ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-483
License No.:	NPF-30
Report No.:	50-483/97-12
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Junction Highway CC and Highway O Fulton, Missouri
Dates:	May 11 through June 21, 1997
Inspectors:	D. G. Passehl, Senior Resident Inspector F. L. Brush, Resident Inspector V. G. Gaddy, Resident Inspector, Fort Calhoun
Approved By:	W. D. Johnson, Chief, Project Branch B

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Callaway Plant
NRC Inspection Report 50-483/97-12

Operations

- The response by plant operators after the loss of normal letdown flow was proper. The coordination meeting held after the event was good (Section O4.1).

Maintenance

- Workers inadvertently closed the safety injection Pump A minimum flow recirculation valve to the refueling water storage tank. There was a weakness in the prejob briefing. Also, there was a lack of attention to detail during the preliminary check of the recorder (Section M1.3).

Engineering

- The licensee's followup operability determination for an electrical conduit sagging and touching the mechanical overspeed trip rod for turbine-driven auxiliary feedwater pump trip-throttle valve was satisfactory and was well documented (Section O8.2).

Plant Support

- The licensee did not meet the availability goal for the postaccident sampling system in 1996. The licensee has improved system availability and has met the availability goal for the postaccident sampling system thus far in 1997 (Section R2.1).

- The licensee has maintained the accidental criticality monitoring and alarm system as required by 10 CFR 70.24. Appropriate procedures and practices were in place to ensure that personnel would be aware of an accidental criticality and take appropriate actions (Section P2.1).

Report Details

Summary of Plant Status

The plant operated near full power throughout the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious. Plant status, operating problems, and work plans were appropriately addressed during daily turnover and plan-of-the-day meetings. Plant testing and maintenance requiring control room coordination were properly controlled. The inspectors observed several shift turnovers and noted no problems.

O2 Operational Status of Facilities and Equipment

O2.1 Review of Equipment Tagouts (71707)

The inspectors walked down the following tagouts:

- Workman's Protection Assurance 23194 - Essential Service Water Train B; and,
- Workman's Protection Assurance 23167 - Emergency Diesel Generator B.

The inspectors did not identify any discrepancies. All tags were on the correct devices and the devices were in the position prescribed by the tags.

O2.2 Engineered Safety Feature System Walkdowns (71707)

The inspectors used Inspection Procedure 71707 to walk down accessible portions of auxiliary feedwater Trains A and B.

Equipment operability, material condition, and housekeeping were acceptable. Some minor discrepancies were brought to the licensee's attention and corrected. The inspectors did not identify any substantive concerns as a result of this walkdown.

O4 Operator Knowledge and Performance

O4.1 Chemical and Volume Control System Letdown Isolation (93702)

a. Inspection Scope (93702)

The inspectors followed up on the unplanned isolation of normal chemical and volume control system letdown. The inspectors reviewed:

- Normal Operating Procedure OTN-BG-00001, "Chemical and Volume Control System," Revision 20; and
- Off-Normal Operating Procedure OTO-BG-00001, "Loss of Letdown," Revision 4.

b. Observations and Findings

On June 10, 1997, pressurizer level Channel BBLB0460D spiked low, causing letdown isolation Valve BGHV0460 to automatically close. This isolated the normal chemical and volume control system letdown flow from the reactor coolant system.

Plant operators performed the proper followup actions in accordance with Procedures OTO-BG-00001 and OTN-BG-00001.

After restoring normal letdown flow, the licensee held a meeting to develop a troubleshooting plan for the momentary failure of pressurizer level Channel BBLB0460D. The meeting was attended by personnel from the operations, engineering, and maintenance departments. Licensee management also attended. The inspectors observed good discussions and exchanges of ideas during the meeting.

Instrumentation and control personnel could not determine an exact cause for failure of the pressurizer channel, but determined the likely cause was failure of a process control card. Instrumentation and control personnel replaced the card. No further problems were noted.

c. Conclusions

The inspectors concluded that the actions of operators following the loss of normal letdown were proper. The meeting held after the event was good.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Closed) Violation 50-483/96011-01: inadequate component cooling water normal operating procedure.

Procedure OTN-EG-00001, "Component Cooling Water," Revision 14, was inadequate in that it did not give appropriate flow values for the various components supplied by the component cooling water system or provide adequate guidance on maintaining proper system temperature.

The licensee performed the following corrective actions:

- Procedure OTN-EG-00001 was revised to provide the correct values for component flow rates.
- Procedure OTN-EG-00001 was revised to state a new minimum system operating temperature.
- Procedure OTN-EG-00001 was revised to provide guidance on maintaining proper system temperature.
- Final Safety Analysis Report Change Notice 96-61 was implemented to state the new lower minimum component cooling water system operating temperature.
- The component cooling water system flow to the various components was re-balanced.

The inspectors concluded that the licensee's corrective actions were adequate.

O8.2 (Closed) Inspection Followup Item 50-483/97007-01: conduit resting on the turbine-driven auxiliary feedwater pump mechanical overspeed trip rod.

In March 1997, the inspectors noted an electrical conduit from the electronic governor sagging and touching the mechanical overspeed trip rod for turbine-driven auxiliary feedwater pump trip-throttle Valve FCHV0312. Plant electricians promptly secured the conduit so that it did not contact the mechanical overspeed trip rod.

The inspectors reviewed:

- Suggestion-Occurrence-Solution Report 97-0360, and
- Operator Aid OOA-ZZ-SEO6, "Turbine Building Area 5 Operator Aid," Revision 2.

The conduit fed a limit switch on Valve FCHV0312. The purpose of the limit switch was to prevent Valve FCHV0312 from opening if the mechanical overspeed linkage was not reset.

The inspectors reviewed the licensee's operability determination documented on the suggestion-occurrence-solution report. The licensee found that the turbine-driven auxiliary feedwater pump remained operable with contact between the conduit and the trip rod. The licensee documented the following reasons:

- The mechanical overspeed function of the turbine-driven auxiliary feedwater pump was not required for the pump to perform its safety function.

- During a normal shutdown of the pump, an operator actuates a solenoid which trips Valve FCHV0312 closed. This involves no movement of the mechanical overspeed trip rod.

- In an overspeed trip condition, the electrical overspeed trip would actuate before the mechanical overspeed trip. The electrical trip actuates a solenoid which then trips Valve FCHV0312 closed. This involves no movement of the mechanical overspeed trip rod.

- There is normally 28 to 32 pounds of spring force on the mechanical overspeed trip rod. The flex conduit would not have exerted enough friction force to prevent the mechanical overspeed trip rod from actuating when required.

The exact period of time that the conduit contacted the mechanical overspeed trip rod was indeterminate. The licensee estimated the time to be a few hours at most since equipment operators inspected the turbine auxiliary feedwater pump room once per shift. The equipment operator inspection includes ensuring that the mechanical overspeed trip rod was reset per Operator Aid OOA-ZZ-SEO6. The equipment operators would have noticed the sagging conduit during this inspection.

In addition, the operations department manager stated that he had inspected the mechanical overspeed trip rod 2 days before the inspectors identified the sagging conduit. The operations department manager had not noticed any problem at that time.

The inspectors concluded that the licensee's operability determination was satisfactory and was well documented. The inspectors also concluded that the sagging conduit was not a long-standing deficiency. The inspectors identified no further concerns.

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 P587136 - Clean and Inspect Emergency Diesel Generator Brushes;
- Work Activity W180093 - Repack Essential Service Water to Component Cooling Water Heat Exchanger B Valve EFHV0052;
- Work Activity P579489 - Clean Emergency Diesel Generator B Lube Oil Heat Exchanger;
- Work Activity P579488 - Clean Emergency Diesel Generator B Jacket Water Heat Exchanger;
- Work Activity W585567 - Painting Inside the Radiological Control Area;
- Work Activity G601695 025 - Troubleshoot Control Rod Urgent Failure Alarm;
- Work Activity W192207 - Repair a Body-to-Bonnet Leak on Steam Generator D Main Feedwater Regulating Valve AEV00076; and
- Work Activity W187530 - Troubleshoot Safety Injection Pump A Discharge to Refueling Water Storage Tank Isolation Valve EMHV8814A.

b. Observations and Findings

With the exception of the maintenance described in Section 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.

M1.2 General Comments - Surveillance

a. Inspection Scope (61726)

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

- Surveillance Procedure OSP-NE-0001B, "Standby Diesel Generator B Periodic Tests," Revision 2;

- Surveillance Procedure ISL-HA-000B1, "Loop-Anlzr; Waste Gas Analyzer," Revision 13; and

- Surveillance Procedure OSP-EM-P001B, "Section XI Safety Injection Train B Operability," Revision 19.

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 Inadvertent Closure of Safety Injection Pump A Minimum Flow Recirculation to Refueling Water Storage Tank Isolation Valve EMHV8814A

a. Inspection Scope (62707)

The inspectors reviewed an event in which workers inadvertently rendered safety injection Train A inoperable for approximately 1 minute.

