

The licensee failed to document in their ACE for the 2009 failure that a self-revealing violation of 10 CFR Appendix B Criterion XVI was identified in inspection report 2010006 for failure for failure to identify the failing capacitor in December 2006. The licensee credited the ACE for CR 21309 as the evaluation for the violation, but did not address it in the ACE. This represented a prior opportunity to identify the problem. This is documented in Section 4OA4.2.2.f of this report.

The licensee also documented that a prior opportunity existed for identification of the speed switch issue in 1991 when high noise was observed in the speed switch circuit. Ultimately the licensee determined that the condition had existed from initial plant operation.

The licensee determined that the 2011 failure had likely existed since December 2010. The licensee identified that a missed opportunity to correct the inadequate maintenance procedures occurred in 2009.

The licensee documented that previous issues with the management of Technical Specification Equipment Outages (TSEO) had been observed prior to the 2010 forced outage.

The licensee documented that the incorrectly installed Swagelok fitting that resulted in the 2012 failure had likely existed since 1993. The licensee did not identify other opportunities to identify the condition.

The licensee reported that the performance indicator transitioned to White at the end of the second quarter of 2012, effective during the first quarter of 2012.

c. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's evaluation documents the plant-specific risk consequences, as applicable, and compliance concerns associated with the issues.

The licensee considered the root cause for the White PI to be "Wolf Creek Management has not driven plant performance through consistent recognition and consideration of aggregate risk relevant to long-term equipment reliability challenges with Emergency AC Power."

The licensee adequately documented the 2009 failure's increase to plant risk due to the loss of emergency AC power. The NRC determined that the licensee's failure to verify or check the adequacy of design for the EDG and TDAFWP control circuits was a violation of very low safety significance (Green) as documented in Section 4OA7 of this report. The NRC determined that the licensee's failure to identify the cause and take corrective actions to preclude repetition of the speed switch failure was a violation of

very low safety significance (Green) as documented in Section 4OA4.2.2.f of this report. The licensee adequately documented the 2011 and 2012 failures' contribution to increased plant risk, but concluded that the failures did not result in a loss of system function.

The licensee documented the increase in risk caused by the failure to restore the A EDG within its technical specification allowed outage time increased plant risk due to having one EDG out of service. The licensee took appropriate actions to shutdown the plant.

The inspector concluded that the licensee's cause evaluations adequately documented the risk consequences and compliance concerns associated with each of these issues.

d. Findings

No findings were identified.

.2.2 Root Cause, Extent of Condition, and Extent of Cause

a. Inspection Procedure 95001 requires that the inspection staff determine that the licensee evaluated the problem using a systematic methodology to identify the root and contributing causes.

The licensee used Barrier Analysis, Event and Causal Factor Chart, and a Cause and Effect Chart in the ACE for the 2009 failure. The licensee later identified that this failure should have been evaluated as a root cause analysis (RCA).

The licensee used Barrier Analysis, Event and Causal Factor Chart, Management Oversight and Risk Tree (MORT) Analysis, Fault Tree Analysis, Task Analysis, Why Tree, and a Safety Culture Analysis in the RCA for the 2011 failure.

The licensee used Barrier Analysis, Event and Causal Factor Chart, MORT Analysis, Change Analysis, Why Tree, and a Safety Culture Analysis in the RCA for the forced outage.

The licensee used Operating Experience (OE) Review, Safety Culture Assessment, Barrier Analysis, Equipment Performance Checklist, and Hardware Failure Analysis in their ACE for the 2012 failure

The licensee used Event and Causal Factor Chart, MORT analysis, Barrier analysis, document reviews, interviews, operating experience/benchmarking, and safety culture analysis in their RCA for the White performance indicator.

The inspector concluded that the licensee had evaluated the issues using systematic methodologies to identify root and contributing causes.

b. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root-cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

The inspector determined that the licensee's root-cause evaluations were generally through and identified appropriate root causes for the failures. For most of the events, the root cause evaluation included a sufficient level of detail to determine the actual or probable cause, as well as the contributing causes.

