

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-483
License No.: NPF-30
Report No.: 50-483/96-14
Licensee: Union Electric Company
Facility: Callaway Plant
Location: Junction Highway CC and Highway O
Fulton, Missouri
Dates: November 24, 1996, through January 4, 1997
Inspectors: D. G. Passehl, Senior Resident Inspector
F. L. Brush, Resident Inspector
H. F. Bundy, Reactor Engineer
G. M. Good, Senior Emergency Preparedness Analyst
Approved By: W. D. Johnson, Chief, Project Branch B

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Callaway Plant
NRC Inspection Report 50-483/96-14

Operations

- The license's decision to shutdown the plant to repair a feedwater isolation valve actuator was appropriate (Section O1.1).
- The control room staff response to a turbine trip during reactor startup was good (Section O1.2). There were no problems during the subsequent startup (Section O1.3).
- An equipment operator was thorough during rounds. The plant material condition was good (Section O2.1).
- An equipment operator inadvertently pulled the wrong fuses on a bus in the main circulating water and service water pump house. This resulted in a partial loss of circulating water flow to the main condenser and required the operators to reduce plant power. This was a violation caused by a personnel error (Section O4.1).

Maintenance

- The licensee's actions to determine the reason for the main feed water isolation valve hydraulic actuator leaks were thorough. The licensee installed incorrect O-rings due to inadequate material control which was a noncited violation (Section M1.3).

Plant Support

- The commitment to perform onshift dose assessments was clearly described in the emergency plan and implementing procedures (Section P3.1).

Report Details

Summary of Plant Status

The plant was at 100 percent power at the beginning of the report period.

On December 1, 1996, due to hydraulic oil leaks on the actuator for feedwater isolation Valve D, the licensee shut down the unit. At 12:48 p.m. on December 5, 1996, the plant was brought back online. However, the turbine tripped a few minutes later due to a hi-hi steam generator water level. At 8:25 p.m. on December 5, 1996, the licensee returned the unit online. The unit reached full power on December 6, 1996.

At 4:41 p.m. on December 18, 1996, the licensee reduced plant power to 92 percent when an equipment operator inadvertently tripped a main circulating water pump. The plant was returned to full power approximately four hours later and operated near 100 percent power for the remainder of the report period.

I. Operations

O1 Conduct of Operations

O1.1 Plant Shutdown

a. Inspection Scope (71707)

On December 1, 1996, the inspectors observed control room operations during portions of the plant shutdown for a forced outage.

b. Observations and Findings

The licensee shut down the unit due to hydraulic fluid leaks on the actuator for main feedwater isolation Valve AEFV0042. The actuator repair effort is discussed in paragraph M1.2. The licensee's decision to shut down the unit was appropriate. The licensee would have been required to enter and exit feedwater isolation valve Technical Specification action statement 3.7.1.6 repeatedly in order to repair the valve.

The shift supervisor held good briefings prior to starting the power reduction and removing major equipment from service. Licensee management was present in the control room and ensured personnel were aware of expectations. There was good communication between the control room operators. The shift supervisor exhibited good command and control. Operators did self-checking prior to manipulating plant components. The inspectors did not note any problems.

In addition, the inspectors verified compliance to the Technical Specifications and Final Safety Analysis Report requirements by reviewing logs, touring main control boards and reviewing status boards.

O1.2 Plant Startup with Turbine Trip, Feedwater System Isolation and Motor-Driven Auxiliary Feedwater System Actuation

a. Inspection Scope (71707, 93702)

On December 5, 1996, the inspectors observed portions of the plant startup following the forced outage discussed in Section O1.1.

During the startup, a hi-hi water level in Steam Generator B resulted in a main turbine trip, feedwater system isolation, and motor-driven auxiliary feedwater actuation. The inspectors observed the control room operator response to the trip.

b. Observations and Findings

During the startup prior to entering Mode 2, the control room supervisor held good briefings. There was good communication among operations personnel. Licensee management was in the control room and discussed their expectations with onshift personnel.

