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

October 10, 2007

EA-07-194

R. T. Ridenoure
Vice President
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
P.O. Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION NRC INSPECTION REPORT 05000285/2007011

Dear Mr. Ridenoure:

On September 18, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Fort Calhoun Station. The enclosed inspection report documents the inspection findings, which were discussed on September 18, 2007, with Mr. Tim Nellenbach, Plant Manager, and other members of your staff. This report documents baseline inspection activities related to Train A emergency diesel generator failures which occurred on February 14, 2007, and February 16, 2007. Region IV management decided to document this inspection in a separate report because the underlying performance deficiencies were complex and the preliminary significance of associated findings appeared to be of greater than very low safety significance. 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 inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report discusses a finding that appears to have Greater than Green (greater than very low) safety significance. As described in Section 4OA2 of this report, contamination containing dust and oil was found on the field flash relay auxiliary contact surfaces, which apparently caused the February 14, 2007 emergency diesel generator failure. Our inspectors determined that: (1) craftsmen were applying an unapproved wet lubricant to the auxiliary contact sliding mechanisms, contrary to vendor recommendations and in the absence of procedural controls; (2) that Fort Calhoun Station staff did not treat the February 14, 2007, emergency diesel generator failure as a significant condition adverse to quality; and (3) actions in response to applicable operating experience were not timely and did not prevent this condition from occurring. These issues were assessed for safety significance based on the best available information, including influential assumptions, using the applicable Significance Determination Process (SDP). The NRC determined that preliminarily the above stated issues, which resulted in two apparent violations, are cumulatively considered as one finding, which was determined to have Greater than Green significance. The final resolution of this finding will convey the increment in the importance to safety by assigning the corresponding color. This preliminary finding has Greater than Green significance because the Train A emergency diesel generator was unavailable for a significant period (between 14 and 28 days, depending on failure mode assumptions). The primary assumptions associated with the preliminary SDP are documented in Attachment 2 to this report.

The finding is associated with two apparent violations of NRC requirements and is being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at www.nrc.gov/about-nrc/regulatory/enforcement.html

Before we make a final decision on this matter, we are providing you an opportunity (1) to present to the NRC your perspectives on the facts and assumptions, used by the NRC to arrive at the finding and its significance, at a Regulatory Conference or (2) submit your position on the finding to the NRC in writing. If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. If a Regulatory Conference is held, it will be open for public observation. If you decide to submit only a written response, such submittal should be sent to the NRC within 30 days of the receipt of this letter. In either case, please provide the following additional information:

- Your position and justification for the applicable exposure time - whether the exposure time should be 28 days (the full duration between surveillances) or 14 days (t/2) if the exact time the diesel became inoperable was unknown.

- Your own assessment of the increase in core damage frequency associated with the Train A emergency diesel generator being unable to perform its safety function. Your assessment should include a discussion of the contribution of internal and external initiating events.

- Your views on the origins of the oil and dust contaminants that were found on the auxiliary contact surfaces.

These issues do not represent an immediate safety concern because of the corrective actions you have taken. These actions involved inspecting and replacing, as necessary, vulnerable auxiliary contacts in the emergency diesel generator control circuits.

Please contact Mr. Jeffrey Clark at (817) 860-8147 within 10 business days of the date of the receipt of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision and you will be advised by separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the inspection finding at this time. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

In addition, this report documents one self-revealing finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a noncited violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Fort Calhoun Station facility.

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

Sincerely,

/RA/ Tony Vegel for

Arthur T. Howell III, Director
Division of Reactor Projects

Docket: 50-285
License: DPR-40

Enclosure:
NRC Inspection Report 05000285/2007011
w/Attachment: Supplemental Information

cc w/Enclosure:
Joe I. McManis, Manager - Licensing
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
P.O. Box 550
Fort Calhoun, NE 68023-0550

David J. Bannister
Site Director - Fort Calhoun Station
Omaha Public Power District
Fort Calhoun Station FC-1-1 Plant
P.O. Box 550
Fort Calhoun, NE 68023-0550

James R. Curtiss
Winston & Strawn
1700 K Street NW
Washington, DC 20006-3817

Chairman
Washington County Board of Supervisors
P.O. Box 466
Blair, NE 68008

Julia Schmitt, Manager
Radiation Control Program
Nebraska Health & Human Services
Dept. of Regulation & Licensing
Division of Public Health Assurance
301 Centennial Mall, South
P.O. Box 95007
Lincoln, NE 68509-5007

Melanie Rasmussen
Bureau of Radiological Health
Iowa Department of Public Health
Lucas State Office Building, 5th Floor
321 East 12th Street
Des Moines, IA 50319

Electronic distribution by RIV:
Regional Administrator **(EEC)**
DRP Director **(ATH)**
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Team Leader, DRP/TSS **(CJP)**
RITS Coordinator **(MSH3)**
OEMail
G. M. Vasquez, RIV
V. L. Dricks, RIV
W. M. Maier, RIV
M. a. Ashley, NRR
J. Wray, OE
Only inspection reports to the following:
DRS STA **(DAP)**
D. Pelton, OEDO RIV Coordinator **(DLP)**
ROPreports
FCS Site Secretary **(BMM)**

SUNSI Review Completed: GDR ADAMS: ■ Yes No Initials: GDR
■ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ■ Non-Sensitive