The inspectors reviewed:

- Technical Specification 3.5.2;

- Work Activity W187530 - Troubleshoot Safety Injection Pump A Discharge to Refueling Water Storage Tank Isolation Valve EMHV8814A;

- Suggestion-Occurrence-Solution Report 97-0717; and

- Operations Department Procedure ODP-ZZ-00001, "Operations Department - Code of Conduct," Revision 7.

b. Observations and Findings

On June 11, 1997, workers inadvertently closed safety injection Pump A minimum flow recirculation to refueling water storage tank isolation Valve EMHV8814A. This rendered safety injection Train A inoperable. Control room operators received an alarm when the valve closed. The workers also realized Valve EMHV8814A closed and notified control room operators. Operators opened the valve shortly thereafter, restoring safety injection Train A to operable status. Safety injection Train A was inoperable for approximately 1 minute.

The system engineer, who was also the work group supervisor, and maintenance electricians were installing a recorder on the supply breaker to the valve. This was to gather data during the open stroke of the valve. After installing the recorder, the electricians planned to verify that the recorder would start by using contacts in the breaker cubicle for a voltage source. Operators were then to close the valve as a second check for proper operation of the recorder.

The electricians properly installed the recorder in accordance with instructions provided on the associated work document. In accordance with the engineer's instructions for checking the recorder, the electricians hooked up leads from the recorder across contact points for the control room hand switch for Valve EMHV8814A. This simulated placing the switch in the closed position, which inadvertently caused the valve to stroke closed.

The licensee formed an event review team and commenced an investigation. The licensee found the cause of the incorrect connection of the recorder to be a personnel error on the part of the work group supervisor. The licensee identified other contributing causes. These included weaknesses in the prejob briefing and electricians' lack of knowledge in using the recorder.

The licensee's corrective actions included providing training on use and setup of the recording equipment. In addition, licensee management emphasized the importance of thorough prejob briefings.

The inspectors reviewed the work package and agreed that the preliminary check of the recorder was not described in the work instructions. The licensee stated that the preliminary check of the recorder was a normal practice and did not have to be described in the work instructions. After reviewing the information, the inspectors agreed that the preliminary check of the recorder did not have to be described in the detailed work instructions. However, the inspectors agreed that the preliminary check should have been discussed during the control room brief. The inspectors also found a lack of attention to detail on the part of the work group supervisor, who failed to ensure that the connection made to check the recorder was correct.

c. Conclusions

The inspectors concluded that there was a weakness in the prejob briefing for the work, and lack of attention to detail during the preliminary check of the recorder.

III. Engineering

E1 Conduct of Engineering

E1.1 Review of Callaway Modification Packages

a. Inspection Scope

The inspectors reviewed the following Callaway Plant modifications:

- Modification Package 96-1008A - Add Local Controllers to Steam Generator B and C Atmospheric Relief Valves; and
- Modification Package 96-1014 - Install an Isolation Valve in Train B Essential Service Water to Auxiliary Feedwater Pump Suction Line.

The review was performed to ensure that procedures, drawings, and other design documents were properly updated.

b. Observations and Findings

The inspectors found no concerns with configuration control following implementation of the modifications. Procedures, drawings, and other design documents were properly updated.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments (71750)

The inspectors observed health physics personnel, including supervisors, routinely touring the radiologically controlled areas. Prejob briefs for work in radiological controlled areas were satisfactory, with open discussions on radiological and personal safety. Licensee personnel working in radiologically controlled 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. The inspectors checked a sample of doors, required to be locked for the purpose of radiation protection, and found no problems.

R2 Status of Radiological Protection and Chemistry Facilities and Equipment

R2.1 Postaccident Sampling Equipment Availability

a. Inspection Scope (71750)

The inspectors reviewed the recent availability of equipment for postaccident sampling. The inspectors determined availability by reviewing the 1996 and 1997 PASS (Postaccident Sampling System) Analyzer/Equipment Status Report. The inspectors interviewed the supervisor of chemistry and other licensee personnel.

b. Observations and Findings

The availability of the postaccident sampling equipment for 1996 and January 1 through April 30, 1997, is described below.

- In-line gamma spectrum analyzer:
  - 63 percent (1996)
  - 88 percent (1997)

- In-line boron analyzer:
  - 70 percent (1996)
  - 100 percent (1997)

- In-line dissolved hydrogen analyzer:
  - 43 percent (1996)
  - 67 percent (1997)

- Reactor coolant system undiluted grab sampler:
  - 92 percent (1996)
  - 100 percent (1997)

The availability goal for each of the three in-line analyzers was 80 percent. The availability goal for the reactor coolant system undiluted grab sampler was 100 percent. The reactor coolant system undiluted grab sampler served as required backup sampling for the three in-line analyzers.

The licensee stated that the reasons the three in-line analyzers had not met the availability goal in 1996 were chronic operational problems and obsolescence of equipment. The reactor coolant system undiluted grab sampler did not meet the 100 percent availability goal because the equipment had to be removed from service during a system modification in 1996.

The licensee modified the postaccident sampling system due to system complexity and old technology. The modification replaced a complicated computer-driven system with a manually-driven system. Following the modification, availability for

the three in-line analyzers met the licensee's goals. However, the licensee continued to experience problems with the in-line dissolved hydrogen monitor.

The low availability of the in-line dissolved hydrogen monitor in 1997 has been related to problems with the sensor. The licensee did not have a functioning spare sensor and a replacement sensor was not readily available. The licensee contracted with the vendor to ensure a spare sensor was available in the future.

c. Conclusions

The inspectors concluded that the licensee did not meet the availability goal for the postaccident sampling system in 1996. System availability has been improved and the licensee has met the availability goal for the postaccident sampling system thus far in 1997.

P2 Status of EP Facilities, Equipment, and Resources

P2.1 Criticality Accident Requirements

a. Inspection Scope (92904)

The inspectors assessed the licensee's compliance with 10 CFR 70.24. The inspectors used guidance entitled "Inspection Plan for Compliance with 10 CFR 70.24, 'Criticality Accident Requirements,' at Operating Nuclear Plants."

The inspectors interviewed several licensee personnel and reviewed the following documents:

- Facility Operating License NPF-30;
- Request for Resolution 03704, Revision A, "Area Radiation Monitor SD-RE-34";
- Final Safety Analysis Report Section 9.1.1, "New Fuel Storage;"
- Final Safety Analysis Report Section 9.1.2, "Spent Fuel Storage;"
- Final Safety Analysis Report Section 12.3.4, "Area Radiation and Airborne Radioactivity Monitoring Instrumentation;"
- Calibration Procedure ITL-SD-00R34, "Loop-Nuc; Area Radiation SD-00R34," Revision 2;
- Test Procedure ISF-SD-00R35, "Fctnal-Nuc; New Fuel Storage Area Rad Mon," Revision 4;

- Calibration Procedure ISL-SD-00R35, "Loop-Nuc; New Fuel Storage Area Rad Mon," Revision 2;
- Test Procedure ISF-SD-00R36, "Fctnal-Nuc; New Fuel Storage Area Rad Mon," Revision 4;
- Calibration Procedure ISL-SD-00R36, "Loop-Nuc; New Fuel Storage Area Rad Mon," Revision 2;
- Test Procedure ISF-SD-00R37, "Fctnal-Nuc; Spent Fuel Pool Area Rad Mon," Revision 6;
- Calibration Procedure ISL-SD-00R37, "Loop-Nuc; Spent Fuel Pool Area Rad Mon," Revision 5;
- Test Procedure ISF-SD-00R38, "Fctnal-Nuc; Spent Fuel Pool Area Rad Mon," Revision 6;
- Calibration Procedure ISL-SD-00R38, "Loop-Nuc; Spent Fuel Pool Area Rad Mon," Revision 7;
- Procedure PDP-ZZ-00011, "Retest Development," Revision 3;
- Technical Specification 3/4 3.3, Radiation Monitoring System;
- Radiological Emergency Response Plan, Revision 16;
- Emergency Plan Implementing Procedure EIP-ZZ-00101, "Classification of Emergencies," Revision 19;
- Emergency Plan Implementing Procedure EIP-ZZ-00230, "Accountability," Revision 17; and
- Procedure OTA-RL-RK062, "Annunciator Response Procedure," Revision 4.

b. Observations and Findings

The inspectors examined the facility operating license. The licensee has not been granted an exemption from 10 CFR 70.24 pursuant to 10 CFR 70.24(d).

The inspectors reviewed the Final Safety Analysis Report. The Final Safety Analysis Report provided descriptions and statements pertaining to the criticality monitors in Sections 9.1.1, 9.1.2, and 12.3.4. The inspectors identified no specific commitments regarding criticality accidents.

The inspectors reviewed the accidental criticality monitoring and alarm system. The system uses gamma-sensitive radiation detectors which provide a distinct audible and visual alarm. The criticality monitors and locations monitored are as follows:

- SD-RE-34 - Cask Handling Area
- SD-RE-35 - New Fuel Storage Area
- SD-RE-36 - New Fuel Storage Area
- SD-RE-37 - Spent Fuel Pool Area
- SD-RE-38 - Spent Fuel Pool Area

The licensee found that Monitor SD-RE-34 was not required under 10 CFR 70.24(a). This was documented in Request for Resolution 03704, Revision A.

The inspectors reviewed the calibration and functional test procedures for the criticality monitors. The monitors generate a high radiation alarm at 2.5 mRem per hour and a high-high radiation alarm at 15 mRem per hour.
Procedure PDP-ZZ-00011 lists the appropriate postmaintenance test requirements.

Both radiation monitors for the spent fuel pool and the new fuel storage area were addressed in Technical Specification 3/4 3.3. The alarm setpoints in the Technical Specification were consistent with the licensee's procedures. The licensee performed a channel check of the monitors once per 12 hours as required. Channel calibrations were performed prior to each reactor startup. Operational tests were performed once per 92 days as required. The licensee ensures that the red flashing light and horn associated with each monitor energize during operational tests and channel calibrations. The inspectors observed all local and control room instrument displays for functionality. The inspectors found no problems.

The inspectors reviewed the licensee's practices regarding evacuations and drills required by 10 CFR 70.24(a)(3). The licensee has maintained and implemented emergency procedures for evacuation and drills. The licensee has performed drills in accordance with the radiological emergency response plan and the emergency plan implementing procedures.

The licensee could not recall ever conducting a specific drill for an accidental criticality. However, the licensee has conducted drills for other radiological emergencies. The licensee stated that personnel response was the same for all radiological emergencies, regardless of cause.

Individuals designated with responsibility for determining the cause of criticality alarms were on-shift personnel, including health physics technicians on duty. Radiation survey instruments were located in the health physics office at access control, in lockers in the technical support building, and elsewhere.

Licensee personnel stated that training for radiological emergencies was given to employees in General Employee Training I, General Employee Training II, and during

training for emergency response organization members. General Employee Training I includes training on the various types of alarms and personnel response. All personnel with unescorted site access attended General Employee Training I classes.

General Employee Training II included more extensive training on radioactive protective measures. All personnel with unescorted access to the radiological controlled area attended General Employee Training II.

All emergency response organization members attended training on emergency action levels and emergency plan implementing procedures.

c. Conclusions

The inspectors concluded that the licensee has maintained the accidental criticality monitoring and alarm system as required. Appropriate procedures and practices were in place to ensure that personnel would be aware of an accidental criticality and take appropriate actions.

V. Management Meetings

X1 Exit Meeting Summary

The exit meeting was conducted on June 20, 1997. The licensee expressed a position on some items in this report.

During the discussion of the inadvertent closure of safety injection Pump A minimum flow recirculation to refueling water storage tank isolation Valve EMHV8814A (Section M1.3), the licensee stated the following:

- The evolution was briefed in the control room prior to being performed.
- Valve EMHV8814A was only shut for approximately 1 minute.
- It was recognized by operators that the valve would be closed.
- Operators were positioned to take action should the valve unexpectedly close.
- The field team was positioned to take action should the valve unexpectedly close.

During the discussion of postaccident sampling equipment availability (Section R2.1), the licensee stated that there was no regulatory basis for the availability goals. This was strictly a Callaway goal.

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

R. D. Affolter, Manager, Callaway Plant
D. L. Bettenhausen, Supervisor, Quality Assurance
J. D. Blosser, Manager, Operations Support
H. D. Bono, Supervising Engineer, Licensing Fuels and Site Licensing
G. J. Czeschin, Superintendent, Training
M. S. Evans, Superintendent, Health Physics
J. M. Gloe, Superintendent, Maintenance
G. A. Hughes, Supervisor, Independent Safety Engineering Group
K. W. Kuechenmeister, Superintendent, Design Engineering
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M. A. Reidmeyer, Engineer, Quality Assurance
R. R. Roselius, Superintendent, Chemistry and Radiological Waste
M. E. Taylor, Assistant Manager, Work Control

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observation
62707	Maintenance Observation
71707	Plant Operations
71750	Plant Support Activities
92901	Followup Operations
92904	Followup Plant Support
93702	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

9611-01	VIO	Inadequate component cooling water normal operating procedure (Section O8.1)
9707-01	IFI	Conduit resting on turbine driven auxiliary feedwater pump mechanical overspeed trip rod (Section O8.2)