In addition, the inspector noted that the overall root cause evaluation for the White performance indicator appropriately identified the organizational issues associated with failure to address long-term equipment reliability and the relatively low margin available in the mitigating systems performance index performance indicators.

The inspector determined that the licensee had not treated the 2009 EDG failure as a significant condition adverse to quality in their CAP. The inspector noted that the licensee's program does not define "significant condition adverse to quality" and does not have a formal process for distinguishing between "significant condition adverse to quality" and "condition adverse to quality". Although a formal definition is not required, the licensee failed to meet the regulatory requirements for a "significant condition adverse to quality." This is documented in Section 4OA4.2.2.f of this report.

The licensee concluded that procedure AI 28A-010, "Screening Condition Reports" should have resulted in CR 21039 being screened as a level 1 or 2 CR, which required a RCA to be performed. The inspector determined that, although the licensee recognized the failure to perform a RCA for the 2009 failure, they failed to appropriately correct the problem. The licensee believed that they had addressed the requirement to classify the condition as level 1 or 2 and perform a RCA by treating the RCA for the White PI (performed under CR 55021) as the RCA for the speed switch failure. The inspector determined that the cause for the White PI was not the same as the cause for the speed switch failure. Specifically, the licensee considered the root cause for the White PI to be "Wolf Creek Management has not driven plant performance through consistent recognition and consideration of aggregate risk relevant to long-term equipment reliability challenges with Emergency AC Power." The cause of the speed switch failure was related to the failure to identify the design error by verifying the adequacy of design. This is documented in Section 4OA4.2.2.f of this report.

c. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root-cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

The licensee's evaluations included evaluations of both internal and industry operating experience. The licensee's evaluations of industry operating experience provided sufficient detail such that general conclusions could be established regarding any similarities.

The inspector identified that the licensee failed to document in their ACE that a self-revealing violation of 10 CFR Appendix B Criterion XVI was identified in inspection report 05000482/2010006 for failure to identify a degraded equipment condition in December 2006. The licensee credited the ACE for CR 21309 as the required evaluation for the violation, but did not address in the violation in that ACE. This issue is documented in Section 4OA4.2.2.f of this report.

d. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root-cause evaluation addressed the extent of condition and the extent of cause of the problems.

The inspector noted that, in preparing for this supplemental inspection, the licensee conducted a re-evaluation of their prior actions and identified that the initial extent of condition review for the 2009 failure had been inadequate. The licensee subsequently determined that the TDAFWP had the same model switch as well as the same design error.

The inspector determined that, while the licensee performed an extent of condition review for the speed switch design error, they did not perform an extent of cause review. This was required by their procedure AI 28A-100, "Cause Analysis" for a RCA. An extent of cause review may have identified other examples of failure to verify the adequacy of design. This issue is documented in Section 4OA4.2.2.f of this report.

The inspector determined that the licensee adequately reviewed the extent of condition and extent of cause for the other failures.

e. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0305.

The licensee did not perform a separate safety culture assessment for the 2009 failure because the licensee credited the safety culture assessment that was performed for the White PI. The inspector determined that, while this was not a performance deficiency, it could lead to a missed opportunity to identify weaknesses unique to this failure.

The licensee's evaluation for the 2011 failure identified weaknesses in the human performance area and the accountability and organizational change management components. The licensee's evaluation for the 2010 forced outage identified weaknesses in the human performance and problem identification and resolution areas, and the organizational change management component. The evaluation for the 2012 failure did not identify any safety culture weaknesses.

The licensee's evaluation for the White PI identified weaknesses in the human performance and problem identification and resolution areas. Within the human performance area, they identified weaknesses in resources, work control, and work management practices. Within the problem identification and resolution area, they identified weaknesses in their CAP. In particular, they assessed their root cause as being impacted by weaknesses in the procedural documentation aspect of the resources

component because they did not have sufficient guidance for evaluating, communicating, and preserving margin associated with the performance indicator.

f. Findings

Introduction. The inspector identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for failure to determine the cause of a significant conditions adverse to quality and take corrective action to preclude repetition.