At approximately 18 percent power, while transferring feed flow control from the feedwater flow bypass valves to the main feedwater regulating valves, the steam generator water levels began to oscillate. A main turbine trip and engineered safety features actuations occurred when the level in Steam Generator B reached the hi-hi setpoint of 78 percent. The magnitude of the level oscillations in the steam generators were exacerbated by the positive moderator temperature coefficient present at low power levels during this early stage in core life.

Operator response following the turbine trip and feedwater isolation was good. In order to rapidly establish normal steam generator level, the operators manually started the turbine-driven auxiliary feedwater pump and used control rods to rapidly reduce power. This prevented a reactor trip on low steam generator level due to the isolation of the main feedwater system. The shift supervisor exhibited good command and control.

c. Conclusions

The control room staff's response to the turbine trip was good. Operator communications were good during the startup and subsequent trip. The shift supervisor exhibited good command and control. Licensee management ensured that plant personnel followed expectations.

O1.3 Second Plant Startup on December 5, 1996 (71707)

Following the trip noted in paragraph O1.2, the licensee reviewed the methods of starting up and increasing power with a positive temperature coefficient. For the second startup on December 5, 1996, the licensee changed the method for

transferring from the main feedwater bypass valves to the main feedwater regulating valves.

Rather than continuing to increase main generator load just after synchronizing to the grid, the licensee held the main generator output to approximately 60 MWe. When steam generator water levels had stabilized and the feedwater bypass valves were approximately 90 percent open, using the steam dumps, the licensee increased the main generator output at approximately one half percent per minute. This allowed a smooth transition from the feedwater bypass to the main feedwater regulating valves. There were no steam generator level deviation alarms during this startup. The inspectors did not identify any significant issues.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Tours

a. Inspection Scope (71707)

The inspectors accompanied an equipment operator during rounds of the auxiliary and fuel buildings. This was to determine the thoroughness of his inspections and his sensitivity to equipment and plant housekeeping problems.

b. Observations and Findings

The operator was appropriately sensitive to the condition and operating status of all equipment inspected. The inspectors noted that the operator wiped oil accumulation from safeguards pumps, which was considered a good practice. The inspectors also noted that any leaks were appropriately identified with work request tags.

The operator noted that chemical and volume control system to centrifugal charging Pump A discharge to reactor coolant pump seals throttle Valve BGHV8357A, had an accumulation of boric acid crystals. The operator stated that this did not meet expectations from both housekeeping and corrosion control standpoints. The inspectors followed up and found that the valve is being tracked by the licensee's boric acid leak tracking program and will be worked at an appropriate time. The inspectors observed that the operator was thorough in his inspections and was particularly sensitive to determining the status of previously identified fluid leaks.

The inspectors observed that material, tools, and equipment were properly stored. With the exception of clutter in the hot tool and radwaste staging areas, the buildings were clean and free of debris. The clutter observed in the noted areas was not unexpected in that refueling outage cleanup was still in progress.

c. Conclusions

The equipment operator was thorough in his inspections and particularly sensitive to determining the status of existing fluid leaks. The plant material condition was good.

O2.2 Cold Weather Preparations

a. Inspection Scope (71707)

The inspectors reviewed the licensee's cold weather preparations.

b. Observations and Findings

The licensee performed a plant walkdown using Procedure OTS-ZZ-00007, Revision 3, "Plant Cold Weather," to ensure that equipment required during cold weather was operational. During the walkdown, the licensee identified a few deficiencies which were corrected. The inspectors did not note any problems during subsequent cold weather conditions.

O4.1 Worker Protection Tag Placed on the Wrong Component which Tripped Main Circulating Water Pump B and Service Water Pump B

a. Inspection Scope (71707)

The inspectors reviewed a December 18, 1996, event, which occurred when an equipment operator inadvertently pulled the metering and relay fuses for electrical Bus PB122. The bus supplied power for main circulating water Pump B and service water Pump B. When the fuses were pulled, the pump undervoltage protective circuits tripped the two pumps. The equipment operator was supposed to pull the instrument potential transformer secondary fuses for electrical Bus PB121.

b. Observations and Findings

While intending to place a worker protection tag on an instrument potential transformer secondary fuses for electrical Bus PB121, an equipment operator incorrectly placed the worker protection tag on the metering and relay fuses for electrical Bus PB122. This action caused main circulating water Pump B and service water Pump B to trip. Main circulating water Pump A and service water Pump A were already secured to allow maintenance on Bus PB121. This left only service water Pump C and main circulating water Pump C in service.