R:_REACTORS_FCS\2007\FCS 2007-011_gdr.wpd

RIV:SPE:DRP/E	RI:DRP/E	SPE:DRP/E	C:DRS/EB1	C:DRS/OB
GDReplogle	LMWilloughby	JDHanna	WBJones	ATGody
/RA/	***E-GDReplogle***	***T-GDReplogle***	***/RA/***	***MEMurphy for***
09/28/07	09/28/07	10/02/07	09/26/07	09/26/07
C:DRS/EB2	SRA:DRS	ACES	C:DRP/E	D:DRS
LJSmith	RLBywater	GMVasquez	JAClark	DDChamberlain
/RA/		/RA/	GDReplogle for	
09/27/07	10/ /07	09/30/07	10/02/07	10/02/07
D:DRP				
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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	50-285
License:	DPR-40
Report:	05000285/2007011
Licensee:	Omaha Public Power District
Facility:	Fort Calhoun Station
Location:	Fort Calhoun Station FC-2-4 Adm. P.O. Box 399, Highway 75 - North of Fort Calhoun Fort Calhoun, Nebraska
Dates:	February 16, 2007 through September 18, 2007
Inspectors:	J. Hanna, Senior Resident Inspector L. Willoughby, Resident Inspector G. Replogle, Senior Project Engineer
Reactor Analyst	R. Bywater, Senior Reactor Analyst
Branch Chief	Jeff Clark, Chief, Project Branch E Division of Reactor Projects
Approved By:	Arthur T. Howell, Director Division of Rector Projects

SUMMARY OF FINDINGS

IR 05000285/2007011; 02/14/2007 - 09/18/2007; Fort Calhoun Station, Resident Report; Postmaintenance Testing, Identification and Resolution of Problems.

The report covered a 31 week period of inspection by a senior resident inspector, a resident inspector and a senior project engineer. One Green noncited violation and two apparent violations of significance 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." 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 3, dated July 2000.

A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A self-revealing Green noncited violation of Technical Specification 5.8.1.a (Procedures) was identified for an inadequate postmaintenance testing procedure. Craftsmen had replaced the field flash relay auxiliary contacts (following a previous field flash failure on February 14, 2007) and had misaligned the contact assembly during installation. Postmaintenance testing was inadequate because it did not verify that the contacts properly repositioned to the closed position following the surveillance test. When the emergency diesel generator was started two days later, for a normal surveillance test, the field did not flash because the contacts were stuck open.

  This finding was greater than minor because the finding was associated with the mitigating systems cornerstone objective (procedure quality attribute) to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The exposure time for this performance deficiency was approximately 60 hours. Using the Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," Phase 1 screening worksheet, the inspectors determined that the finding was of very low safety significance (Green) because it was not: 1) a design or qualification deficiency; 2) a loss of system safety function; 3) an actual loss of safety function for greater than its technical specification allowed outage time; 4) a loss of safety function of a non-technical specification train; or 5) a seismic, flooding or severe weather related finding. The finding had crosscutting aspects in the human performance area, specifically the resource attribute (H.2(c)) in that a complete and accurate test instruction was not provided to test the 2CR auxiliary relay contacts (Section 1R19).

- TBD. The inspectors identified an apparent violation of 10 CFR 50, Appendix B, Criterion XVI (Corrective Actions), with two examples, for the failure to: 1) treat the February 14, 2007, emergency diesel generator failure as a significant condition adverse to quality; and 2) promptly identify and correct a significant condition adverse to quality (high resistance on field flash circuit contacts) after determining that similar operating experience was applicable. In addition, a contributor to the inoperable emergency diesel generator included the failure to revisit the diesel generator operability evaluation in response to the applicable operating experience. Overall, the licensee responded to various problems in isolation and did not adopt a corrective action process that maintained emergency diesel generator reliability and availability.

This apparent violation was greater than minor because it affected the mitigating systems cornerstone objective (equipment performance attribute), to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. For the preliminary significance determination, the inspectors used a 14 day exposure time, which was half the time period between the last successful surveillance and the February 14, 2007, failure. However, this exposure time could increase to 28 days if the NRC determines the failure was caused by contact binding, versus contamination. Using the NRC Inspection Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," significance determination process, a Region IV senior reactor analyst determined that the finding was potentially Greater than Green. The finding had crosscutting aspects in the area of problem identification and resolution, operating experience component, because the licensee failed to institutionalize relevant operating experience in a reasonable time (P.2(b)) (Section 4OA2.1).

- TBD. The inspectors identified an apparent violation of Technical Specification 5.8.1.a (Procedures) for failing to establish a procedure for proper lubrication of the auxiliary contact sliding mechanism, an activity that affected the performance of the emergency diesel generator. As a result, craftsmen used an unapproved wet lubricant on the emergency diesel generator field flash relay auxiliary contact sliding mechanisms, which was contrary to vendor recommendations, without a procedure that directed the action. The lubricant was the most likely contributor to oil and dust contamination on the auxiliary contact surfaces, which apparently caused the emergency diesel generator failure on February 14, 2007. In addition, a contributor to the apparent violation included the failure to properly implement the Reliability Centered Maintenance Program.

  This finding was greater than minor because it affected the mitigating systems cornerstone objective (procedure quality attribute), to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. For the preliminary significance determination, the inspectors used a 14 day exposure time, which was half the time period between the last successful surveillance and the February 14, 2007, failure. However, this exposure time could increase to 28 days if the NRC determines the failure was caused by contact binding, versus contamination. Using the NRC Inspection Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," significance determination process, a Region IV senior reactor analyst determined that the finding was potentially Greater than Green. The finding had crosscutting aspects in the area of human performance, resources component, in that the licensee failed to provide a procedure to control a safety related maintenance activity (H.2(c)) (Section 4OA2.2).

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the below listed risk significant post-maintenance test activity. The inspectors: (1) reviewed the applicable licensing basis and/or design-basis documents to determine the safety functions; (2) evaluated the safety functions that may have been affected by the maintenance activity; and (3) reviewed the test procedure to ensure it adequately tested the safety function that may have been affected. The inspectors reviewed test data to verify that acceptance criteria were met.

- February 14, 2007, Work Order 263000-02, "Replace the Auxiliary Contacts on the 2CR Starter"

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

Introduction. A self-revealing Green noncited violation of Technical Specification 5.8.1.a (Procedures) was identified for an inadequate postmaintenance testing procedure. Craftsmen had replaced the field flash relay auxiliary contacts (following a previous field flash failure on February 14, 2007) and had misaligned the contact assembly during installation. Postmaintenance testing was inadequate because it did not verify that the contacts properly repositioned to the closed position following the surveillance test. When the emergency diesel generator was started two days later, for a normal surveillance, the field did not flash because the contacts were stuck open.

Description. When an emergency diesel generator first starts, a control circuit must energize the generator field flash circuit in order to ensure proper electric generator operation. A vital component in the field flash circuit is the field flash relay (2CR relay) and its auxiliary contacts (2CR contacts). The contacts must be in the closed position to enable the initial field flash but open when the field flash circuit is no longer needed. At the end of a surveillance run, the contacts must be in their normally closed position to support flashing the field during the next emergency diesel generator start. If the contacts fail open, the emergency diesel generator is inoperable.

Following a Train A emergency diesel field flash failure on February 14, 2007, the licensee found that the field flash relay auxiliary contacts had failed (this failure is discussed in Section 4OA2 of this report). For this particular failure, high electrical resistance across the auxiliary contacts likely caused the malfunction. Craftsmen replaced the auxiliary contacts and performed postmaintenance testing in accordance with Work Order 00263000-02. During the postmaintenance test, the emergency diesel generator started and developed the required voltage. Operators returned the emergency diesel generator to service. The licensee did not recognize, at the time, that the field flash relay auxiliary contacts were stuck in the open position or that the emergency diesel generator was inoperable.

On February 16, 2007, the licensee performed a surveillance of the Train A emergency diesel generator and the generator field again failed to flash. The licensee found the stuck open contacts and determined craftsmen had inadvertently misaligned the contacts during installation, which caused the assembly to bind. The licensee's root cause analysis determined that the postmaintenance test was inadequate because it failed to verify that the field flash relay auxiliary contacts had returned to their normally closed position.

Analysis. The failure to perform an adequate postmaintenance test following safety related work was a performance deficiency. This finding was greater than minor because the finding was associated with the mitigating systems cornerstone objective (procedure quality attribute) to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The exposure time for this performance deficiency was approximately 60 hours. Using the Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," Phase 1 screening worksheet, the inspectors determined that the finding was of very low safety significance (Green) because it was not: 1) a design or qualification deficiency; 2) a loss of system safety function; 3) an actual loss of safety function for greater than its technical specification allowed outage time; 4) a loss of safety function of a non-technical specification train; or 5) a seismic, flooding or severe weather related finding. The finding had crosscutting aspects in the human performance area, specifically the resource attribute (H.2(c)) in that a complete and accurate test instruction was not provided to test the 2CR auxiliary relay contacts.

Enforcement. Fort Calhoun Technical Specification 5.8.1.a states, in part, "Written procedures... shall be established, implemented and maintained covering the following activities... The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, 1978." Regulatory Guide 1.33, Revision 2, Appendix A, 1978, Section 8b(1)(q), recommends, in part, specific procedures for surveillance tests, including "emergency power tests." The licensee performed postmaintenance testing of the emergency diesel generator in accordance with Work Order 00263000-02. Contrary to the above, as of February 16, 2007, the field flash relay postmaintenance test procedure, an emergency power test procedure, was not adequate to satisfy this requirement because the postmaintenance test failed to verify that the auxiliary contacts were properly installed. Since this finding was of very low safety significance and was documented in the licensee's corrective action program as Condition Reports 2007-00745 and 2007-00756, this violation is being treated as a noncited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2007011-01), Inadequate Emergency Diesel Generator Postmaintenance Test.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

Selected Issue Follow-up Inspection

a. Inspection Scope

The inspectors selected the below listed issue for an in-depth review. The inspectors considered the following during the review of the licensee's actions: 1) complete and accurate identification of the problem in a timely manner; 2) evaluation and disposition of operability/reportability issues; 3) consideration of extent of condition, generic implications, common cause, and previous occurrences; 4) classification and prioritization of the resolution of the problem; 5) identification of root and contributing causes of the problem; 6) identification of corrective actions; and 7) completion of corrective actions in a timely manner.

- February 14, 2007, Train A emergency diesel generator field flash failure

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

The following two apparent violations are equal contributors to the emergency diesel generator failure. These apparent violations support one finding of potentially Greater than Green significance. The NRC will document final enforcement and significance in future correspondence.

.1 Inadequate Corrective Actions for Emergency Diesel Generator Failure

Introduction. The inspectors identified an apparent violation of 10 CFR 50, Appendix B, Criterion XVI (Corrective Actions), with two examples, for the failure to: 1) treat the February 14, 2007, emergency diesel generator failure as a significant condition adverse to quality; and 2) promptly identify and correct a significant condition adverse to quality (high resistance on field flash circuit contacts) after determining that similar operating experience was applicable. In addition, a contributor to the inoperable emergency diesel generator included the failure to revisit the diesel generator operability evaluation in response to the applicable operating experience. Overall, the licensee responded to various problems in isolation and did not adopt a corrective action process that maintained emergency diesel generator reliability and availability.

Description. When an emergency diesel generator first starts, a control circuit must energize the generator field flash circuit at 750 rpm in order to ensure proper electric generator operation. A vital component in the field flash circuit is the field flash relay (2CR relay) and its auxiliary contacts (2CR contacts). Prior to the 750 rpm engine speed, the 2CR contacts are in their normally closed position. At 750 rpm the circuit is energized and the generator field is flashed. When generator voltage is sufficient, the generator voltage regulator can control the generator field, thus the field flash circuit is no longer needed. The field flash circuit is then disabled by energizing the 2CR relay, which opens the 2CR contacts. The relay is then de-energized and the contacts return to their normally closed position, ready for the next emergency diesel generator start. The generator will fail to develop adequate voltage if the field flash circuit does not function as designed. Two potential failure modes include excessive resistance across the 2CR contacts (due to surface contamination or oxidation) and mechanical binding of the contacts in the stuck open position.

On February 14, 2007, during the monthly Train A emergency diesel generator surveillance, the generator field failed to flash at the required 750 rpm. The licensee determined that a malfunction of the 2CR auxiliary contacts had caused the field flash failure.

Inadequate Corrective Actions for February 14, 2007 Failure: On April 30, 2007, the inspectors identified that the licensee had failed to treat the February 14, 2007, unsuccessful emergency diesel generator run as a significant condition adverse to quality and had subsequently failed to take required actions.

A failed emergency diesel generator is a significant condition adverse to quality. For significant conditions adverse to quality, 10 CFR 50, Appendix B, Criterion XVI (Corrective Actions) requires the licensee to identify the cause for the failure and to take actions to preclude repetition. While the licensee did enter the problem into their corrective action program as Condition Report 200700725 and replaced the 2CR auxiliary contacts, it failed to identify the cause for the failure or to specify actions to preclude repetition. This is the first example of an apparent violation fo 10 CFR 50, Appendix B, Criterion XVI.

Root Cause: In response to the inspectors concerns, the licensee performed a root cause assessment and sent the failed auxiliary contacts to an independent laboratory for analysis. The root cause determined that high contact electrical resistance caused the failure. The licensee had measured contact electrical resistance immediately afterwards and noted that the as-found resistance varied between 10 and 300 Ohms (on numerous different measurement attempts). The resistance should have been 0 Ohms. The licensee determined that as little as 11 Ohms of resistance was sufficient to cause circuit failure.

An independent laboratory provided a formal report to the licensee entitled “Failure Analysis of GE CR105 X 300 Auxiliary Contact Assemblies,” dated July, 2007. The laboratory found contaminants on the contact surfaces. The contamination was a combination of oil and dust, which likely came from the operating environment. The report speculated that some of the oil could have come from the fingers of individuals who had handled the contacts. However, the report later dismissed this possibility by stating that some of the contaminants were “caked” on the surface.

The laboratory cautioned that the reliability of the results was affected by mishandling of the auxiliary contacts prior to their arrival at the lab. The report stated that the as-found condition of the contacts was disturbed and that the auxiliary contacts had been disassembled and then reassembled in an inappropriate manner. The inspectors determined that the contacts were mishandled following the diesel failure because the licensee had not recognized the problem's significance and had failed to follow reasonable protocols for the control and handling of the failed component. Nonetheless, based on pictures of the contact surfaces, showing spots of contamination, and electrical resistance readings, the inspectors agreed that the circuit failure was likely caused by the dust and oil surface contamination. However, neither the inspectors nor the licensee could conclusively exclude the possibility that the contacts had stuck in the open position following the previous surveillance (28 days earlier).

Inadequate Response to Applicable Industry Operating Experience: The inspectors found that the licensee had failed to promptly identify a significant condition adverse to quality in response to applicable operating experience. Fort Calhoun entered operating experience associated with an emergency diesel generator failure - dirty field flash relay contacts - into their Operating Experience System on May 19, 2006 (Fort Calhoun Operating Experience Number 2007-6767). High resistance across K2 (field flash interrupt) contacts caused the diesel generator to fail its surveillance test. The K2 contacts serve the same function as the Fort Calhoun 2CR contacts.

The licensee failed to properly evaluate emergency diesel generator operability in response to the operating experience. Fort Calhoun personnel wrote Condition Report 200602614. dated June 21, 2006, to evaluate the operating experience. The operability determination did not challenge operability because, at the time, Operations did not know if the operating experience applied to Fort Calhoun. Engineering determined that the operating experience was applicable to Fort Calhoun on September 16, 2006, but did not revisit operability, they just updated the condition report. The failure to revisit operability when additional information was identified was inconsistent with NRC RIS 2005-20, "Part 9900 Technical Guidance: Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety." Specifically, this document states, in part:

> Reviewing the performance of SSCs [structures systems and components] and ensuring their operability is a <u>continual</u> [emphasis added] process. Potential degraded or nonconforming conditions of SSCs may be discovered during many activities:... j. Operational event reviews.

The inspectors determined that the subsequent engineering response and related corrective actions were not timely. Engineers determined that the operating experience was applicable to Fort Calhoun on September 16, 2006, but waited until January 30, 2007, to make a recommendation for a functional test. The due date for procedure changes was June 15, 2007. The inspectors noted that checking the resistance across the auxiliary contacts could have been performed in a few minutes.

In addition, the inspectors determined that the licensee's response to the subject operating experience was not reasonable because:

- The operating experience was directly applicable to Fort Calhoun Station.

- Fort Calhoun had documented instances of unexpected high resistance readings on 2CR and 3CR auxiliary contacts. In 1989 and 1990, FCS wrote Work Orders 892492, 900235, and 900485 that documented higher than expected contact resistance on the Train B emergency diesel generator 2CR and 3CR auxiliary contacts. The 3CR auxiliary contacts are exactly the same component (manufacturer and model number) as the 2CR contacts. In response to this problem, the licensee replaced the affected Train B auxiliary contacts. The Train A auxiliary contacts were not replaced.

- The field flash circuit was particularly sensitive to high resistance across the 2CR contacts. As little as 11 Ohms could cause field flash circuit failure (similar to the operating experience description).

- The 2CR auxiliary contacts had been in service for many years.

- The licensee did not establish a periodic preventive maintenance task to check contact condition or electrical resistance.

This is the second example of an apparent violation of 10 CFR 50, Appendix B, Criterion XVI.

Analysis. The failure to treat the February 14, 2007, emergency diesel generator failure as a significant condition adverse to quality and the failure to promptly identify a significant condition adverse to quality in response to applicable operating experience were performance deficiencies. These concerns were greater than minor because they affected the mitigating systems cornerstone objective (equipment performance attribute), to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. For the preliminary significance determination, the inspectors used a 14-day exposure time, which was half the time period between the last successful surveillance and the February 14, 2007, failure. However, this exposure time could increase to 28 days if the NRC determines the failure was caused by contact binding, versus contamination. Using the NRC Inspection Manual Chapter 0609, Appendix A, “Determining the Significance of Reactor Inspection Findings for At-Power Situations,” significance determination process Phase 1 screening worksheet, the finding screened to a Phase 2 significance determination because the Train A emergency diesel generator was inoperable for greater than the Technical Specification allowed outage time. A Region IV senior reactor analyst performed a Phase 2 significance determination and found the finding was potentially Greater than Green. The senior reactor analyst performed a preliminary Phase 3 significance determination, which is included as Attachment 2 to this report. The finding had crosscutting aspects in the area of problem identification and resolution, operating experience component, because the licensee failed to institutionalize relevant operating experience in a reasonable time (P.2(b)).

Enforcement. 10 CFR 50, Appendix B, Criterion XVI (Corrective Actions) states, in part, “Measures shall be established to assure that conditions adverse to quality, such as failures... [and] deficiencies 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, as of April 30, 2007, the licensee failed to take measures to assure that the cause of the February 14, 2007, Train A emergency diesel generator failure (a significant condition adverse to quality) was determined and corrective actions taken to preclude repetition. In addition, prior to February 14, 2007, the licensee failed to promptly identify and correct a significant condition adverse to quality, in that the licensee had determined that operating experience associated with an emergency diesel generator failure was applicable to Fort Calhoun but failed to promptly identify the same significant condition at this station. The licensee captured this finding in their corrective action program as Condition Report 200700725. This is an apparent violation pending completion of a final significance determination, AV 05000285/20070011-02, Inadequate Emergency Diesel Generator Corrective Measures.

.2 <u>Failure to Have Procedure for Work on Safety Related Components</u>

<u>Introduction</u>. The inspectors identified an apparent violation of Technical Specification 5.8.1.a (Procedures) for failing to establish a procedure for proper lubrication of the auxiliary contact sliding mechanism, an activity that affected the performance of the emergency diesel generator. As a result, craftsmen used an unapproved wet lubricant on the emergency diesel generator field flash relay auxiliary contact sliding mechanisms, which was contrary to vendor recommendations, without a procedure that directed the action. The lubricant was the most likely contributor to oil and dust contamination on the auxiliary contact surfaces, which apparently caused the emergency diesel generator failure on February 14, 2007. In addition, a contributor to the apparent violation included the failure to properly implement the Reliability Centered Maintenance Program.

<u>Description.</u> The inspectors identified that craftsmen were applying a wet lubricant (Molykote 55M) to the 2CR auxiliary contact sliding surfaces without an approved procedure that directed the action. The independent laboratory found a wet lubricant on the auxiliary contacts sliding surfaces. The licensee had informed the laboratory that the lubricant was most likely Molykote 55M. This lubricant was the most likely contributor to oil found on the contact surfaces because oil tends to migrate and the lubricant was in the closest proximity to the contact surfaces.

The auxiliary contact vendor, General Electric (GE), had recommended against using a wet lubricant, such as Molykote 55M, because it would attract dirt and foreign material and could cause auxiliary contact binding. While the licensee had written a letter to GE, asking for permission to use Molykote 55M, the licensee was unable to find a response from GE that accepted the practice. More recently, the licensee contacted GE and was informed that the vendor still did not approve of wet lubricants on the auxiliary contact sliding mechanisms.

Plant craftsmen informed the inspectors that they always used Molykote 55M on auxiliary contacts in the plant. The inspectors asked the licensee to provide the procedure that directed and approved this action. The licensee was unable to provide an appropriate instruction. The licensee believes that fossil unit workers had started the informal lubrication practice and permanent plant workers continued it.

By failing to establish a procedure for this activity, the licensee bypassed other processes, such as 10 CFR 50.59, that could have identified potential adverse unintended consequences - such as the increase in the probability of malfunction of equipment important to safety.

Failure to Follow Reliability Centered Maintenance Program: As a contributing cause, the licensee determined that their Reliability Centered Maintenance program was inadequate. The licensee had planned to change to a new program, which would effectively correct the problem.

The inspectors found that the program was adequate, but the licensee had failed to properly implement the program. For example, PBD-13, "Preventive Maintenance," Revision 4 states, in part:

> The reliability centered maintenance methodology consists of a series of orderly steps to systematically identify functional subsystems for a system, identify components required to satisfy the function, and then determine credible failure modes for each item and the effects that these failure modes would have on equipment operation.
>
> Preventive Maintenance Basis (PM Basis) - the PM Basis identifies and justified the PM program on a <u>component</u> [emphasis added] level.
>
> Predictive (Condition Monitoring) Activities - activities that analyze equipment performance to detect and develop trends so that appropriate corrective actions can be taken <u>before</u> [emphasis added] the equipment is no longer capable of performing its intended function...
>
> Preventive Maintenance Standards are developed for each major component type. Preventive Maintenance Standards include: normal preventive maintenance to be performed; its frequency and basis; failure mechanisms, their causes, and preventive maintenance that could be performed on that type of component; site specific component failure information for that component type; and recommendations, requirements, and industry operating experience.
>
> Appendix D to PBD-13 specifies, in part, that a "comprehensive PM program" be developed because single failures can not be tolerated for risk significant structures systems and components.

Contrary to the above, for the 2CR relays (with attached 2CR auxiliary contacts):

1. For the field flash function, the licensee identified the subsystem required to support the function but failed to determine credible failure modes for each item or the effects that these failure modes would have on equipment operation. Consequently, no meaningful preventive maintenance or condition monitoring was performed.

2. No PM Basis was identified and justified on a component [emphasis added] level basis for the 2CR auxiliary contacts (or the circuit that contained the contacts).

3. Predictive Maintenance activities were not specified to analyze equipment performance to detect and develop trends so that appropriate corrective actions could be taken before [emphasis added] the equipment was no longer capable of performing its intended function.

4. A comprehensive preventive maintenance activity was not established for these risk significant components.

The inspectors noted that the licensee had performed evaluations for other relays and their associated contacts. The failure modes included dirty contacts. This is a contributor to the apparent violation. However, failing to establish preventive maintenance to preclude relay failures meant that the licensee had essentially implemented a "run to failure, then fix" approach for these components.

Analysis. The failure to provide a technical specification required procedure to control the application of lubricants on safety related components was a performance deficiency. This finding was greater than minor because it affected the mitigating systems cornerstone objective (procedure quality attribute), to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. For the preliminary significance determination, the inspectors used a 14-day exposure time, which was half the time period between the last successful surveillance and the February 14, 2007, failure. However, this exposure time could increase to 28 days if the NRC determines the failure was caused by contact binding, versus contamination. Using the NRC Inspection Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," significance determination process Phase 1 screening worksheet, the finding screened to a Phase 2 significance determination because the Train A emergency diesel generator was inoperable for greater than the technical specification allowed outage time. A Region IV senior reactor analyst performed a Phase 2 significance determination and found the finding was potentially Greater than Green. The senior reactor analyst performed a preliminary Phase 3 significance determination, which is included as Attachment 2 to this report. The finding had crosscutting aspects in the area of human performance, resources component, in that the licensee failed to provide a procedure to control a safety related maintenance activity (H.2(c)).

Enforcement. Fort Calhoun Technical Specification 5.8.1.a states, in part, "Written procedures... shall be established, implemented and maintained covering the following activities... The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, 1978." Regulatory Guide 1.33, Revision 2, Appendix A, 1978, Section 9, recommends procedures for Maintenance that can affect the performance of safety-related equipment. Contrary to the above, the licensee failed to provide a written procedure for maintenance that could affect the performance of safety-related auxiliary contacts, in that craftsmen were applying lubrication to safety-related auxiliary contact sliding mechanisms without a procedure or other written instruction. The licensee captured this finding in their corrective action program as Condition Report 2007-2911. This is an apparent violation pending completion of a final significance determination, AV 05000285/20070011-03, Failure to Provide Procedure for Safety Related Maintenance Activities.

4OA6 Meetings, Including Exit

On September 18, 2007, the Senior Resident Inspector presented the inspection findings to Mr. Tim Nellenbach, Plant Manager, and other members of the licensee's staff. The licensee acknowledged the findings. The inspector confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENTS: 1. SUPPLEMENTAL INFORMATION
2. PRELIMINARY SIGNIFICANCE DETERMINATION

Attachment 1

SUPPLEMENTAL INFORMATION
KEY POINTS OF CONTACT

Licensee Personnel

D. Bannister, Acting Site Director
G. Cavanaugh, Supervisor, Regulatory Compliance
M. Frans, Manager, System Engineering
H. Faulhaber, Division Manager, Engineering
M. Ferm, Manager, Shift Operations
D. Guinn, Licensing Engineer
D. Lakin, Manager, Corrective Action Program
J. McManis, Manager, Licensing
T. Nellenbach, Plant Manager
R. Johansan, Manager, Maintenance

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000285/2007011-02	AV	Inadequate Emergency Diesel Generator Corrective Measures (Section 4OA2.1)
05000285/2007011-03	AV	Failure to Provide Procedure for Safety Related Maintenance Activities (Section 4OA2.2)

Opened and Closed

05000285/2007011-01	NCV	Inadequate Emergency Diesel Generator Postmaintenance Test (Section 1R19)

LIST OF DOCUMENTS REVIEWED

Section 1R19: Post-Maintenance Testing

Work Order 263000-02, “Replace the Aux Contacts on the 2CR Starter”

Drawing B120C11509, “Schematic Diagram Field Flashing Control,” Sheet 1, Revision 9

Root Cause Analysis Report, “Emergency Diesel Generator #1 (Unknown Inoperability - 2/14/07 to 2/16/07)”

Condition Reports 200700756, 200700725, 200700745, and 200700875

Section 4OA2: Other Activities (Identification and Resolution of Problems (71152))

Procedures

SO-R-2, “Condition Reporting and Corrective Action,” Revision 34
MM-ST-DG-0001, “Diesel Generator DG-1 Inspection,” Revisions 56 and 57
OP-ST-DG-0001, “Diesel Generator 1 Check,” Revision 53
PBD-13, “Preventive Maintenance,” Revision 4
PED-SEI-13, “Preventive maintenance Program – Technical Basis,” Revision 11

Drawings

B120C11509, “Schematic Diagram Field Flashing Control,” Sheet 1, Revision 9
B120C11509, “Schematic Diagram Field Flashing Control,” Sheet 2, Revision 3
44D302335, “1 Phase Full Wave SCR Static Exciter,” Sheet 2, Revision 6
B120F11503, “emergency Generators Control Cabinets AI-133A & AI-133B,” Sheet 3, Revision 13

Maintenance Work Orders

900485, 892492, 892951, 263000-02

Condition Reports

2007-2227, 2007-2712, 2007-2911, 2007-2912, 200700725, 200700745, 200700756, 200700875

Miscellaneous

Control Room Logs, Day Shift, 01-17-2007
Control Room Logs, Day Shift, 02-14-2007
Control Room Logs, Night Shift, 02-14-2007
Control Room Logs, Day Shift, 02-16-2007
Control Room Logs, Night Shift, 02-16-2007
Shift Manager Logs, Night Shift, 02-16-2007

Southwest Research Institute “Failure Analysis of GE CR105 X 300 Auxiliary Contact Assemblies” dated July 2007

Root Cause Analysis Report, “Emergency Diesel Generator DG-1 Field Flash Functional Failure (2/14/2007)”

NUREG/CR-5762, Comprehensive Aging Assessment of Circuit Breakers and Relays (ML0412805681)

TD G080.2800, “Instruction Manual for Static Exciter Regulator for AC Generators,” Revision 1

TD G100.0490, “Instruction Manual for AC Synchronous Generators,” Revision 0

TD G080.4350, “Renewal Parts Magnetic Motor Starters NEMA Size 3”

TD G080.3500, “NEMA Size 3 CR105 Magnetic Contactors, CR106 Magnetic Starters”

LIST OF ACRONYMS

AV	Apparent Violation
CFR	Code of Federal Regulations
NCV	noncited violation
NRC	Nuclear Regulatory Commission

Attachment 2

Preliminary Significance Determination

Significance Determination Basis for Apparent Violations, February 14, 2007 Failure

Reactor Inspection for IE, MS, BI Cornerstones

a. Phase 1 Screening Logic, Results and Assumptions

In accordance with NRC Inspection Manual Chapter 0612, Appendix B, "Issue Screening," the inspectors determined that: 1) the failure to identify the cause and specify corrective actions to preclude repetition for a significant condition adverse to quality; 2) the application of a lubricant on the auxiliary contacts without an approved procedure; 3) the failure to promptly identify and correct a significant condition adverse to quality, that was identified through operating experience reviews; 4) the failure to revisit operability in response to new adverse operating experience; and 5) the failure to implement the Reliability Centered Maintenance program were performance deficiencies. This finding was determined to be greater than minor because the condition affected the availability/reliability the Train A emergency diesel generator and thus affected the “Equipment Performance” attribute under the Mitigating Systems cornerstone.

The last known successful test of Train A emergency diesel generator occurred 28 days prior to the February 14, 2007, failure. Because the exact failure mode could not be determined the exposure time was assumed to be one half the time since the last know successful performance of the diesel generator or 14 days. In accordance with NRC Inspection Manual Chapter 0609, Appendix A, “Determining the Significance of Reactor Inspection Findings for At-Power Situations,” dated March 23, 2007, the inspectors conducted a significance determination process (SDP) Phase 1 screening and determined that the finding resulted in loss of the safety function of Train A emergency diesel generator for greater than the Technical Specification allowed outage time. Consequently, a Phase 2 SDP risk significance estimation was required.

b. Phase 2 Estimation

Internal Events and Large Early Release Frequency (LERF)

The inspectors and a RIV senior reactor analyst (SRA) performed a Phase 2 evaluation using the Risk-Informed Inspection Notebook for Fort Calhoun Power Station, Revision 2.01, (SDP Phase 2 Notebook) and its associated "Phase 2 Pre-solved Table."

The last successful surveillance test of Train A emergency diesel generator was performed on January 17, 2007, and the test failure was on February 14, 2007. The inspectors could not determine with certainty when the EDG became non-functional. Therefore, in accordance with the SDP Usage Rule for exposure time, a "T/2" exposure time of 14 days was assumed. A 14-day exposure time is represented as a "3 - 30 day" exposure category in the SDP Phase 2 evaluation.

The inspectors determined that after an emergency start of Train A emergency diesel generator during a loss of offsite power (LOOP), operators would not be capable of diagnosing and correcting the problem with the field flash relay. Therefore, recovery was not credited.

The Train A emergency diesel generator was identified as a target in the Phase 2 pre-solved table so it could be used directly to assess the finding. The pre-solved table identified that the finding was "CDF-dominant." Therefore, no additional review was required for LERF consideration. For a 3 - 30 day exposure time, the pre-solved table identified that the significance of the finding was White with respect to CDF. The dominant sequence (with an equivalent risk contribution of 6) involved a station blackout (LOOP with failure of the EDGs), and failure to recover offsite power in 8 hours (LOOP - EAC - REC8).

External Events

Neither the Fort Calhoun SDP Phase 2 Notebook, nor the pre-solved table includes screening capability for external events or other initiating events. Because the risk contribution of the finding due to internal events was Greater than Green, the SRA conducted additional review for external event contribution. Experience has shown, using the Risk-Informed Inspection Notebooks, that accounting for external initiators could result in increasing the risk significance of an inspection finding by as much as one order of magnitude. The SRA determined that the most efficient method of accounting for external initiators was to use the guidance provided in IMC 0609, Appendix A, Attachment 3, "User Guidance for Screening of External Events Risk Contributions."

Screening of Fire Risk Contributions

The finding affected Train A emergency diesel generator, which was not in the protected train of the post-fire safe shutdown path. Ordinarily, this would result in the finding being screened from further consideration for fire-risk contribution using IMC 0609, Appendix A, Attachment 3. However, the licensee's probabilistic safety assessment staff informed the analyst that there were some fire areas where Train A emergency diesel generator was credited. These fire areas included fires in the upper electrical penetration room, the lower electrical penetration room, and for any fire scenario involving a LOOP with the loss of the 4160 V Bus 1A4 or the EDG-2. The risk contribution of these fire areas is addressed in the Section C.

Screening of Seismic Risk Contributions

The analyst determined the finding did not immediately screen out as insignificant due to seismic risk contribution. This was because Train A emergency diesel generator was on the licensee's IPEEE list of equipment addressed in their seismic margins approach to seismic risk contribution, it was used to mitigate the consequences of a loss of AC power during a seismic event, and the exposure time of the finding was greater than 3 days. Therefore, the analyst continued the evaluation using the guidance in the Risk Assessment Standardization Project (RASP) External Events Handbook.

The analyst estimated the seismic contribution using the "Seismic Event Modeling and Seismic Risk Quantification Handbook" of the RASP External Events Handbook. For Fort

Calhoun Station, the frequency of a seismically-induced LOOP event was estimated as 1.06E-4/year. The SPAR model estimate of the failure-to-run of EDG-2 was 2.068E-2. Therefore the estimated Δ CDF of a seismically-induced LOOP with a random failure of DG-2 for a 14-day exposure period was in the high E-8/year range. The seismic risk contribution of the finding was insignificant relative to the internal events result.

Screening of Flood Risk Contributors

Using IMC 0609, Appendix A, Attachment 3, Table 3.1, "Plant Specific Flood Scenarios and Initiator Frequencies," the analyst determined that Train A emergency diesel generator was not a structure, system, or component identified as critical to avoiding core damage for any flood scenario of significance. Therefore, flood risk contribution was screened out from further consideration.

Estimation of External Event Risk Contributions

Based on the screening of external event risk contributions described above, the analyst concluded the total risk contribution from external events (other than fire) resulting from the finding was not significant. Further assessment was necessary with respect to fire-risk contribution.

c. Validation of Phase 2 SDP Results

The SRA used the NRC's simplified plant analysis risk (SPAR) model for Fort Calhoun Station, Revision 3.31, dated April 10, 2006, to estimate the increase in risk associated with the finding due to internal initiating events. Average test and maintenance and "winter" raw water success criteria were assumed. A cutset truncation of 1.0E-12 was used.

Consistent with the Phase 2 SDP evaluation, the SRA used a 14-day exposure time and the observed failure of Train A emergency diesel generator was modeled as a failure-to-start basic event.

The SRA noted that an influential assumption in the analysis would be whether the finding resulted in a random, independent, or common-cause failure of the Train A emergency diesel generator field flash relay. Guidance in the RASP Handbook states that if the cause of the failure cannot be determined to be independent, or common-cause related, that the cause should be assumed to be random in the analysis. Additionally, the RASP Handbook states that a component failure can be considered independent when the cause is well understood and there is no possibility (probability = 0.0) that the same circumstances exist in other components in the common-cause component group.

At the conclusion of the inspection, the licensee had not definitively ruled out the potential for common-cause failure to be a consideration in its root cause assessment work. Some evidence indicated that the Train A emergency diesel generator field flash relay failure may have been independent based on differences in the age of the relays and past maintenance practices. However, the SRA considered that there must be at least some possibility that the same circumstances resulting in the Train A emergency diesel generator failure could exist in EDG-2.

Consistent with guidance in the RASP Handbook, including the NRC document, "Common-Cause Failure Analysis in Event Assessment, (June 2007)", the SRA modeled the condition by adjusting the following basic events in the SPAR model:

EPS-DGN-FS-1A = TRUE
EPS-DGN-FR-1A = 1.0
EPS-DGN-CF-RUN = FALSE

The SPAR baseline CDF was 1.69E-5/year. The evaluation case for the above change set resulted in a CDF of 2.40E-4/year. The dominant core damage sequence was a LOOP, followed by failure EDG-2, failure to maintain reactor coolant system subcooling, and failure to recover an EDG or offsite power within 4 hours.

The change in CDF (ΔCDF) was:

$$\Delta CDF = CDF_{case} - CDF_{base}$$

= 2.40E-4/year - 1.69E-5/year = 2.23E-4/year.

Therefore, the total change in core damage frequency over the exposure time that was related to this finding was calculated as:

ΔCDF = 2.23E-4/year ÷ 365 days/year * 14 days = 8.56E-6 over the period.

This result was consistent with the White Phase 2 SDP result. Therefore, the analyst considered the White Phase 2 SDP result to be validated for the risk contribution resulting from internal initiating events.

Potential Risk Contribution due to LERF,

The dominant core damage sequences evaluated in the Phase 2 SDP evaluation did not involve a potential for containment bypass. Therefore, using the guidance of IMC 0612, Appendix H, "Containment Integrity Significance Determination Process," the finding screened from further consideration with respect to LERF. The analyst concluded that the significance of the finding obtained from the ΔCDF assessment was sufficient to characterize its risk significance and no further LERF-related evaluation was necessary.

Estimation of Risk Contribution from Fire and Total Risk Contribution of Finding

Using information provided by the licensee from its own fire analysis work, the analyst performed a simplified estimate of the total risk contribution (including fire events) using the internal events SPAR model result. The licensee estimated that for a finding resulting in unavailability of the Train A emergency diesel generator, approximately 33 percent of the total core damage frequency resulted from fire events.

Therefore, for a 14-day exposure period, the total risk contribution of the finding for internal initiating events and external initiating events combined could result in a ΔCDF in the low E-5 range.

d. Licensee's Preliminary Risk Evaluation

The licensee's probabilistic safety assessment (PSA) staff provided the analyst with preliminary insights from its own risk assessment of the Train A emergency diesel generator failure. The licensee first performed its assessment assuming Train A emergency diesel generator was out of service for maintenance, which did not address the concern discussed above addressing adjustments for potential common-cause failure. The licensee's baseline model CDF, which also includes seismic initiators, was 1.87E-5/year. The evaluation case CDF with Train A emergency diesel generator in maintenance was 7.54E-5/year, resulting in a ΔCDF of 2.2E-6/year over the 14-day exposure period.

The licensee provided additional information after consideration of fire scenarios and consideration of common cause failure to start of EDG-2. The new model added the existing licensee's existing Revision 7 PRA model to an upgraded fire model taken from the Individual Plant Examination of External Events (IPEEE). An example of an upgrade in the fire model obtained from the IPEEE was that the probability of circuit failure resulting from a hot short was increased from the IPEEE original value of 0.06 to a revised value of 0.6.

In the revised model, which now included internal events, internal flood, seismic, and fire, the baseline CDF with random failures of the EDGs and nominal common cause failure, was 4.08E-5/year. With Train A emergency diesel generator failed, and a change in the probability of EDG-2 failure due to common cause increasing similar to the SPAR model calculation, the resulting evaluation case CDF was 1.75E-4/year. This resulted in a ΔCDF of 5.14E-6/year over the 14-day exposure period.

The dominant fire initiating event was a fire in the EDG-2 room, with subsequent failure of EDG-2, hot short-induced failure of offsite power to its associated vital bus, and failure of offsite power to the other train with the already failed Train A emergency diesel generator. Core damage sequences involving this initiator represented 13 percent of the total contribution to CDF.

e. Conclusion

The Phase 2 analysis of the significance of the finding, validated with use of the NRC SPAR model, resulted in a determination that the significance was at least of low-to-moderate safety significance (White). However, this conclusion was dependent on the influential assumption of a 14-day exposure time. Additionally, external initiating events were known to be a potentially significant contributor to the overall significance of the finding. Although the licensee's preliminary results had been discussed, the licensee had not completed its own final analysis of the significance of the finding by the conclusion of the inspection. Pending completion of this analysis and review by the NRC staff, the analyst considered the significance of the inspection finding best characterized as "Greater than Green."