Description. On October 22, 2009, with the reactor defueled and the B EDG out of service for maintenance, the plant received multiple alarms for the A EDG indicating an abnormal running condition. Operators responded to the generator and verified it was not running. The licensee found that the A EDG had alarmed due to actuation of speed control relays despite being in a standby condition. This condition would have prevented an automatic start of the A EDG, resulting in the A EDG being inoperable. The licensee entered a Notification of Unusual Event because this resulted in a condition where both trains of onsite emergency AC were inoperable.

This failure contributed to having a White Mitigating Systems Performance Indicator-Emergency AC system. In preparing for a supplemental inspection using Inspection Procedure 95001, the licensee reviewed the history of this failure and their corrective actions. Initial indications of deficiencies in the speed switch operation occurred in 1991 when workers saw indications of excessive noise in the speed switch circuitry. This was not entered into their CAP. The licensee installed filter capacitors at the input to the speed switch power terminals. In 2006, the licensee identified that they were unable to calibrate the speed switch due to high noise, despite having the capacitors installed. The licensee replaced the speed switch and the power supply. This issue was also not entered into their CAP.

The licensee entered the October 2009 failure into their CAP as a level 3 CR 21039. An ACE determined that the cabinet annunciator power supply was contributing high levels of electrical noise to the circuits within the diesel generator control cabinets. The licensee also identified that one of the filter capacitors had failed. The licensee further identified that the filter capacitors did not meet Institute of Electrical and Electronics Engineers (IEEE) Standard 384-1974. The licensee took actions to replace the power supply and the capacitor to reduce the noise and restore compliance with IEEE standards. The NRC performed a Problem Identification and Resolution inspection in July 2010 and identified that the licensee had failed to identify the failing capacitor as a cause of the 2006 calibration issue. This violation was documented as NCV 05000482/2010006-08.

The licensee also tested the B EDG on October 27, 2009, to verify noise levels were within the capacity of the speed switch to prevent spurious actuation. The B EDG had a voltage ripple of 2,015 mV, but no acceptance criteria were specified in the work order and no immediate corrective action was taken. On March 17, 2010, emergency diesel generator B was declared inoperable due to a degraded annunciator power supply.

The power supply had an excessive voltage ripple at 2,895 mV, in excess of the allowable value of 500 mV. The failure to establish acceptance criteria in the original work order was documented as NCV 05000482/2010003-02. As a result of this violation, the licensee generated a level 3 CR (27908). The ACE was rejected by the Corrective Action Review Board (CARB) on March 2, 2011, due to weaknesses in the evaluation. The licensee generated CR 34979 to document the failure of CR 27908 to pass its required CARB review. The licensee initiated a corrective action under CR 34979 to perform laboratory testing of the speed switch circuit. The testing was completed in the fall of 2011. During this test, the lab identified that the speed switch signal wire shield terminal location had a significant impact on the circuit performance and that terminal 14 was the optimal location. After these test results were received, the licensee did not perform any follow-up actions to correct the miswired circuit and did not return the rejected ACE to the CARB to complete the approval process.

In the fall of 2012, the licensee reviewed the ACE for CR 21039 in preparation for this supplemental inspection. It was during this review that the licensee ultimately discovered the multiple deficiencies in their previous evaluations and corrective actions. The licensee found that their procedure AI 28A-010, “Screening Condition Reports” should have resulted in CR 21039 being screened as a level 1 or 2 CR, which would have required a RCA. The licensee also identified that the actual cause was revealed during the lab testing from CR 34979. The licensee discovered that vendor drawings showed the wire shield was required to be connected to terminal 14. Instead, the wire shield was connected to a screw on the speed switch casing. The licensee re-performed an extent of condition review and determined that the TDAFWP had the same model switch as well as the same design error. The licensee further identified that the previous failures of the speed switch to pass calibration in 1991 and 2006 had not been entered into the CAP. The licensee generated corrective actions to modify the design of the diesel generator control circuits by landing the wire shield at terminal 14. The licensee planned to replace the entire TDAFWP control panel for other reasons. These actions were planned to be complete by the end of the current outage. The licensee performed a RCA for the White PI under CR 55021.