When the equipment operator pulled the metering and relay fuses, the control room operators received a number of indications alerting them that the pumps had tripped. Control room personnel immediately commenced reducing power to prevent a turbine trip on loss of main condenser vacuum. Condenser pressure

increased and stabilized at approximately 4.5 inches Hg after reactor power was reduced to 92 percent. The condenser pressure turbine trip setpoint was 7.5 inches Hg. The operators started essential service water Pump A to provide an adequate service water supply.

After determining that the fuses were inadvertently pulled, the licensee restored both Bus PB121 and Bus PB122 and restarted main circulating water Pump B. Service water Pump A was also started and essential service water Pump A was secured. The plant was returned to 100 percent power.

The licensee initiated an investigation of the event using the corrective action process.

The licensee identified the following major causes:

- Failure to perform self-checking of the worker protection tag against the component labeling.
- Many of the fuses outside the power block were not consistently labeled.

The licensee's corrective actions included reviewing proper tagout techniques with equipment operators. This includes the expectation that field supervisors resolve any discrepancies between tagout sheet nomenclature and component labels in the field. The licensee was also reviewing the adequacy of fuse labeling for components outside the power block. Fuse labeling problems inside the power block were identified and corrected at an earlier time.

The inspectors agreed with the licensee's findings.

Administrative Procedure ODP-ZZ-00310, "Workman's Protection Assurance Tagging", Revision 2, Step 4.1.10.3, required that the method and order specified on the tagout control sheet be followed when hanging tags.

The tagout control sheet for Workman's Protection Assurance 21672, Tag 10, specified that a tag be hung on the potential transformer secondary fuses for Bus PB121. Failure to adhere to this requirement is considered a violation of the licensee's administrative procedure.

NRC Inspection Report 50-483/9611 identified a similar occurrence when an equipment operator pulled incorrect fuses and rendered centrifugal charging Pump A inoperable. This licensee-identified and corrected violation is being treated as a cited violation due to a repeat occurrence of a recent event (483/9614-01).

c. Conclusions

The inspectors concluded that the failure to pull the correct fuses was due to personnel error.

O8 Miscellaneous Operations Issues

O8.1 Technical Specification Interpretations (71707)

During a review of Callaway Technical Specification Interpretations, the inspectors noted that NRC personnel were identified as giving concurrence for the positions taken in two of them:

- Technical Specification Interpretation 1 - Emergency Core Cooling System Accumulators, and
- Technical Specification Interpretation 4 - Turbine Overspeed Protection.

The inspectors informed the licensee that this form of NRC involvement is not recognized by the Commission and is not an acceptable practice. However, the referencing of official NRC correspondence in a licensee Technical Specification Interpretation is acceptable. The inspectors requested that the licensee remove any informal references to NRC review and/or approval from their Technical Specification Interpretations. The licensee's Onsite Review Committee had already approved removing these interpretations from the Technical Specifications.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments - Maintenance

a. Inspection Scope (62707)

The inspectors observed or reviewed portions of the following work activities:

- Work Activity P541890 - Centrifugal Charging Pump A Motor Bearing Oil Sight Glass Leaks,
- Work Activity W175769 - Rebuild Spare Feedwater Isolation Valve Actuator,
- Work Activity P548345 - Clean and Inspect Feeder Circuit Breaker to Motor-Driven Auxiliary Feedwater Pump A,
- Work Activity P548864 - Calibrate Auxiliary Feedwater Flow to Steam Generator B Feed Flow Transmitter, and

- Work Activity P576360 - Cold Weather Preparations.

b. Observations and Findings

Except as noted in paragraph M1.3, the inspectors found no concerns with the maintenance observed. All work observed was performed with the work packages present and in active use. The inspectors frequently observed supervisors and system engineers monitoring job progress, and quality control personnel were present when required. Housekeeping and foreign material exclusion controls were satisfactory.

