

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-483/89019(DRP)

Docket No. 50-483

License No. NPF-30

Licensee: Union Electric Company
Post Office Box 149 - Mail Code 400
St. Louis, MO 63166

Facility Name: Callaway Plant, Unit 1

Inspection at: Callaway Site, Steedman, Missouri

Inspection Conducted: October 16 through November 30, 1989

Inspectors: B. H. Little
C. H. Brown

Approved By: 
Richard L. Hague, Chief
Reactor Projects Section 3C

12/15/89
Date

Inspection Summary

Inspection from October 16 through November 30, 1989 (Report No. 50-483/89019(DRP))

Areas Inspected: A routine unannounced safety inspection of non-routine events, containment spray system, safety assessment/quality verification, plant operations, and maintenance and surveillance was performed.

Results: One violation was identified which involved the licensee's failure to maintain a containment isolation valve (EG-HV-60) operable (Paragraph 2.b). Other results included: observations of minor housekeeping deficiencies (Paragraph 3); utility management's active involvement in the development and implementation of self-improvement initiatives; quality assurance audits and surveillances are comprehensive, performance based, and effective in identification and resolution of quality concerns (Paragraph 4); special training for operator's response to instrument power supply failures was demonstrated effective during a subsequent failure (Paragraph 5); and a conservative safety attitude was demonstrated during supervision planning and performance of work associated with an instrument air leak within the containment (Paragraph 6).

DETAILS

1. Persons Contacted

D. F. Schnell, Senior Vice President, Nuclear
*G. L. Randolph, General Manager, Nuclear Operations
*J. D. Blosser, Manager, Callaway Plant
C. D. Naslund, Manager, Operations Support
*J. V. Laux, Manager, Quality Assurance
*J. R. Peevy, Assistant Manager, Technical Services
*W. R. Campbell, Manager, Nuclear Engineering
*M. E. Taylor, Assistant Manager, Work Control
D. E. Young, Superintendent, Operations
*W. R. Robinson, Assistant Manager, Operations and Maintenance
R. R. Roselius, Superintendent, Health Physics
*T. P. Sharkey, Supervising Engineer, Site Licensing
G. J. Czeschin, Superintendent, Planning and Scheduling
W. H. Sheppard, Superintendent, Maintenance
G. R. Pendegraff, Superintendent, Security
L. H. Kanuckel, Supervisor, Quality Assurance Program
G. A. Hughes, Supervisor, Independent Safety Engineer Group
*J. C. Gearhart, Superintendent, Operations Support, Quality Assurance
C. S. Petzel, Quality Assurance Engineer
J. A. McGraw, Superintendent, Design Control

*Denotes those present at one or more exit interviews.

In addition, a number of equipment operators, reactor operators, senior reactor operators, and other members of the quality control, operations, maintenance, health physics, and engineering staffs were contacted.

2. Reports of Non-Routine Events (92700)

a. Seismic Qualification of Containment Coolers

On November 17, 1989, the inspector was advised by the licensee of a potential concern associated with the seismic qualification of the containment coolers. The concern was based on an analysis performed by Wolf Creek (WC) (hand calculation FH-QW-001) which indicated that the containment coolers at WC were not qualified to withstand a safe shutdown earthquake.

The containment coolers at Callaway and WC were built by American Air Filter (AAF), which provided the original seismic analysis. The analysis performed by WC was in response to a Bechtel Problem Investigation Request (PIR) which advised WC of problems Bechtel had encountered with AAF's seismic analysis for other projects.

The licensee's engineering review of WC's analysis found some assumptions included in WC calculation, FH-QW-001, were not valid and/or were overly conservative. Based on a preliminary engineering review of AAF calculations and the Bechtel PIR, the licensee believed that the containment coolers met seismic requirements and considered the coolers "operable" pending further review and verification. The concern and "operability" judgement were documented in incident report (IR) Number 89-412 for tracking and resolution.

On November 21, 1989, the licensee contracted Dominion Engineering Incorporated (DEI) to perform a detailed seismic analysis of the containment coolers. On December 1, 1989, the licensee received preliminary results of DEI's seismic analysis. The analysis applied conservative assumptions and also addressed Bechtel's PIR concerns regarding the AAF analysis. DEI's results for the operating basis earthquake (OBE) showed that the maximum OBE stress is less than half of the allowable stress and that the maximum safe shutdown earthquake (SSE) stress is about 75 percent of the allowable stress (per Bechtel specification).