The inspector reviewed the licensee’s evaluations and associated CRs. The inspector found that while the licensee identified significant issues with their CAP, they did not identify all of them. For example:

The inspector determined that the licensee had not treated the 2009 EDG failure as a significant condition adverse to quality in their CAP. The inspector noted that the licensee’s program does not define “significant condition adverse to quality” and does not have a formal process for distinguishing between “significant condition adverse to quality” and “condition adverse to quality”. Although a formal definition is not required, the licensee failed to meet the regulatory requirements for a “significant condition adverse to quality.”

The inspector determined that, although the licensee eventually recognized the failure to perform a RCA for the 2009 failure, they failed to appropriately correct the error by conducting a RCA. The licensee believed that they had addressed the requirement to

classify the condition as level 1 or 2 and perform a RCA by treating the RCA for the White PI (CR 55021) as the RCA for the speed switch failure. The inspector determined that this was not adequate because the cause for the White PI was not the same as the cause for the speed switch failure. Specifically, the licensee considered the root cause for the White PI to be "Wolf Creek Management has not driven plant performance through consistent recognition and consideration of aggregate risk relevant to long-term equipment reliability challenges with Emergency AC Power." This was not the cause of the speed switch failure, which is related to the failure to identify the design error by verifying the adequacy of design.

The inspector determined that, while the licensee performed an extent of condition review for the speed switch design error, they did not perform an extent of cause review. This was required by their procedure AI 28A-100, "Cause Analysis," for a RCA. An extent of cause review may have identified other examples of failure to verify design requirements.

The inspector discovered that, contrary to the licensee procedure AP 28A-100, "Condition Reports," the licensee failed to complete the CARB approval of the ACE for CR 27908 following its initial rejection. Had this review and approval been completed, the licensee would have had an additional opportunity to identify that the actual cause had not been addressed.

The inspector identified that licensee procedure AI 28A-100, "Cause Analysis," required an ACE to be performed for CR 27077, which documented NRC violation 2010006-08. The licensee had considered the ACE for CR 21039 to meet that requirement. However, the inspector determined that the ACE for CR 21039 did not address that violation or determine the cause.

The inspector also noted that the licensee's CAP was not effective in resolving this issue. All intended actions had been completed and closed. When an additional unrelated EDG failure resulted in additional regulatory action and a supplemental inspection, the licensee, with assistance, began to reexamine its actions and find flaws in the corrective action process. By the time of this inspection, the licensee had still not identified all of the deficiencies in their CAP process associated with this failure. The inspector determined that, had the licensee followed the systematic process intended by their CAP, the licensee would have had multiple additional opportunities to identify and correct the significant condition adverse to quality, possibly even before it resulted in a failure. The most significant problem was that the licensee failed to recognize that this issue constituted a significant condition adverse to quality and take the necessary actions to determine the root cause and implement actions to prevent recurrence. As a result, the actions were not systematic or in accordance with the CAP. Because the inspector identified several issues and aspects of the finding that were not identified by the licensee, the NRC added value to the licensee's disposition of the violation, and therefore identification credit is attributed to the agency.

Analysis. The failure to determine the cause of a significant condition adverse to quality and take corrective action to preclude repetition was a performance deficiency. The

performance deficiency was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the associated cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to determine the cause and take effective corrective action for electrical noise that impacted the EDG speed switches resulted in the degraded condition continuing to exist for over two years after the initial failure. Using Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," the inspector determined the finding affected the Mitigating Systems cornerstone and was routed to Appendix A. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process For Findings At-Power," the inspector determined that the finding was of very low safety significance (Green) because the finding: (1) was a deficiency affecting the design or qualification of a mitigating structure, system, or component (SSC), but the corrective actions that were implemented were sufficient to ensure that the SSC maintained its operability and functionality. The NRC determined the finding had a cross cutting aspect in the human performance area associated with decision-making - systematic processes because the licensee did not make safety-significant or risk-significant decisions using a systematic process when they evaluated the cause of the diesel generator failure [H.1(a)].