M1.2 General Comments - Surveillance

a. Inspection Scope (61726)

The inspectors observed all or portions of the following test activities:

- Surveillance Procedure OSP-EF-P001A - Emergency Service Water Train A Operability,
- Surveillance Procedure OSP-NE-0001A - Standby Diesel Generator A Periodic Tests, and
- Surveillance Procedure OSP-SA-0017A - Train A Safety Injection System - Containment Spray Actuation System Slave Relay Test.

b. Observations and Findings

Surveillance testing observed during this inspection period was conducted satisfactorily in accordance with the licensee's approved programs and the Technical Specifications.

M1.3 Feedwater Isolation Valve Actuator Hydraulic Leaks

a. Inspection Scope (62707)

On November 29, 1996, the actuator on feedwater isolation Valve AEFV0042 for Steam Generator D, developed a hydraulic leak on both hydraulic system trains. Each train is capable of independently closing the feedwater isolation valve upon receiving a feedwater system isolation signal. The inspectors reviewed the licensee's efforts to repair the actuator and determine the root cause of the leaks.

b. Observations and Findings

The licensee discovered that the wrong size O-rings had been installed on both hydraulic system trains for the actuator on Valve AEFV0042. Although the inside

diameter of the O-rings was correct, the thickness was incorrect. As the hydraulic pressure in the actuator cycled during normal operation, the O-ring material wore away which established a leak path outside the valve.

The licensee determined the root cause to be a maintenance error during refurbishment of a spare hydraulic actuator for Valve AEFV0042. Workers refurbished the spare actuator just prior to the recent refueling outage. This refurbishment included installing new O-rings on the hydraulic trains on October 8, 1996. However, some of the O-rings were the incorrect size. The licensee later replaced the existing actuator on AEFV0042 with the newly refurbished spare (with the incorrect O-rings) during the refueling outage as part of an overall preventive maintenance task.

In December 1996, during the licensee's followup investigation after the leak was discovered, the licensee inspected several dozen O-rings and found a total of 17 incorrect O-rings that had been installed in both hydraulic trains in Valve AEHV0042. The licensee replaced these with the correct O-rings.

The licensee held a multidisciplinary review to determine the root cause of and corrective actions for this event. As a result, the licensee initiated a case study of this event due to the broad scope of potential corrective actions.

The licensee's short term corrective actions included successfully repairing the valve and testing a representative sample of O-rings in stock to ensure no other O-ring problems existed. No incorrect O-rings were identified.

The licensee's long term corrective actions include the case study, which addresses:

- Ensuring correct drawings are specified and available in work packages,
- Reviewing material control wording to clear up confusing nomenclature on parts sizing,
- Ensuring adequate work planning and coordination for complex maintenance efforts, and
- Conducting training on the results of the case study for the various disciplines involved in maintenance activities.

The inspectors reviewed the work package used to refurbish the actuator on AEFV0042 just prior to the refueling outage. The inspectors found that the supervisor in charge of the job did not thoroughly review the work package for information on replacement O-rings. Information on replacement O-rings of the correct size and material was available in the work package.

Criterion V of Appendix B to 10 CFR Part 50 requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, and drawings appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. The failure to adhere to this requirement is considered a violation of Criterion V of Appendix B to 10 CFR Part 50. This licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (483/9614-02).

c. Conclusions

The inspectors concluded that the licensee's actions to determine the reason for the leak were thorough. The inspectors also found the licensee's repair of the leaking hydraulic components to be satisfactory. The licensee's control of O-ring material for rebuilding the feedwater isolation valve actuator was lacking.

III. Engineering

E1 Conduct of Engineering

E1.1 Engineering Involvement In Plant Activities (37551)

The inspectors noted that engineering was appropriately involved in plant activities during this inspection period. The inspectors noted that system engineers conducted plant walkdowns of assigned systems for cold weather preparations as discussed in Section O2.2 of this report. Expectations were included on a management policy entitled "System Walkdowns," NE-System Walkdown-01, Revision 1. In addition, plant engineers participated in the multidisciplinary case study team and root cause evaluation for the failure of feedwater isolation Valve AEFV0042 (Section M1.3). The inspectors had no concerns.

E2 Engineering Support of Facilities and Equipment

E2.1 Review of Facility Conformance to Updated Final Safety Analysis Report Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the Final Safety Analysis Report description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the Final Safety Analysis Report description. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the Final Safety Analysis Report that related to the areas inspected. No inconsistencies were noted between the wording of the Updated Safety Analysis Report and the plant practices, procedures, and/or parameters observed by the inspectors.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Radiological Protection Program Observations

The inspectors toured various areas of the radiologically controlled areas of the plant. Health physics personnel were observed routinely touring the radiologically controlled areas. Licensee personnel observed performing work in radiological control areas exhibited good radiation worker practices. Contaminated areas and high radiation areas were properly posted. Area surveys posted outside rooms in the auxiliary building were current.

P3.1 Licensee Onshift Dose Assessment Capabilities

a. Inspection Scope (TI 2515/134)

Using Temporary Instruction 2515/134, the inspectors gathered information regarding:

- Dose assessment commitment in emergency plan,
- Onshift dose assessment emergency plan implementing procedure, and
- Onshift dose assessment training.

b. Observations and Findings

On December 17, 1996, the inspectors conducted an inoffice review of the emergency plan and implementing procedures to obtain the information requested by the temporary instruction. The inspectors also conducted a telephone interview with the licensee on December 17, 1996, to verify the results of the review. Based on the documentation review and the licensee interview, the inspectors determined that the licensee had the capability to perform onshift dose assessments using real-time effluent monitor and meteorological data and that the commitment was clearly described in the emergency plan and implementing procedures.

c. Conclusion

The commitment to perform onshift dose assessments was clearly described in the emergency plan and implementing procedures. Further evaluation of the information obtained using the temporary instruction will be conducted by NRC Headquarters personnel.

V. Management Meetings

X1 Exit Meeting Summary

The exit meeting was conducted on January 3, 1997. The licensee expressed a position on the subject of the violation in this report.

During the discussion of the equipment operator inadvertently pulling the wrong fuse which caused operators to reduce plant power (Section O4.1), the licensee stated that the event was not significant enough to merit a violation for the following reasons:

- The licensee disagreed that a procedure violation occurred given a literal interpretation of the equipment control tagging procedure,
- The licensee stated that 10 CFR 50, Appendix B, did not apply to the non-safety related fuse, and
- The licensee stated that the equipment control tagging procedure was a reference-use procedure.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. D. Blosser, Manager, Operations Support
H. D. Bono, Supervising Engineer, Licensing Fuels and Site Licensing
D. G. Cornwell, General Supervisor, Maintenance
R. T. Lamb, Superintendent, Operations
J. V. Laux, Manager, Quality Assurance
D. W. Neterer, Shift Supervisor
J. R. Peevy, Manager, Emergency Preparedness and
Organizational Support
G. L. Randolph, Vice President, Nuclear Operations
M. A. Reidmeyer, Engineer, Quality Assurance
R. R. Roselius, Superintendent, Chemistry and Rad Waste
J. D. Schnack, Engineer, Quality Assurance
T. P. Sharkey, Supervising Engineer, Nuclear Operations

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 62707: Maintenance Observations
IP 71707: Plant Operations
IP 93702: Prompt Onsite Response to Events at Operating Power Reactors
TI 2515/134 Licensee Onshift Dose Assessment Capabilities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

9614-01 VIO Equipment Operator Pulled Incorrect Fuse (Section O4.1)
9614-02 NCV Leaking O-Rings On Feedwater Isolation Valve AEFV0042
For Steam Generator D (Section M1.3)

Closed

9614-02 NCV Leaking O-Rings On Feedwater Isolation Valve AEFV0042
For Steam Generator D (Section M1.3)

LIST OF DOCUMENTS REVIEWED

Emergency Plan Implementing Procedures

EIP-ZZ-00101	Classification of Emergencies	Revision 19
EIP-ZZ-00102	Emergency Implementing Actions	Revision 15
EIP-ZZ-01211	Management Action Guides for Nuclear Emergencies	Revision 18

Other Documents

Callaway Radiological Emergency Response Plan	Revision 20 CN 96-02
---	-------------------------