The inspector determined that the licensee was responsive to the potential seismic deficiency and that professional discipline was applied by the licensee's engineering personnel in the resolution of this matter.

b. Inspection of Licensee Event Reports

Through direct observations, discussions with licensee personnel, and a review of records, the following licensee event reports were reviewed to determine that reportability requirements were fulfilled, that immediate corrective action was accomplished, and that corrective action to prevent recurrence was accomplished in accordance with Technical Specifications (T/S). The LER listed below is considered closed.

(Closed) LER 89-009: A containment isolation valve (EG-HV-0060 - Component Cooling Water (CCW)) failed to fully close against full system differential pressure when tested.

Background Information

On May 11, 1989, during stroke testing of valve EG-HV-60 against full system differential pressure (DP), the valve failed to fully close. Prior periodic and post-maintenance testing was performed under partial DP or static system conditions in accordance with T/S and ASME Section XI requirements. DP testing of EG-HV-60 was done as part of the licensee's expanded motor operated valve (MOV) testing program developed in 1988 and first implemented during the refuel 3 outage (April-May 1989). The expanded MOV testing program was developed in response to generic concerns identified in IE Bulletin 85-03. In general, Bulletin 85-03 applied DP testing requirements to MOVs in three safety systems, e.g., auxiliary feedwater, residual heat removal, and safety injection. The

licensee applied Bulletin DP testing requirements to all safety related MOVs, on a phase in basis. The phase in is scheduled to be completed during refuel 5. Subsequently, on June 28, 1989, the NRC issued Generic Letter (GL) 89-10 which requires utilities to expand their programs to include DP testing of all safety related valves within the next five years or three refuel outages (refuel 6 for Callaway).

Following EG-HV-60's failure to close against system DP, the torque switch setting was increased, and the valve retested satisfactorily on May 12, 1989. The initial failure to close was documented on an incident report (IR) Number 89-185, for further evaluation. Through a maintenance history review, the licensee determined that EG-HV-60 had been tested satisfactorily against system DP prior to initial plant startup (July 1984). On March 6, 1986, the valve was repacked. The post-maintenance testing specified and performed was in accordance with T/S and ASME Section XI e.g., cycling test and verification of isolation time. The test as performed did not test the valve's ability to close against full system DP.

On July 21, 1989, following an engineering and on-site review committee (ORC) review, the licensee determined that EG-HV-60 had been inoperable during the period following valve repacking (March 6, 1986) through discovery (May 11, 1989). The licensee assumed that the repacking caused additional valve stem friction which prevented full closure of the valve.

Inspectors Review

The inspector reviewed LER 89009 and IR 89-185 and interviewed licensee personnel involved in the evaluation and resolution process. The inspector determined that appropriate corrective action was taken to restore valve operability. The deficiency was documented on quality records and reviewed by the licensee.

The IR evaluation process, including a detailed maintenance history review, contributed to the delay in issuance of the LER. The change in post-maintenance testing criteria, which establishes valve operability, was also a contributor. Typically, component inoperability, identified through surveillance or testing, would be assumed to occur at the time of discovery. As EG-HV-60 was not tested against full system DP following repacking, the licensee appropriately assumed inoperability commenced at that time.

Safety Significance

The CCW system is a seismically designed closed loop system both inside and outside of containment. The system is designed to remain intact immediately following a loss of coolant accident (LOCA) or high energy line break (HELB). The CCW system is automatically isolated from the containment when containment pressure reaches 27 psig through initiation of a containment isolation signal, CIS "B". The CIS "B" results in automatic closure of two in-series valves in

the CCW supply line (EG-HV-71 and 58) and two in-series valves in the CCW return line (EG-HV-60 and 59). EG-HV-71, 58, and 59 had each tested satisfactorily against full system DP. EG-HV-60 was tested satisfactorily against partial system DP following repacking and as a quarterly surveillance i.e., the valve was cycled during reduced system flow (DP) which resulted from the bypass valve EG-HV-130 (normally closed) being open (in parallel with EG-HV-60). The simultaneous closing of the above valves would reduce the DP across EG-HV-60 and increase the probability that the valve would have closed in response to a CIS "B". Additionally, valve indication and control is provided in the control room (CR). An incorrect position of EG-HV-60 following a CIS "B" would be readily apparent (indicated on both the safety system status panel and the control panel). Emergency procedure E-0 directs the CR operator to verify correct valve positions following a CIS "B" and directs that the valve be manually closed if required. It is expected that EG-HV-60 would close as closure of any other in-series valve would establish static system conditions, i.e., less DP than the valve had successfully closed against.