Enforcement. Title 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions," requires, in part, that, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition." Contrary to the above, between October 22, 2009, and March 8, 2013, the licensee failed to assure that the cause of a significant condition adverse to quality was determined and that corrective actions were taken to preclude repetition. Specifically, after the plant experienced a functional failure of the A EDG, the licensee failed to recognize that the condition impacted both trains of emergency AC and the TDAFWP, and was thus a significant condition adverse to quality. As a result, the licensee failed to identify the cause and take corrective actions to preclude repetition. The licensee has since put adequate corrective actions into their CAP to correct the significant condition adverse to quality. There were no actual or potential safety consequences. Because this violation has very low safety significance and was entered into the licensee's CAP as CR 65323, this violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy: NCV 05000482/2013009-01, "Failure to Identify the Cause and Take Corrective Action to Preclude Repetition of a Diesel Generator Functional Failure".

.2.3 Corrective Actions

a. Inspection Procedure 95001 requires that the inspection staff determine that appropriate corrective actions are specified for each root and contributing cause or that the licensee has an adequate evaluation for why no corrective actions are necessary.

The licensee identified that the original corrective actions for the 2009 failure were inadequate during their effectiveness review prior to the supplemental inspection.

Specifically, the signal line shield wire had not been properly terminated, and this was not identified during the original cause evaluation. The licensee has since implemented appropriate corrective actions. This is documented in Section 4OA7 of this report.

The inspector determined that generally the licensee's proposed corrective actions were appropriate to address the root and contributing causes identified for each event, with the exception of the issue identified above. To address the White PI, the license implemented a MSPI Review Board to review system performance on a monthly basis and has planned system modifications to reduce the overall plant risk and increase the performance indicator margin. They have also made changes to their preventive maintenance strategy to perform more risk significant work while shutdown to reduce unavailability time.

b. Inspection Procedure 95001 requires that the inspection staff determine that the licensee prioritized corrective actions with consideration of risk significance and regulatory compliance.

The licensee found that their procedure AI 28A-010, "Screening Condition Reports" should have resulted in CR 21039 being screened as a level 1 or 2 CR, which would have required a RCA. The inspector determined that the licensee had not treated the 2009 emergency diesel generator failure as a significant condition adverse to quality in their CAP. The inspector noted that the licensee's program does not define "significant condition adverse to quality" and does not have a formal process for distinguishing between "significant condition adverse to quality" and "condition adverse to quality". Although a formal definition is not required, the licensee failed to meet the regulatory requirements for a "significant condition adverse to quality." The license ultimately designated the corrective actions to re-wire the speed switches as corrective actions to preclude repetition within their CAP. This issue is documented in Section 4OA4.2.2.f of this report.

The inspector concluded that the corrective actions taken by the licensee were prioritized with appropriate considerations of risk significance and regulatory compliance. Actions to correct the design errors and increase the oversight of maintenance have been completed. Actions to improve the MSPI margin by installing additional equipment are planned to be completed by the end of 2013.

c. Inspection Procedure 95001 requires that the inspection staff determine that the licensee established a schedule for implementing and completing the corrective actions.

The inspector concluded that that an appropriate schedule had been established for implementing and completing the corrective actions. The licensee was also meeting their planned due dates for corrective actions.

d. Inspection Procedure 95001 requires that the inspection staff determine that the licensee developed quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition.

The licensee's procedure AI 28A-100, "Cause Analysis" requires an "effectiveness follow-up" be performed for conditions reportable to the NRC and conditions resulting in an NRC finding or violation.

The licensee planned to perform an effectiveness review of corrective actions for the 2009 failure by conducting an effectiveness follow-up due in December 2014. The inspector concluded that this was adequate since the licensee has already verified that the corrective action to rewire the speed switch circuit will correct the issue.

The licensee planned to perform an effectiveness review of corrective actions for the 2011 failure in December 2013.

