UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

July 14, 2009

David J. Bannister, Vice President
and Chief Nuclear Officer
Omaha Public Power District
Fort Calhoun Station FC-2-4
P. O. Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION – NRC PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000285/2009007

Dear Mr. Bannister:

On May 15, 2009, the U. S. Nuclear Regulatory Commission (NRC) completed a team inspection at Fort Calhoun Station. The enclosed report documents the inspection findings, which were discussed on May 15, 2009, with Mr. John Goodell, Division Manager, Quality and Performance Improvement, and other members of your staff. A subsequent exit was conducted on June 24, 2009, with Mr. Richard Clemens, Division Manager, Nuclear Engineering, and other members of your staff to recharacterize several of the findings.

The inspection examined activities conducted under your license as they relate to identification and resolution of problems, safety and compliance with the Commission's rules and regulations and with the conditions of your operating license. The team reviewed selected procedures and records, observed activities, and interviewed personnel. The team also interviewed a representative sample of personnel regarding the condition of your safety conscious work environment.

This report documents one NRC-identified finding. This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance of the violation and because it is entered into your corrective action program, the NRC is treating this violation as a non-cited violation consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest this non-cited violation, 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, U.S. Nuclear Regulatory Commission, Region IV, 612 E. Lamar Blvd., Suite 400, Arlington, Texas, 76011-4125; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspector at Fort Calhoun Station. In addition, if you disagree with the characterization of any finding 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 Fort Calhoun Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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 document system (ADAMS). ADAMS is accessible from the NRC website at www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Gregory E. Werner, Chief
Plant Support Branch 2
Division of Reactor Safety

Docket: 50-285
License: DPR-40

Enclosure: Inspection Report 05000285/2009007
w/Attachments: Supplemental Information
Initial Information Request

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000285
License:	DPR-40
Report:	05000285/2009007
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:	April 27 through June 24, 2009
Team Leader:	Douglas R. Bollock, Senior Reactor Inspector
Inspectors:	John C. Kirkland, Senior Resident Inspector James F. Drake, Senior Reactor Inspector Paula A. Goldberg, Reactor Inspector Michael M. Vasquez, Senior Health Physics Inspector
Approved By:	Gregory E. Werner, Chief Plant Support Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000285/2009007; April 27 through June 24, 2009; Fort Calhoun Station "Biennial Baseline Inspection of the Identification and Resolution of Problems."

The team inspection was performed by four regional inspectors and one senior resident inspector. One Green non-cited violation of was identified during this inspection. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process". Findings for which the significance determination process does not apply may 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.

Identification and Resolution of Problems

The team reviewed approximately 500 condition reports, work orders, engineering evaluations, root and apparent cause evaluations, and other supporting documentation to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. The team reviewed a sample of system health reports, self-assessments, trending reports and metrics, and various other documents related to the corrective action program. Because of these reviews, the team concluded that when site personnel identified problems, they entered them into the corrective action program. The team identified several issues with the quality of cause evaluations. The team concluded that corrective actions were generally effective and implemented in a timely manner.

The licensee evaluated industry operating experience for relevance to the facility and entered applicable items in the corrective action program. The licensee used industry operating experience when performing root cause and apparent cause evaluations. The licensee performed effective quality assurance audits and self-assessments, as demonstrated by identification of similar issues identified by the team during the inspection.

Based on 66 interviews including six focus groups (consisting of approximately 48 people) conducted during this inspection, observations of plant activities, and reviews of the corrective action and employee concerns programs, the team determined that site personnel were willing to raise safety issues and document them in the corrective action program. The team observed that workers at the site felt free to report problems to their management, and were willing to use the Employee Concerns Program.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a Green non-cited violation for the licensee's failure to meet 10 CFR Part 50, Appendix B, Criterion V in that the licensee failed to perform an operability determination for a degraded condition. The licensee determined that certain

relays classified as Functional Importance Determination 1, should be replaced every 9 or 15 years depending on the duty cycle and environmental conditions. Most of the relays in the emergency diesel generator had been in service since initial installation, over 35 years ago. Subsequent to the inspection, the licensee performed an operability determination that showed all the effected relays were operable. This condition has been entered into the licensee's corrective action program as Condition Reports 2009-2319 and 2342.

The finding was determined to be greater than minor because the performance deficiency is associated with the procedure quality attribute (maintenance procedures) of the mitigating system cornerstone, and the performance deficiency adversely affected the associated cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, Phase 1 Significance Determination, and determined that it was of very low safety significance (Green) because the failure to perform the operability determination did not result in loss of operability or functionality and because the finding did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance, decision-making, in that the licensee did not make safety-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions to ensure safety is maintained [H.1(a)] (Section 4OA2.5).

B. Licensee-Identified Violations

None

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (71152)

The team based the following conclusions on the sample of corrective action documents that were initiated in the assessment period, which ranged from September 2007 to the end of the on-site portion of the inspection on May 15, 2009.

.1 Assessment of the Corrective Action Program Effectiveness

a. Inspection Scope

The team reviewed approximately 500 condition reports (CRs), including associated root cause, apparent cause, and direct cause evaluations, from approximately 11000 that had been issued between September 2007 and May 15, 2009, to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. The team reviewed a sample of system health reports, operability determinations, self-assessments, trending reports and metrics, and various other documents related to the corrective action program. The team evaluated the licensee's efforts in establishing the scope of problems by reviewing selected logs, work requests, self-assessments results, audits, system health reports, action plans, and results from surveillance tests and preventive maintenance tasks. The team reviewed work requests and attended the licensee's daily Condition Review Group and the management review committee meetings to assess the reporting threshold, prioritization efforts, and significance determination process, and observed the interfaces with the operability assessment and work control processes when applicable. The team's review included verifying the licensee considered the full extent of cause and extent of condition for problems, as well as how the licensee assessed generic implications and previous occurrences. The team assessed the timeliness and effectiveness of corrective actions, completed or planned, and looked for additional examples of similar problems. The team conducted interviews with plant personnel to identify other processes that may exist where problems may be identified and addressed outside the corrective action program.

The team also reviewed corrective action documents that addressed past NRC-identified violations to ensure that the corrective action addressed the issues as described in the inspection reports. The inspectors reviewed a sample of corrective actions closed to other corrective action documents to ensure that corrective actions were still appropriate and timely.

The team considered risk insights from both the NRC's and Fort Calhoun Station risk assessments to focus the sample selection and plant tours on risk significant systems and components. The team selected the following risk significant systems: 4160V and 480V Electrical Distribution systems and Emergency Diesel Generators. The samples

reviewed by the team focused on, but were not limited to, these systems. The team also expanded their review to include five years of evaluations involving the 4160V and 480V Electrical Distribution and Emergency Diesel Generators to determine whether problems were being effectively addressed. The team conducted walkdowns of these systems to assess whether problems were identified and entered into the corrective action program.

The team also reviewed the performance improvement plan and changes to the corrective action program stemming from the actions Fort Calhoun Station did in preparation for the Inspection Manual Chapter 95002 Supplemental Inspection that occurred in early 2008. A few of these changes included procedural changes, streamlining casual analysis determinations, and forming a Corrective Action Review Board (CARB) to review condition reports deemed as conditions adverse to quality.

b. Assessments

1. Assessment - Effectiveness of Problem Identification

The team concluded that the licensee correctly identified deficiencies that were conditions adverse to quality and did enter them into the corrective action program in accordance with the licensee's corrective action program guidance and NRC requirements. The team only identified two conditions adverse to quality that were not placed in the corrective action program, specifically two boric acid leaks not previously identified by the licensee. The licensee had written approximately 11000 corrective action documents during the two-year period of review.

The team reviewed the boric acid program and noted that it states that all boric acid leaks should be identified and documented. The boric acid program showed improvement over the past two years in that boric acid leak definitions were clear and the licensee was identifying and writing condition reports for many leaks previously disregarded as minor.

2. Assessment - Effectiveness of Prioritization and Evaluation of Issues

The licensee generally performed adequate evaluations of conditions adverse to quality during this assessment period. The team reviewed 40 that involved operability reviews to assess the quality, timeliness, and prioritization of operability assessments. The team noted that the immediate and prompt operability assessments reviewed were completed in a timely manner; they included an adequate engineering review when needed and were completed in accordance with station procedures with only a few exceptions. Examples of weak operability determinations and weakness in identifying the significance of adverse conditions included:

- During an August 2008 triennial fire protection inspection, the NRC identified fire protection piping that had not passed the surveillance test for four refueling cycles. The operability determination determined the piping to be operable, however it did not consider that the piping could continue to degrade and might not be operable before the next surveillance test. The team determined that the licensee was not

following guidance from Regulatory Issue Summary 2005-20 for evaluating degraded or non-conforming conditions.

- Fort Calhoun's Corrective Action Program did not consider risk in determining the significance of a condition report. Following a 2007 diesel generator field flashing failure, Fort Calhoun originally categorized the failure as a lower tiered condition report. After communicating with other nuclear plants, the licensee realized they were an outlier and that the field failing to flash on the diesel generator was a significant condition adverse to quality.

The team also reviewed 50 root and apparent cause evaluations to assess the quality and thoroughness of licensee's causal analysis of conditions adverse to quality. Overall the inspectors noted improvement in the causal analysis products from 2007 to the end of 2008. Weaknesses in the evaluations were identified in preparation for the 95002 Supplemental Inspection in early 2008. Due to the licensee's 95002 inspection preparation, the procedures and program were changed to enhance the process and more thoroughly and effectively identify the underlying causes of conditions adverse to quality. These changes included using six site personnel to lead root cause analysis teams, training for those individuals in root cause analysis techniques, training all site personnel that may be on root cause teams, revising the extent of cause evaluation process, and having a weekly Corrective Action Review Board to review condition reports that have apparent or root causes with them to ensure they are properly evaluated. The following are examples of weak root cause analyses from September 2007 to May 2009.

- The licensee's root cause associated with Condition Report 2007-3745 for a hydrazine spill that caused a Notice of Unusual Event declaration identified the cause as inadequate design and maintenance of the lower tote (tank) manhole gasket. The configuration of the system was that one tote was stacked on top of the other. The lower tote was connected to the upper tote and was filled manually by the upper tote as needed. The licensee identified that the problem was the hydrazine leaking through the fill valve into the lower tote, which caused the lower tote to be overfilled, but classified this as a contributing cause rather than the root cause.

- A poor extent of condition was noted in an apparent cause analysis for the pressurizer heater breaker failure in August 2007. The extent of condition of the defect (curved breaker bar) never extended beyond the specific date code of the breaker that failed. Another pressurizer breaker failed in November 2007 due to a different failure mechanism; however, forensic analysis of that breaker revealed the beginning of curvature on the breaker bar. This issue is being addressed as an unresolved item in section 4OA2.5.

The team noted improvements in the root cause analyses from 2007 to 2009. The licensee identified weaknesses with their extent of condition and extent of cause evaluations, and they were being addressed by management, as witnessed by the team during a Corrective Action Review Board. In most cases where the team identified weak extent of cause/extent of condition, the recommended corrective actions were noted as being broad and thorough enough to correct the extent of condition.

3. Assessment – Effectiveness of Corrective Action Program

Overall, the team concluded that the licensee did develop appropriate corrective actions to address problems based on a sample size of 75. The team identified two corrective actions associated with conditions adverse to quality that were not completed in a timely manner. These examples were:

- The emergency diesel generator starting air accumulators had rust in them, first identified in early 2008. The carbon steel accumulators were periodically cleaned, but the rust would return and the inspectors noted that the primary air line lubricator internals had to be replaced due to small amounts of rust debris.

- The Low Pressure Safety Injection Pump SI-1A discharge valve was first identified with a boric acid leak in 2005. The valve packing was repaired in 2006, but leakage was identified again in 2007, along with scoring on the valve stem. The valve was repacked in 2008, but the stem was not replaced, even though replacement parts were available. The licensee elected to defer stem replacement until 2009 to coincide with a scheduled operator overhaul. During subsequent post maintenance testing, the valve did not go fully opened or closed during a stroke test. Work was done on the valve and it was declared operable, however the valve was identified as having an active boric acid leak by the team.

.2 Assessment of the Use of Operating Experience

a. Inspection Scope

The team examined the licensee's program for reviewing industry operating experience, including reviewing the governing procedure and self assessments. A sample size of 42 operating experience notifications that had been issued during the assessment period were reviewed to assess whether the licensee had appropriately evaluated the notification for relevance to the facility. The team then examined whether the licensee had entered those items into their corrective action program and assigned actions to address the issues. The team reviewed a sample of root cause evaluations and corrective action documents to verify if the licensee had appropriately included industry-operating experience.

b. Assessment

Overall, the team determined that the licensee was evaluating industry operating experience for relevance to the facility, based on reviewing a sample size of 42 industry operating experience. The licensee had entered applicable items in the corrective action program in accordance with station procedures. The team concluded that the licensee was evaluating industry operating experience when performing root cause and apparent cause evaluations. Both internal and external operating experience was being incorporated into lessons learned for training and pre-job briefs.

The team noted that root and apparent cause evaluations were required in order to evaluate whether internal or external operating experience was available associated with the event or failure being examined and whether the evaluation and actions to address those items had been effective. However, a number of root cause evaluations reviewed did not include a sufficient assessment as to whether the issue evaluated had potential application to other similar component or plants. Few exceptions were noted where recent root cause evaluations identified relevant operating experience which had been ineffectively addressed.

.3 Assessment of Self-Assessments and Audits

a. Inspection Scope

The team reviewed a sample size of 14 licensee self-assessments, surveillances, and audits to assess whether the licensee was regularly identifying performance trends and effectively addressing them. The team reviewed audit reports to assess the effectiveness of assessments in specific areas. The team evaluated the use of self- and third party assessments, the role of the quality assurance department, and the role of the performance improvement group related to licensee performance.

b. Assessment

The team concluded that the licensee had adequate audit and self-assessment processes. The team observed that the assignment of the licensee's assessment team included members with the proper skills and experience to ensure an effective self-assessment was conducted. The assessments were all self-critical and identified the weaknesses that the team noted in our review.

.4 Assessment of Safety Conscious Work Environment

a. Inspection Scope

The inspection team conducted interviews with 66 individuals. The interviews were conducted through six focus groups of six to ten individuals, each group broken down by their disciplines, and through individual interviews. The interviewees represented various functional organizations and ranged across contractor, staff, and supervisor levels. The team conducted these interviews to assess whether conditions existed that would challenge the establishment of a safety conscious work environment at Fort Calhoun Station.

b. Assessment

The inspectors concluded that in general the licensee maintained a safety conscious work environment. All personnel interviewed indicated that they would not hesitate to raise safety concerns or to approach their management if they felt a safety concern had been left unresolved. Approximately 20 percent of site personnel had stated that they have never received training on writing condition reports and could not write one. This was most common amongst security personnel and long-term contractors. Several employees interviewed made the recommendation that the licensee provide them with training on initiating condition reports and that the licensee make paper condition reports available with a drop box or suggestion box. All personnel were aware of the Employee Concerns Program. The team identified that several licensee contractors had a misconception about the NRC. A majority of the contractors believed they needed to have a validated, serious concern in order to bring the concern to the NRC. The licensee was evaluating appropriate actions to address these issues at the end of the inspection.

.5 Specific Issues Identified During This Inspection

a. Failure to Perform an Operability Determination after Identifying a Degraded Condition.

Introduction. The team identified a Green non-cited violation for the licensee's failure to meet 10 CFR Part 50, Appendix B, Criterion V in that the licensee failed to perform an operability determination for a degraded condition. The licensee determined that certain relays classified as Functional Importance Determination (FID) 1, should be replaced every 9 or 15 years depending on the duty cycle and environmental conditions. Most of the relays in the emergency diesel generator had been in service since initial installation over 35 years ago.

Description. In 2007, the licensee began a strategic initiative called Equipment Reliability and Optimization Project. The project developed guidance for decision-making and setting first performance dates of new preventive maintenance for components on safety-related and certain non safety-related equipment. One result of the project was to develop preventive maintenance schedules, which included determining the replacement frequency of certain relays. Relays were categorized using a functional importance determination matrix. For example, components categorized as Functional Importance Determination 1 included items whose loss of a function would cause a reactor or turbine trip, a down power of greater than 10 percent, and cause the loss of a maintenance rule risk significant function. The criteria for functional importance determination was contained in Procedure PED-SEI-46, "Functional Equipment Group (FEG) and Functional Importance Determination (FID) Process," issued May 28, 2008.

During the Spring 2008, the Equipment Reliability and Optimization Project determined that relays categorized as Functional Importance Determination 1 should be replaced at a frequency of either 9 or 15 years depending on duty cycle and service conditions. This replacement frequency was based on the licensee's reviews of industry practices and vendor documents regarding the expected lifetime of the relays. The Equipment Reliability and Optimization Project also determined (based on a qualitative risk review) that those Functional Importance Determination 1 components, which exceeded their replacement frequency, should be replaced "within one to two fuel cycles." The total number of Functional Importance Determination 1 relays to be replaced within two cycles was estimated by the licensee to be about 340 relays.

In addition, the Equipment Reliability and Optimization Project found that no preventive maintenance had been performed on most Functional Importance Determination 1 relays and that preventive maintenance should be developed for these relays. The Equipment Reliability and Optimization Project determined the frequency for the new preventive maintenance and input the needed information into the licensee's work management systems.

Specific to the diesel generators, licensee engineers informed the inspector that the majority of the relays on the diesel generator had never been replaced and thus were over 35 years old. By May 2008, the licensee determined that these relays exceeded

the replacement frequency; however, the licensee did not perform an operability determination.

Procedure NOD-QP-31, "Operability Determinations Process (ODP)," Revision 38, Section 6.2.1, discussed identification of a degraded or non-conforming condition. This section states, "The operability determination is to be made promptly, with timeliness commensurate with the potential safety significance of the issue." This procedure also defined a degraded condition as one in which the qualification or functional capability of a structure, system, or component, is reduced, and identified an example of conditions that can reduce the capability of a system as aging.

After the team questioned the licensee about the relays being degraded, the licensee performed an operability determination that showed all the effected relays were operable.

Analysis. The performance deficiency associated with this finding involved the licensee's failure to follow Procedure NOD-QP-31. The finding was determined to be greater than minor because the performance deficiency is associated with the procedure quality attribute (maintenance procedures) of the mitigating system cornerstone, and the performance deficiency adversely affected the associated cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very low safety significance (Green) because the failure did not result in loss of operability or functionality and because the finding did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance, decision-making, in that the licensee did not make safety-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions to ensure safety is maintained. [H.1(a)]

Enforcement. 10 CFR Part 50, Appendix B, Criterion V requires, in part, that activities affecting quality shall be prescribed by documented instructions or procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. The assessment of operability of safety-related equipment needed to mitigate accidents was an activity affecting quality and was implemented by Procedure NOD-QP-31, "Operability Determinations Process (ODP)," Revision 38. Section 6.2.1 of that procedure discussed identification of a degraded or non-conforming condition and stated, "The operability determination is to be made promptly, with timeliness commensurate with the potential safety significance of the issue." Contrary to this requirement, the licensee did not accomplish an activity affecting quality in accordance with procedures. Specifically, between May 2008 and May 15, 2009, the licensee failed to perform an operability determination promptly on the emergency diesel generators, after identifying degraded relays. Because the finding is of very low safety significance and is entered into the licensee's corrective action program as Condition Report 2009-2319, and 2342, this violation is being treated as a non-cited violation consistent with

Section VI.A of the Enforcement Policy: NCV 05000285/2009007-01, “Failure to Perform an Operability Determination after Identifying a Degraded Condition.”

b. Failure to Perform Vendor and Industry Recommended Testing on Safety-Related and Risk Significant 4160 and 480 V Circuit Breakers

Introduction. The team identified an unresolved item associated with inadequate maintenance procedures for 4160 and 480 V safety-related breakers. The team determined that maintenance procedures used to ensure that 4160 and 480 V safety-related breakers were being maintained and overhauled in a timely manner were inadequate. The licensee had no engineering analysis or technical basis to justify the deviation from vendor/Electric Power Research Institute guidance. At the end of the inspection, the licensee identified approximately 20 breakers that had failed over the last 15 years and the team was waiting for additional information to determine if the failures were related to the inadequate maintenance.

Description. The team identified that the licensee was not performing the maintenance on the breakers as recommended by the vendor or Electric Power Research Institute guidelines. The licensee had completed a review of its breaker maintenance programs in November 2007 and modified it based on Electric Power Research Institute Documents TR-106857-V2 and TR-106857-V3, which are preventive maintenance program bases for low and medium voltage switchgear. The licensee only implemented portions of the recommended maintenance program, and had no engineering analysis or technical basis to justify the changes. Additionally, the guidance states in part that, "this program assumes breakers are in nominally good condition to begin with. Breakers that have not been serviced for a very long time may need an overhaul or have a detailed inspection performed before this program is applied." The licensee had not been performing the entire vendor or Electric Power Research Institute recommended tests, inspections, and refurbishments on the breakers since installation.

The team reviewed the licensee's circuit breaker maintenance procedures and records. The team determined that the licensee had not refurbished Asea Brown Boveri 4160 or General Electric 480 V safety-related and risk significant non-safety-related circuit breakers within the vendor specified 10-year maximum overhaul periodicity or the Electric Power Research Institute guidance of 12 years and had no engineering basis or evaluation to justify the deviation. The team compared the Electric Power Research Institute guidance and vendor-recommended maintenance requirements against the licensee's maintenance procedures and found that the licensee was not performing some of the recommended activities or had extended the periodicity of some inspections beyond even the Electric Power Research Institute recommended guidelines. The Fort Calhoun Station program for medium and low voltage switchgear and circuit breakers did not include most of the recommended testing and trending. Specifically, no testing of the operation of the 125-V DC control circuitry was performed at the voltages postulated to exist at the device terminals during design basis events. Contemporary industry standards and Electric Power Research Institute guidance recommend reduced control voltage testing as part of breaker maintenance. Vendor overhaul procedures include reduced control voltage testing on the as-found and as-left control circuit. While

there is not an explicit requirement to perform reduced voltage testing on breaker control circuitry, the Electric Power Research Institute guidance recommends reduced voltage testing on breaker control circuitry in order to have reasonable assurance of reliable operation of control circuitry at the postulated minimum control voltage. Additional recommended testing per the preventative maintenance program basis Documents TR-106857-V2 and TR-106857-V3 that were not being performed included:

- Thermography inspections of the breakers and switchgear at recommended periodicity and trending

- Measurement of the electrical resistance of coils and relays, trended over time to detect progressive failure of winding insulation and give an indication of the condition of these electrical devices.

As a result, the team requested the basis for not performing all of the recommended maintenance activities. The licensee was unable to produce an engineering evaluation that allowed the use of the Electric Power Research Institute guidance versus the vendor guidance. Additionally, the team found that the licensee failed to update their in-use guidance when operating experience or new vendor information were issued. Because the licensee was unable to produce documentation demonstrating recommended maintenance had been performed at the appropriate intervals or which qualified the practice of extending the maintenance and refurbishment intervals, the team was concerned about the reliability of the safety-related and safety significant breakers that had not been overhauled within 10 years.

The licensee stated that the 10-year vendor requirement was based on breakers manufactured and lubricated with petroleum-based grease and that their Asea Brown Boveri circuit breakers were lubricated with synthetic-based grease, Anderol 757, which does not dry out as fast and extends the useful life of the lubrication. The licensee cited a May 11, 1995, letter from Asea Brown Boveri/Combustion Engineering that implied grease hardening was not an issue with Anderol 757 lubricant. The team identified operating experience which showed that other licensees had experienced grease hardening in Asea Brown Boveri breakers that contained the Anderol 757.

Following the10 CFR Part 21 report issued by D. C. Cook on March 3, 1989, Asea Brown Boveri established the 10 year overhaul frequency. This report was issued after two Asea Brown Boveri 4160 V breakers failed to close because of hardened grease in their operating mechanism. Additional operating experience from Perry supported that grease hardening can occur in less than ten years, pertaining to the 4160 V “C” residual heat removal (RHR) pump breaker. It stated in part, "Various anomalies were identified during the process of disassembling the breaker," and “the lubricant within the operating mechanism appears to be hardened.” Based on the breaker serial number it was determined that this breaker would have used the synthetic lubricate. This provided further evidence that synthetic grease can degrade in less than 10 years. Asea Brown Boveri breaker historical industry data showed that the lubrication in the operating mechanism tended to harden within 10 years and that this condition can cause sluggish breaker operation. The issue was entered into the licensee’s corrective action program

and was being evaluated under Condition Report 2009-2306. This issue is unresolved pending review of the causes of the breaker failures as related to the improperly performed maintenance (Unresolved Item 05000285/2009007-02).

c. Managing Gas Accumulation in Emergency Core Cooling System, Decay Heat Removal, and Containment Spray System

Introduction. The team identified an unresolved item concerning the licensee's program to identify and manage gas accumulation in emergency core cooling, decay heat removal, and containment spray systems. Specifically, on April 30, 2009, the licensee identified that a section of piping was inappropriately excluded from the scope of its Gas Management Program. Based on this, the licensee was reviewing the program to determine if additional piping was excluded that could cause voided piping, thereby resulting in the inoperability of a safety-related system.

Description. In response to NRC Generic Letter 2008-08, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," dated January 11, 2008 (ML072910759), the licensee developed a program to manage gas accumulation in the identified systems. By letter, dated October 14, 2008, Omaha Public Power District described the results of its analyses and concluded that gas accumulation in safety systems was unlikely to create conditions adverse to safety at the Fort Calhoun Station.

However, on April 30, 2009, while performing ultrasonic examination of system piping under Work Order QC-ST-HPSI-0001, the licensee identified a gas void on the suction line to high pressure safety injection Pump SI-2B, downstream of Valve HCV-349. In its review, Omaha Public Power District found that it had inappropriately omitted this section of piping from the scope of the Gas Management Program. The team noted that the Updated Safety Analysis Report, section 6.2, page 11 of 35, revision 34, stated, in part, that this section of piping was not necessary to meet the core cooling requirements. However, opening Valve HCV-349 is in the Emergency Operating Procedures, and could introduce the void into the suction piping of high pressure safety injection Pump SI-2B.

When discovered, the licensee conservatively declared that section of high pressure safety injection suction piping inoperable and entered Technical Specifications 2.3(2)(e), a 24-hour Limiting Condition for Operation. The licensee took actions to immediately vent and fill that section of piping and declared the system operable. The licensee initiated Condition Report 2009-2069 to determine the cause of the event and to evaluate whether other sections of piping were inappropriately excluded from the scope of its analyses that could render safety-related systems inoperable.

At the conclusion of this inspection, the licensee had not completed its reviews. This issue is unresolved pending further NRC review of the licensee's Gas Management Program Basis to determine if similar sections of piping were inappropriately excluded such that gas voids could render safety-related systems inoperable (Unresolved Item 05000285/2009007-03).

d. Failure to report a potential defect of breaker trip bars per 10 CFR Part 21

Introduction. The team identified an unresolved item concerning the extent of a deviation originally discovered in a failed safety-related breaker. An inadequate evaluation of the deviation was performed that could result in an event or condition not being properly reported under 10 CFR Part 21, 10 CFR Part 50.72, 10 CFR Part 50.73 or 10 CFR Part 73.71.

Description. On August 24, 2007, safety-related Breaker MCC-4B1-B01, Pressurizer Backup Heaters Bank 3 Group 8 failed its instantaneous trip setting on one phase. The failure analysis determined the failure to be curvature of the trip bar, likely due to a material defect. This failure was a deviation as defined by 10 CFR Part 21 (a departure from the technical requirements included in a procurement document) and the licensee's governing procedure SO-R-1, "Reportability Determinations." In order for this deviation to be reportable under 10 CFR Part 21, 10 CFR 50.72, 10 CFR 50.73 or 10 CFR 73.71, the deviation must be determined to be a defect. As defined by 10 CFR Part 21, a defect includes deviations in a basic component delivered to a purchaser for use in a facility or an activity subject to the regulations in this part if, on the basis of an evaluation, the deviation could create a substantial safety hazard.

In evaluating the deviation, the licensee arbitrarily determined that the deviation only applied to breakers with the same date code as the failed breaker. This conclusion was reached with no engineering basis and without consultation with the vendor of the breaker. In evaluating deviations, only the vendor can fully determine the extent of the deviation and its potential effect on other plant components. Since Procedure SO-R-1 does not direct vendor notification unless the initial deviation is potentially associated with a substantial safety hazard, it was not possible to determine whether the deviation existed in other components.

The licensee determined there were no other breakers with the same date code located anywhere on site, thus the only breaker assumed to have the deviation was the initial breaker that failed. Due to safety-related function of the particular breaker, it was determined that there was no substantial safety hazard, and the event was not reportable under 10 CFR Part 50.72 or 10 CFR Part 50.73. Thus the licensee determined that any reporting requirements required under Part 21 were satisfied, as described in 10 CFR Part 21.2(c). However, since the extent of the deviation was measured against breakers only with the same date code, and without consultation with the vendor, the evaluation was inadequate to determine if the event was reportable under 10 CFR Part 50.72 or 10 CFR Part 50.73. In addition, a proper evaluation of components stored in the warehouse could not be made resulting in an inadequate evaluation to determine if the condition was reportable under 10 CFR Part 21.

On November 14, 2007, safety-related breaker MCC-3C1-B01, Pressurizer Backup Heaters Bank 2 Group 4 failed its 300 percent thermal test, instantaneous trip setting, on all three phases. This breaker was the same make and model as the breaker that failed on August 24, 2007, but was a different date code. The failure analysis of this breaker

was documented in the same report as the initial breaker failure. While the failure mechanism of this breaker was different than the previous breaker failure, the failure analysis noted that the trip bar was curved, though it did not contribute to the failure. The first breaker failure was determined to be curvature of the trip bar, and the second breaker was exhibiting the same characteristics.

Since the two failures occurred so close together in time and the failure analyses were documented in the same report, the licensee could have reasonably questioned the extent to which the deviation present in the first breaker occurred.

After a review of the two breaker failure events, the team asked the licensee to determine if other breakers were installed in the plant or stored in the warehouse that contained the same deviation. This issue is unresolved pending review of potentially affected breakers after the licensee consults with the vendor to determine if a substantial safety hazard exits (Unresolved Item 05000285/2009007-04).

4OA6 Meetings

Exit Meeting Summary

On May 15, 2009, the team presented the inspection results to Mr. John Goodell, Division Manager, Quality and Performance Improvement, and other members of the licensee staff. A subsequent exit was conducted on June 24, 2009, with Mr. Richard Clemens, Division Manager, Nuclear Engineering, and other members of your staff to recharacterize several of the findings. 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

None

SUPPLEMENTAL INFORMATION
KEY POINTS OF CONTACT

Licensee Personnel

Jeff Reinhart	Site Vice President
John Goodell	Division Manager, Quality and Performance Improvement
Richard Clemens	Division Manager, Nuclear Engineering
Dave Merrick	Coordinator, Employee Concerns Program
Gary Cavanaugh	Supervisor, Corrective Action
Mark Frans	Manager, System Engineering
Joe Gasper	Manager, Design Engineering
Nicole Bretey	Program Engineer
Tom Matthews	Manager, Nuclear Licensing
Erick Matzke	Senior Nuclear Licensing Engineer, Regulatory Compliance
Amy Hansen	Supervisor, Performance Improvement
Tim Pilmaier	Manager, Performance Improvement
Steve Miller	Supervisor, System Engineering I&C/Electrical
Tim Uehling	Manager, Chemistry
Donna Guinn	Supervisor, Regulatory Compliance
Steve Andersen	Supervisor, Component Engineering and Testing
Kevin Melstad	Supervisor, Mechanical Maintenance
Tony Christensen	Senior Operations Engineer, Operations

NRC personnel

John Hanna	Senior Resident Inspector, Fort Calhoun Station

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000285/2009007-02	URI	Failure to Perform Vendor and Industry Recommended Testing on Safety-Related and Risk Significant 4160 and 480 V Circuit Breakers (Section 4OA2.5)
05000285/2009007-03	URI	Managing Gas Accumulation in Emergency Core Cooling System, Decay Heat Removal, and Containment Spray System (Section 4OA2.5)
05000285/2009007-04	URI	Failure to report a potential defect of breaker trip bars per 10 CFR Part 21 (Section 4OA2.5)

Opened and Closed

05000285/2009007-01	NCV	Failure to Perform an Operability Evaluation of a Degraded Condition (Section 4OA2.5)

Closed

None

Discussed

None

LIST OF DOCUMENTS REVIEWED

PROCEDURES

NUMBER	TITLE	REVISION/ DATE
NOD-QP-19	Cause Analysis Program	34
NOD-QP-31	Operability Determination Process (ODP)	39
SO-R-1	Reportability Determinations	17
EM-PM-EX-0200A	4160 VCircuit Breaker Inspection	16
EM-PM-EX-0201	G.E. Type AK-2A-50S and AKS-50 Circuit Breaker Inspection	18
EM-PM-EX-0202	G.E. Type AK-2A-25 and AK-7A-25 Circuit Breaker Inspection	26
EM-PM-EX-1400	4160 V Switchgear Inspection	30
ARP-CB-20/A14	Annunciator Response Procedure A14 Control Room Annunciator A14	34
ARP-CB-20/A15	Annunciator Response Procedure A15Control Room Annunciator A15	38
ARP-CB-20/A16	Annunciator Response Procedure A16 Control Room Annunciator A16	19
ARP-CB-20/A17	Annunciator Response Procedure A17 Control Room Annunciator A17	24
ARP-CB-20/A18	Annunciator Response Procedure A18 Control Room Annunciator A18	24
ARP-CB-20/A19	Annunciator Response Procedure A19 Control Room Annunciator A19	23
OI-EE-1	Normal Operation of the 4160 V System	25
OI-EE-2	Normal Operation of the 480 V System	82
EM-PM-EX-0201	G.E. Type AK-2A-50S and AKS-50 Circuit Breaker Inspection	18
PED-SEI-40	AOV Program Plan	03
CR 2008-3014	Apparent Cause Analysis Summary Report	11/13/08
QCP-400	Visual Inspection	12
PED-SEI-20	Duties and Responsibilities of System Engineering Personnel	09
SE-EQT-MX-0002	Carbon Steel and Low Alloy Steel Fasteners In-service Testing Inspections	12/30/08
PBD-10	Boric Acid Corrosion Control	12
FCSG-24	Corrective Action Program Expectations	13
SO-R-2	Condition Reporting and Corrective Action	41
IC-ST-3001A	DG-1 Starting Air Compressors Discharge Check Valves Exercise Test	0
IC-ST-SA-3001A	DG-1 Starting Air Compressors Discharge Check Valve Exercise Test	0
PED-GEI-51.1, EC42621	Update Fuse List for Diesel Generator Control Panels	0

NOD-QP-21	Operating Experience (OE) Program	25
SO-O-25	Temporary Modification Control	10/21/08
PED-QP-1	Engineering Assistance Requests	12
FCSG-45	Operator Challenge Program	2
SDBD-DG-112	Emergency Diesel Generators	22
PE-ST-VX-3004	ASME Code Relief Valve Test for the DG Air Start System Receiver Tank	08
OI-CW-2	Attachment 8B "Reversal of Traveling Screens (Slow Speed)	47

VENDOR DOCUMENTS

NUMBER	TITLE	REVISION/ DATE
TD C490.0370	Instruction Manual for ABB Combustion Engineering Vacuum Replacement Breakers	06/20/95
TD G080.1910	Instruction Manual for AKD-5 Powermaster Switchgear	2/28/89
TD G080.2280	Instruction Manual for Low-Voltage Power Circuit Breakers Type AK-50/75/100, AKT-50, AKU-50, and AKF-2C/2D/2E	2/28/89
TD G080.1930	Instruction Manual for Power Circuit Breakers Types AK-2/3/2A-15, -25, -50/50S	2/28/89
TD G080.192	Power Circuit Breakers Types AK-2/2A-15, AK- 2/3/2A/3A-25, AKU-2/3/2A/3A -25	N/A
TD G080.0020	Metal-Clad Switchgear Types M26 and M36 for Magne-Blast Air Circuit Breaker Types AM-4.16 and AM-13.8	1
165-40404-SMC	Switchgear Specifications	11/09/1967
165-40404-SLC	Powermaster AKD-5 Low Voltage Switchgear	11/09/1967

CONDITION REPORTS

2006-5629	2008-1905	2008-6794
2006-5883	2008-1918	2008-7060
2006-5986	2008-1957	2008-7168
2007-2268	2008-2007	2009-0019
2007-2441	2008-2047	2009-0102
2007-2489	2008-2086	2009-0146
2007-2543	2008-2120	2009-0411
2007-2549	2008-2170	2009-0905
2007-2622	2008-2392	2009-0976
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2007-2955	2008-2642	2009-1082
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OPERATING EXPERIENCE

2007-12240	2008-2299	2009-0405
2007-12660	2009-0247	2008-12728
2007-12840	2009-0248	2008-0681
2007-12851	2007-12326	2008-1054
2008-0048	2007-12344	2008-1783
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2008-2236	2009-0406	2009-0408
2008-2281	2009-0407	2009-0409
2008-0527	2008-2235	2009-0248

WORK ORDERS

0021982 01	0323645 01	0025898 01
0049129 01	0041009 01	0064753 01
0075638 01	0084849 01	0099079 01
0165152 01	0320898 01	0204912 01
0183595 01	0223508 01	0232909 01
0238560 01	0270044 01	0271803 01
0233366 02	0308917 01	0282615 01
0294378 01	0303848 01	0307320 01
0321564 03	0324803 01	0313294 01

AUDITS

08-QUA-059	"Quality Department Surveillance Report Station Engineering"	08/01/08
08-QUA-033	"Quality Department Surveillance Report "In-service Inspection and Testing"	06/10/08
08-QUA-023	SARC Audit Report Number 72, 2&66 Engineering Configurations Management, Electrical Equipment Qualification, and Computer Software Control	04/14/08
08-QUA-022	SARC Audit Report Number 1(2)-0308, QA/SARC Audit review	4/14/08
07-QUA-074	SARC Audit Report Number 45 Corrective Action	12/21/07
08-QUA-056	SARC Audit Report Number 1 Quality Assurance Program	9/2/08
07-QUA-072	SARC Audit Report Number 29&61 Shift Operations & Clearances/Conformance of Facility Operations	12/17/07
08-QUA-83	SARC Audit Report Number 29&61 Shift Ops & Clearances/Conformance of Facility Ops	12/16/08
08-QUA-075	Surveillance Report, rev 1. Security Operations	11/6/08
09-QUA-011	QA Audit Report Number 6, rev 1. Site Security Plan and Implementing Procedures	3/4/09
08-QUA-019	QA Audit Report Number 4 Emergency Response Plan & Procedures	4/8/08
08-QUA-085	QA Audit Report Number 48 Nuclear Fuel	12/22/08
08-QUA-031	Surveillance Report, Fuel Movement	5/30/08

DRAWINGS

NUMBER	TITLE	REVISION
Fig. 8.1-1	Simplified One Line Diagram Plant Electrical System P&ID	131

Miscellaneous

LIC-08-0010, Letter from Tesar, M. A. (OPPD) to NRC, “Omaha Public Power District Response to NRC Bulletin 2007-01,” February 8, 2008

NRC Bulletin 2007-01, “Security Officer Attentiveness,” December 12, 2007

NRC Information Notice 2008-09, “Turbine-Driven Auxiliary Feedwater Pump Bearing Issues,” May 22, 2008

NRC Memorandum from Kobetz (Reactor Inspection Branch) to Case, M. (Division of Policy and Rulemaking), “Safety Evaluation Regarding Endorsement of NEI Guidance for Adhering to the Licensed Thermal Power Limit,”

NRC Regulatory Issue Summary 2005-20, Revision 1, “Revision to NRC Inspection Manual Part 990 Technical Guidance, ‘Operability Determinations & Functional Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety’,” April 16, 2008

NRC Regulatory Issue Summary 2007-21, Revision 1, “Adherence to Licensed Power Limits,” February 9, 2009

NRC Regulatory Issue Summary 2007-29, “Clarified Guidance for Licensed Operator Watch-Standing Proficiency,” December 7, 2007

Part 21 Notification, “Conval Valves We’d Qualifications,” November 9, 2007

NRC Inspection Report 05000285/2009006, Fort Calhoun Station NRC Inspection Procedure 95002, dated May 21, 2008.

EC 45932, “Equipment Operability Guidance,” dated April 9, 2009

FAX, “Maintenance of ABB 5VKB-R Breakers” dated February 2, 1995

EROP Program Recommendations, “Medium Voltage Switchgear (Less than 15K and more than 600V)”, Rev 0

EROP Program Recommendations, “Low Voltage Switchgear (Less than 4.16KV)”, Rev 0

TR-106857-V2, “Preventative Maintenance Program Basis: Medium Voltage Switchgear”, dated August 1996

TR-106857-V3, ”Preventative Maintenance Program Basis: Low Voltage Switchgear”, dated August 1996

Updated Safety Analysis Report, Section 8, Electrical Systems 12-07-06

EPIX report of breaker failures for 4160 and 480 Vcircuit breakers since 1995, dated 5/21/2009

FCS Performance Improvement Plan, dated March 24, 2009

2007 Safety Conscious Work Environment (SCWE) Survey Summary Report, Fort Calhoun Nuclear Station, dated August 22, 2007

2008 Safety Conscious Work Environment (SCWE) Survey Summary Report, Fort Calhoun Nuclear Station, dated August 22, 2008

Self-Assessment 08-04, Problem Identification & Resolution, dated December 12, 2008

Initial Information Request - February 6, 2009
Fort Calhoun Station Problem Identification and Resolution Biennial Inspection
(IP 71152B)

The inspection will cover the period of September 14, 2007, to April/May 2009. All requested information should be limited to this period unless otherwise specified. You can upload the information to the Certrec inspection website. We would also like the information provided on a CD prior to our preparation week. We will break down the request by required dates to allow for effective preparation. Information provided in electronic media may also be in the form of e-mail attachment(s), CDs, or thumb drives. The Agency has converted to MSOffice. We have document viewing capability for Adobe Acrobat (.pdf) files and other image files.

Please have the information uploaded to the Certrec Website by March 30, 2009, if possible.

1. Summary list of all Fort Calhoun Station Condition Reports (CRs) of significant conditions adverse to quality

2. A list of all corrective action documents that aggregate or "roll-up" one or more smaller issues for the period

3. Summary list of all action requests which were down-graded or up-graded in significance since 09/01/2007

4. List of all root cause analyses completed since 09/01/2007. Include in this listing those root causes considered as upper tier cause evaluations.

5. List of root cause analyses planned, but not complete at end of the period, include in this list the upper tier cause evaluations.

6. List of all apparent cause analyses completed since 09/01/2007.

7. List of plant safety issues raised or addressed by the employee concerns program since 09/01/2007

8. List of action items generated or addressed by the plant safety review committees since 09/01/2007

9. All quality assurance audits and surveillances of corrective action activities completed since 09/01/2007

10. A list of all quality assurance audits and surveillances scheduled for completion since 09/01/2007, but which were not completed

11. All corrective action activity reports, functional area self-assessments, and non-NRC third party assessments completed since 09/01/2007

12. Corrective action performance trending/tracking information generated since 09/01/2007 and broken down by functional organization. Quarterly reports are sufficient for this area if they are broken down by organization and issue.

13. Current revisions of corrective action program procedures for: Condition Reporting, Corrective Action Program, Root Cause Evaluation/Determination, Operator Work Arounds, Work Requests, Requests for Engineering Resolution (RFR), Temporary Modifications, Procedure Change Requests, Deficiency Reporting and Resolution, Operating Experience Evaluation

14. Action requests or other actions generated since 09/01/2007 for each of the items below:

    Part 21 Reports:
    [Applicable] NRC Information Notices:
    All LERs issued by Omaha Public Power District
    NCVs and Violations issued to OPPD (including licensee-identified violations)

15. Safeguards event logs

16. Current system health reports or similar information

17. Current predictive performance summary reports or similar information

18. Corrective action effectiveness review reports generated since 09/01/2007

19. List of risk significant components and systems

20. List of actions done and/or in the Human Performance Improvement Plan since the last PIR inspection

21. Outage maintenance that was not done for whatever reason

22. Any rework of maintenance performed from last outage

24. A listing of all external events (OE) evaluated for applicability at Fort Calhoun Station since 09/01/2007