The inspector determined that although the valve closure deficiency underscores generic concerns relating to MOV testing, the specific failure had only minor safety significance. The deficiency was identified through the licensee's expanded MOV testing initiative. However, EG-HV-60 was demonstrated inoperable (incapable of closing against full system DP when tested on May 11, 1989) a condition which most likely occurred following valve repacking on March 6, 1986. Within the above duration, the plant operated in all modes.

T/S limiting condition for operation (LCO) 3.6.3 requires that containment isolation valves (including EG-HV-60) be operable in Modes 1 through 4. The licensee's failure to maintain EG-HV-60 operable from March 6, 1986 through May 11, 1989 is a violation of T/S LCO 3.6.3 (483/89019-01(DRP)).

The violation meets the tests of 10 CFR 2, Appendix C, Section V.G.1; consequently, no Notice of Violation will be issued and this matter is considered closed.

Other than the violation described above all activities were conducted in an adequate and safe manner.

3. Containment Spray System Walkdown (71710) (Assisted by T. Alexion, NRR)

The inspectors performed a walkdown of the containment spray system (including the spray additive system) and confirmed that the system was as shown on the piping orthographic drawings and the FSAR figures (no actual pipe lengths or positions were measured). All major components were found to be properly labeled.

The inspectors also verified that the position of the valves in the plant (by direct observation), the position of the associated electrical breakers in the various switchgear rooms, and the indication status of the associated switches on the main control board were in their correct positions as specified on the normal operating procedure system lineup checklist. The review of procedures showed that procedure OTN-EN-00001 provides the required lineup with the plant at power.

Components, breakers, and compartments were found to be clean and satisfactorily maintained (no valve packing leaks were found, no bent valve stems or missing handwheels were noted, oil levels were maintained in the containment spray pump motors). Minor cleanup is needed at the base of the spray additive tank near and around the ground cable, at the spray additive tank sight glass, and at the test connections of a few differential pressure cells near the spray additive tank (some leaking and chemical buildup). Regarding the containment spray pump room, the only exception noted was that the conduit to the train "A" pump discharge pressure transmitter was not securely fastened.

The physical condition of the hangers and supports appeared to be satisfactory with no apparent problems. The component cooling water piping also appeared satisfactory. The train "B" pump room cooler fans were running at the time of inspection and also appeared to be operating satisfactorily.

Calibration and surveillance records for the containment spray and spray additive systems indicated that the pumps, valves, and other operating parameters were functioning within the required limits. The instrumentation measuring and test equipment calibration dates were current.

The inspectors also reviewed the calculations and procedures for increasing the sodium hydroxide concentration in the spray additive tank (the associated technical specification changes were recently approved by the NRC in Licensee Amendment Number 44). All calculations and procedures appeared to be appropriate.

Other than the minor deficiencies discussed above, all conditions were safe and adequate.

4. Safety Assessment/Quality Verification (35502)

An inspection of the licensee's quality programs was performed to assess the implementation and effectiveness of programs associated with management control, verification, and oversight activities. The inspectors considered areas indicative of overall management involvement in quality matters, self improvement programs, and response to regulatory and industry initiatives. The inspection focused on the overall effectiveness of the licensee's quality assurance (QA) program as reflected by performance trends.

The inspection included interviews with the licensee's QA, quality control (QC), and various department personnel involved in problem identification and improvement programs. The inspection also included a review of selected quality reports, QA audit and surveillance reports, associated request for corrective action (RCA), and response to RCA items. The documents listed below were included in the review.

Special Assessments

- Safety Systems Outage Modification Assessment (SSOMA) (Report Number 89-001).
- Joint Utility Management Assessment (JUMA) (Report Number AP89-012).

QA Audits

- Maintenance (Report Number AP89-005).
- Materials Management (Report Number AP89-021).

QA Surveillances

- Safety operations at reduced inventory conditions (Report Number SP89-071).
- Control room observations of the plant shutdown and cool-down for refuel 3 (Report Number SP89-099).
- Operations at reduced inventory with the reactor vessel head in place (Report Number SP89-110).
- Core off-load, spent fuel pool, insert shuffle and core refueling (Report Number SP89-113).
- Plant heat-up from Refuel 3 (Report Number SP89-157).