The licensee conducted an effectiveness follow-up for the evaluation of the forced outage in March 2013. The licensee concluded that their corrective actions have been effective in improving maintenance outage performance.

The licensee determined that an effectiveness follow-up was not required for the 2012 failure because the failure was licensee-identified. This practice is in accordance with the licensee's procedure. The licensee performed a review of training effectiveness and identified additional corrective actions to be taken to revise training materials.

The licensee planned to determine the effectiveness of corrective actions for the White performance indicator by conducting an effectiveness follow-up due in December 2013. The inspector concluded that the corrective actions planned are likely to be effective at improving the licensee's margin for the MSPI performance indicators.

The inspector concluded that qualitative and quantitative measures of success had been developed for determining the effectiveness of the corrective actions to preclude repetition.

e. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's planned or taken corrective actions adequately address a Notice of Violation that was the basis for the supplemental inspection, if applicable.

The NRC did not issue a Notice of Violation to the licensee. Therefore, this inspection requirement was not applicable.

f. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On March 8, 2013, the inspector presented the results of the onsite portion of the inspection to Mr. Matthew Sunseri, President and Chief Executive Officer, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

Prior to the completion of this inspection, an additional failure occurred for the B EDG on March 13, 2013. An in-office review was conducted of the available information and the licensee's evaluation, and it was determined that this failure would not be reported under the MSPI – EAC. Additional information concerning the design control issues provided after the onsite portion of the inspection led to changes to the characterization of the findings. A telephonic exit meeting on April 29, 2013, to present the final inspection results to Mr. Matthew Sunseri, President and Chief Executive Officer, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a NCV.

A violation of Title 10 CFR 50, Appendix B, Criterion III, "Design Control," which requires, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Contrary to the above, from initial plant operation until November 2012, the licensee failed to verify the adequacy of the design of the EDG and TDAFWP speed circuits. Specifically, the licensee failed to verify the adequacy of the noise shielding design of the EDG and TDAFWP control circuits' speed sensor signal line in accordance with the speed switch's vendor requirements. The design had the speed switch signal wire shield terminated to a case screw. However, the drawing provided by the switch manufacturer, Synchro-Start, required the wire shield to be terminated to terminal 14 in the control circuit. The violation is more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the associated cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process For Findings At-Power," the inspector determined that the violation is of very low safety significance (Green) because the finding was a deficiency affecting the design or qualification of a mitigating structure, system, or component, and did result in a loss of operability of the B EDG in 2006 and 2009. The licensee planned to rewire the EDG control circuits and replace the TDAFWP control cabinet during the current outage. Since the finding is of very low safety significance, was identified by the licensee, and has been entered into the licensee's CAP as CR 65324, this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

P. Bedgood, Manager, Radiation Protection
J. Broschak, Vice President, Engineering
R. Clemons, Vice President, Strategic Projects
J. Cuffe, Supervisor, Radiation Protection
D. Dees, Superintendant, Operations
T. East, Superintendent, Emergency Planning
R. Evenson, Requalification Program Supervisor
R. Flannigan, Manager, Nuclear Engineering
K. Fredrickson, Engineer, Licensing
R. Hammond, Supervisor, Regulatory Support
J. Harris, System Engineer
S. Henry, Operations Manager
R. Hobby, Licensing Engineer
S. Hossain, Engineer, System Engineering
J. Keim, Support Engineering Supervisor
R. Lane, Superintendent, Operations
M Legresley, System Engineer
M.McMullen, Technician, Engineering
C. Medinciy, Supervisor, Radiation Protection
W.Muilenburg, Licensing Supervisor
M.McMullen, Design Engineer, Engineering
K. Miller, Technician Level III, Instruments and Controls
R. Murray, Simulator Supervisor
E. Ray, Manager, Training
L. Ratzlaff, Manager, Maintenance
L. Rockers, Licensing Engineer
R. Ruman, Manager, Quality
D. Russell, Operations Training Superintendent
G. Sen, Regulatory Affairs
D. Scrogum, Systems Engineer, Engineering
M.Skiles, Supervisor, Radiation Protection
R. Smith, Site Vice President
L. Solorio, Senior Engineer
R. Stumbaugh, Health Physicist III, Radiation Protection
M.Sunseri, President and Chief Executive Officer
J. Truelove, Supervisor, Chemistry
M.Westman, Assistant to Site Vice President
J. Yunk, Manager, Corrective Actions

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000482/2013009-01	NCV	Failure to Identify the Cause and Take Corrective Action to Preclude Repetition of a Diesel Generator Functional Failure. (Section 4OA4.2.2.f)

LIST OF DOCUMENTS REVIEWED

PROCEDURES

NUMBER	TITLE	REVISION
AI 26A-006	Mitigating Systems Performance Index	3
AI 28A-010	Screening Condition Reports	15
AI 28A-016	Cause Analysis Methods and Techniques	3
AI 28A-017	Effectiveness Follow-up	3
AI 28A-100	Cause Analysis	4
AP 28A-100	Condition Reports	13
AP 28A-100	Condition Reports	19
STS IC-615B	Slave Relay Test K615 Train B Safety Injection	27A
STS IC-645A	Slave Relay Test K645 Train A Containment Spray	17
STS KJ-005A	Manual/Auto Start, Sync & Loading of EDG NE01	57
STS KJ-011A	EDG NE01 24 Hour Run	29A
STS KJ-011B	EDG NE02 24 Hour Run	28

DRAWINGS

NUMBER	TITLE	REVISION
10466-M-018-0106-12	Electrical Schematic, Engine Gauge Panel	34
10466-M-021-0073-11	Diagram, Electrical Schematic	S
E-13KJ01A	Schematic Diagram Diesel Gen. KJ01A Engine Control	14
E-13KJ01B	Schematic Diagram Diesel Generator KKJ01A Engine Control	2
WIP-M-018-00106-W17-C-1	Electrical Schematic, Engine Gauge Panel	0

CONDITION REPORTS

21039	21073	25663	27077
27908	30918	33909	34979
35343	50360	55021	60212
60664	60665	60666	62308
62327	62436	62591	62592
65086	65096	65168	65176
65178	65218	65222	65223
65323	65324	65335	65336
68515			

WORK ORDERS

10-326671

MISCELLANOUS

NUMBER	TITLE	REVISION
-	Updated Safety Analysis Report [Section 8.3]	25
-	Corrective Action Review Board Meeting Minutes	3/2/2011
-	MSPI Unreliability Data – Emergency Diesel Generators	April 2012
-	MSPI Review Board Meeting Minutes	12/13/2012
-	MSPI Review Board Meeting Minutes	1/23/2012
-	MSPI Derivation Report, Emergency AC System Unavailability Index	January 2011
-	MSPI Derivation Report, Emergency AC System Unavailability Index	January 2013
-	Maintenance Rule a(1) Action Plan for Function KJ-01	-
-	Emergency Diesel Generator Reliability/Availability Improvement Plan	10
-	Maintenance Rule Functional Failure Determination for KJ-01	5/4/12
-	System Health Report, Emergency Diesel Generators	2/18/13
10466-M-018	Design Specification for Standby Diesel Generators for	13

MISCELLANOUS

NUMBER	TITLE	REVISION
	Wolf Creek Generating Station	
10466-M-021	Design Specification for Auxiliary Feedwater Pumps and Turbine Drive for Standardized Nuclear Unit Power Plant System	13
57974	Receiving Quality Inspection Report for Engine Gauge Panel for Diesel Generator	4/4/1981
81475	Receiving Quality Inspection Report for Turbine Control Panel	3/30/1983
EC 014341	EDG Speed Switch Wiring Correction	0
LER 05000482 2009-005	Loss of both Diesel Generators with all fuel in the Spent Fuel Pool	00
M-018-01320	Installation & Adjustment Instructions Model ESSB Electronic Speed Switch	W02
QH-2012-0152	Diesel Generator (DG) Assessment for INPO Questions	-
T.S. 3.8.1	AC Sources - Operating	155
WCNOC-163	Mitigating System Performance Index (MSPI) Basis Document	8