QA Monthly and Semi-annual Reports (January through June 1989)

Inspection Findings

The inspectors found that utility management was actively involved in quality program development and implementation and continue to aggressively support self-improvement initiatives. The initiatives appear to have had a positive effect on overall plant performance and conditions. For example, the plant experienced only one unplanned reactor trip during the last 12 months; there was a notable improvement in operation's control of systems and the coordination and control of work activities during refueling 3 and subsequent plant outages. Improved radiological controls and conditions in the plant were noted as well as a significant reduction in radioactive contaminated areas.

Performance errors have decreased in frequency in 1989, but remain the major contributor to reportable events at Callaway. The licensee's assessment of root cause identified the need for improved communications and in some instances procedure enhancements. The licensee has applied the Human Performance Evaluation System (HPES) technique in the assessment of plant problems and in the evaluation of control room practices and outage performance. In response to HPES, findings the licensee has implemented various programs to reduce performance errors. The programs include the assignment of outage managers during refueling and maintenance outages, integrated crew training (effective communications), and root cause training. "Peer discussions recently utilized, appear effective in the identification of root cause and correction of performance errors. Additional control room access restrictions have been implemented to minimize distractions or interruptions of control room personnel. Operations managements' morning meetings and crew briefings (non-control room personnel) are no longer held in the control room.

QA was actively involved in the quality assessment of all major functional areas at Callaway. The special assessments and audits were comprehensive, sufficiently detailed and documented, and demonstrated the licensee's responsiveness to NRC initiatives and concerns. The SSOMA used the "vertical slice" approach similar to the NRC's inspection method of assessing plant modifications. The SSOMA focused on refuel 3 Callaway Modification packages (CMPs), and provided an assessment of design, procurement, installation, testing documentation, and training. The materials management audit was performed at the request of plant management in response to adverse inspection findings by NRC at other plants in the area of vendor interface and procurement programs. The maintenance audit was a performance based assessment of maintenance activities during the refuel 3 outage. The QA effort involved approximately 500 manhours of direct field observation of ongoing work during both the AM and PM shifts.

QA surveillances, were effectively used in the assessment of the programmatic and implementation aspects associated with technical specification requirements, plant startups and shutdowns, refueling and operations at reduced coolant inventory. The inspectors observed that QA maintains a high profile on site specifically during off-normal conditions or during infrequent, complex activities. QA appears to be effective in problem identification as well as obtaining resolution of quality concerns.

The inspection showed that problems identified were appropriately documented on RCAs and communicated to responsible line management. QA received line management response to RCAs which included evaluation of cause, corrective action, and action to prevent recurrence. QA assessment and trending of RCAs was included in QA's semiannual report to licensee management.

All activities were conducted in an adequate and safe manner.

5. Plant Operations (71707)

a. Operational Safety Verification

Inspections were routinely performed to ensure that the licensee conducts activities at the facility safely and in conformance with regulatory requirements. The inspections focused on the implementation and overall effectiveness of the licensee's control of operating activities and on the performance of licensed and non-licensed operators and shift technical advisors. The inspections included direct observation of activities, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions of operation (LCO), and reviews of facility procedures, records, and reports. The following items were considered during these inspections:

- Adequacy of plant staffing and supervision.
- Control room professionalism, including procedure adherence, operator attentiveness, and response to alarms, events, and off-normal conditions.
- Operability of selected safety-related systems, including attendant alarms, instrumentation, and controls.
- Maintenance of quality records and reports.

The inspectors have observed a continuing improvement in control room (CR) conditions and professional conduct. CR instruments, controls, and annunciator deficiencies are worked on a high priority basis, which has resulted in improved material conditions and frequent "black board" status. Alarming annunciators are generally the result of ongoing surveillance activities. The inspectors have also observed improved CR discipline in shift turnover activities and communications.

In September 1989, improper operator action, associated with restoration following a power failure in the engineered safety features (ESF) cabinet, resulted in an auxiliary feedwater actuation and subsequent steam generator chemistry problem. The licensee's evaluation of the event identified procedural and communication deficiencies as contributors to the operator error. Special training to prevent recurrence included a video taped reenactment of the procedure and associated communications. Procedural deficiencies were corrected. Through interviews with operating crew personnel, the inspectors found that crew members viewed the video technique as positive and effective in increasing personal awareness and beneficial in promoting proper communication.

In September 1989, the same power supply failure occurred. The power supply module was replaced and tested satisfactorily. ESF was restored without incident. The events are documented in LER numbers 89-010 and 89-013. The LERs remain open pending further NRC review.

Cold Weather Protection

The inspectors performed a sample inspection of the implementation of the licensee's cold weather protection program. The inspectors determined that the licensee's program, per administrative procedure APA-ZZ-00302 (Plant Cold Weather Preparation), had been initiated in a timely manner and was satisfactorily completed.

b. Off-shift Inspection of Control Room

The inspectors performed routine inspections of the control room during off-shift and weekend periods; these included inspections between the hours of 10 p.m. and 5 a.m. The inspections were conducted to assess overall crew performance and, specifically, control room operator attentiveness during night shifts.

The inspectors determined that both licensed and non-licensed operators were attentive to their duties, and that the administrative controls relating to the conduct of operation were being adhered to.

Other than minor deficiencies discussed above, all activities were conducted in a safe and adequate manner.

6. Maintenance/Surveillance (62703) (61726)

Selected portions of the plant surveillance, test and maintenance activities on safety-related systems and components were observed or reviewed to ascertain that the activities were performed in accordance with approved procedures, regulatory guides, industry codes and standards, and the Technical Specifications. The following items were considered during these inspections: the limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibration was performed prior to returning the components or systems to service; parts and materials that were used were properly certified; and appropriate fire prevention, radiological, and housekeeping conditions were maintained.

The observed ongoing maintenance and surveillance activities were found to be properly authorized and were being performed using approved procedures. The activities were noted to be scheduled and required isolations and tagging were found to be correctly carried out. The limiting conditions for operation were adhered to during the performance of these activities. In general, the workmanship was found to be satisfactory.

a. Maintenance

The reviewed maintenance activities included:

<u>Work Request No.</u>	<u>Activity</u>
W-119359	Implementing RFR-89-5358.
W-125105	Preparation of feedwater heater piping and performance of ultrasonic tests for pipe wall thickness checks.
P-446267	Auxiliary feedwater pump room cooler inspection including P-459602 (annual and semi-annual preventative maintenance).
W-129148	Troubleshooting and change-out of transmitter AE-LI-549 (steam generator "D" level indicator).
W-107257	Reweld "dog arm pin" on containment spray pump "B" door.

On November 3, 1989, power was reduced to approximately 22 percent to permit inspection and repair of an instrument air system leak within the bioshield area. The air leak was due to a failed air filter gasket which caused isolation of the normal letdown flow (reactor coolant system (RCS) to chemical volume control system (CVCS)). The inspector attended task planning and briefing meetings and observed supervisory controls established for the corrective maintenance. ALARA considerations were factored into the task planning and briefings. Detailed instructions and limits were provided for health physics and maintenance personnel. A shift outage manager was assigned to the task. A conservative safety attitude was apparent in the detail of task preparation and supervisory controls established for the repair. The plant was returned to full power on November 4, 1989.

b. Surveillance

The reviewed surveillances included:

<u>Procedure No.</u>	<u>Activity</u>
ESP-ZZ-00004	Detector normalization.
ESP-ZZ-00018	Incore versus excore auxiliary feedwater pump comparison.
OSP-ZZ-00001	Control room shift and daily log reading and channel checks.
ISF-AB-0P535	Steam generator "C" main steam outlet pressure protective train "B".
ISF-AL-00P39	Condensate storage tank to auxiliary feedwater pump suction header pressure transmitter.
OSP-NE-00002	"B" diesel generator loading and one hour run test.
CMP-88-1020	Modification on EG-HV-53.

All activities were conducted in an adequate and safe manner.

7. Violations for Which a "Notice of Violation" Will Not be Issued

The NRC uses the Notice of Violation as a standard method for formalizing the existence of a violation of a legally binding requirement. However, because the NRC wants to encourage and support licensee initiatives for self-identification and correction of problems, the NRC will not generally issue a Notice of Violation for a violation that meets the tests of 10 CFR 2, Appendix C, Section V.G.1. These tests are: (1) the violation was identified by the licensee; (2) the violation would be categorized as

Severity Level IV or V; (3) the violation was reported to the NRC, if required; (4) the violation will be corrected, including measures to prevent recurrence, within a reasonable time period; and (5) it was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation.

A Violation for which a Notice of Violation will not be issued is identified in Paragraph 2.b of this report.

8. Exit Meeting (30703)

The inspectors met with licensee representatives (denoted under Persons Contacted) at intervals during the inspection period. The inspectors summarized the scope and findings of the inspection. The licensee representatives acknowledged the findings as reported herein. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary.