UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

March 28, 2000

Garry L. Randolph, Vice President and
Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, Missouri 65251

SUBJECT: NRC INSPECTION REPORT NO. 50-483/00-07

Dear Mr. Randolph:

This refers to the inspection conducted on February 28 through March 3, 2000, at the Callaway Plant facility. The purpose of the inspection was to review radiation protection activities. The enclosed report presents the results of this inspection.

With the exceptions of the items noted below, the radiation protection program was implemented acceptably.

Based on the results of this inspection, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. These violations are being treated as noncited violations (NCVs), consistent with Section VII.B.1.a of the Enforcement Policy. These NCVs are described in the subject inspection report. If you contest the violation or severity level of these NCVs, 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, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Callaway Plant facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response, if requested, will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/
Gail M. Good, Chief
Plant Support Branch
Division of Reactor Safety

Docket No.: 50-483
License No.: NPF-30

Enclosure:
NRC Inspection Report No.
50-483/00-07

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-483
License No.:	NPF-30
Report No.:	50-483/00-07
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Junction Highway CC and Highway O Fulton, Missouri
Dates:	February 28 through March 3, 2000
Inspectors:	Larry Ricketson, P. E., Senior Radiation Specialist Plant Support Branch
	Dan Carter, Radiation Specialist Plant Support Branch
Approved By:	Gail M. Good, Chief, Plant Support Branch Division of Reactor Safety
Attachment:	Supplemental Information

EXECUTIVE SUMMARY

Callaway Plant
NRC Inspection Report No. 50-483/00-07

A routine, announced inspection was conducted. The inspection reviewed exposure controls, radioactive material controls, radiation protection documentation, results of the program to maintain radiation doses as low as is reasonably achievable (ALARA), and quality assurance oversight of radiation protection activities.

Plant Support

- Exposure controls were generally implemented correctly. However, a violation of Technical Specification 6.12.1.b was identified because workers entered high radiation areas on three occasions without being made knowledgeable of the dose rate levels in the area or without using the radiation work permit that allowed entrance into the area. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Suggestion Occurrence Solution 99-2953 (Section R1.1).

- The only ALARA briefing presented during the inspection did not comprehensively discuss radiation work permit requirements and prohibitions. The lack of a discussion of the radiation work permit requirements contributed, partially, to a violation of Technical Specification 6.8.1 (Section R1.1).

- A violation of Technical Specification 6.8.1 was identified because a worker failed to read and understand radiation work permit requirements. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Suggestion Occurrence Solution 00-0462 (Section R1.1).

- Many minor radiological housekeeping and contamination control problems were identified, indicating a lack of attention to detail (Section R1.2).

- The licensee's 3-year person-rem average was increasing. The 1998 and 1999 3-year averages were significantly higher than the latest pressurized water reactor national dose average. An axial offset anomaly and expanded outage work scopes contributed to the increasing dose trend (Section R1.3).

- Skin dose assessments were performed correctly (Section R3).

- The quality assurance organization provided acceptable oversight of radiation protection activities (Section R7).

Report Details

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Exposure Controls

a. Inspection Scope (83750)

The inspectors interviewed licensee personnel and reviewed the following items:

- Radiological area posting
- Radiation work permit instructions
- Pre-job briefings and worker information

b. Observations and Findings

To evaluate the licensee's past performance related to the implementation of exposure controls, the inspectors reviewed corrective action documents, called suggestion occurrence solution reports, initiated from June 1, 1998 to March 3, 2000. Based on this review, the inspectors concluded exposure controls were generally implemented correctly. However, the inspectors noted that licensee personnel had identified an adverse trend related to the control of high radiation area boundaries.

Technical Specification 6.12 establishes high radiation area controls. Technical Specification 6.12.1 states, in part, that each high radiation area shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a radiation work permit. Technical Specification 6.12.1.b states, in part, that individuals may be allowed to enter high radiation areas after the dose rate levels in the area have been established and personnel have been made knowledgeable of them.

Suggestion Occurrence Solutions 99-2497, 99-2710, and 99-2902 documented examples of personnel that by-passed barricades around high radiation areas and entered the areas improperly. Specifically, the workers in these examples had not informed radiation protection personnel of their intent to enter the high radiation areas; therefore, they were not briefed by radiation protection personnel. Because they were not briefed by radiation protection personnel, the workers entered high radiation areas without being made knowledgeable of the dose rates in the areas. In the latter two examples, the individuals were not working in accordance with the radiation work permit that allowed entry into the areas. These occurrences were three examples of a Technical Specification 6.12 violation. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Suggestion Occurrence Solution 99-2953 (50-483/0007-01).

To evaluate the licensee's current performance related to the implementation of exposure controls, the inspectors reviewed radiation protection activities associated with a personnel entry into the reactor building while the reactor was operating. The entry was conducted March 2, 2000. In preparation for the reactor building entry, licensee personnel conducted a pre-job briefing. The inspectors noted that the briefing followed the guidance of Health Physics Procedure HDP-ZZ-06100, "Reactor Building Access," Revision 001, Attachment 5. Step 9 of the attachment required an ALARA briefing. The inspectors noted that the radiation protection personnel providing the ALARA briefing did not specifically discuss the special instructions or prohibitions of the applicable radiation work permit, Radiation Work Permit 00-10120. Additionally, the radiological conditions were not discussed in detail.

Following the pre-job briefing, the inspectors observed the workers as they entered the radiological controlled area in preparation for the reactor building entry. The inspectors noted that one individual indicated during the access computer sign-in process that he had read Radiation Work Permit 00-10120. The inspectors observed that the individual had not exercised the option to read the radiation work permit on the computer screen. The inspectors asked the individual if he had read the radiation work permit. The individual indicated that he had read the radiation work permit on an earlier entry. The individual then entered the radiological controlled area and went into the reactor building.

The inspectors then reviewed access control computer records and confirmed that the individual had made no previous radiological controlled area entries using Radiation Work Permit 00-10120. Therefore, the individual had no opportunity to read the radiation work permit during a previous entry. After the individual exited the radiological controlled area, he was interviewed by radiation protection personnel. The individual repeated that he had read the radiation work permit prior to a previous entry. A licensee representative determined the date of the previous entry and determined that the individual was unaware that the radiation work permit used for this entry was different from the radiation work permit used by the individual during the previous reactor building entry.

Technical Specification 6.8.1 requires, in part, that written procedures be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33, Appendix A, Section 7.e(1), includes procedures for the access control to radiation areas including a radiation work permit system. To comply with this requirement, the licensee implemented Health Physics Technical Procedure HTP-ZZ-01203, "RWP Access Control," Revision 26. Section 3.1.1 of this procedure required that workers entering the radiological controlled area read and understand the radiation work permit and acknowledge understanding by electronic acknowledgment. The failure of the individual discussed above to read and understand Radiation Work Permit 00-10120 is a violation of Technical Specification 6.8.1. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Suggestion Occurrence Solution 00-0462 (50-483/0007-02).

The inspectors concluded that this violation would have been prevented if the pre-job briefing had been more comprehensive and informed the workers of the radiation work permit requirements and prohibitions.

The reactor building entry and the associated tasks were completed safely and the total accumulated dose was low.

c. Conclusions

Exposure controls were generally implemented correctly. However, a violation of Technical Specification 6.12.1.b was identified because workers entered high radiation areas on three occasions without being made knowledgeable of the dose rate levels in the area or without using the radiation work permit that allowed entrance into the area. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Suggestion Occurrence Solution 99-2953.

The only ALARA briefing presented during the inspection did not comprehensively discuss radiation work permit requirements and prohibitions. The lack of a discussion of the radiation work permit requirements contributed, partially, to a violation of Technical Specification 6.8.1.

A violation of Technical Specification 6.8.1 was identified because a worker failed to read and understand radiation work permit requirements. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Suggestion Occurrence Solution 00-0462.

R1.2 Radioactive Material Controls

a. Inspection Scope (83750)

The inspectors toured the radiological controlled area and reviewed:

- Radioactive material and contamination controls
- Container labeling

b. Observations and Findings

The inspectors noted numerous housekeeping problems that could have contributed to the spread of contamination if not corrected. Hoses and electrical cords crossed contaminated area boundaries without being secured to prevent movement and the spread of radioactive contamination. The licensee initiated Suggestion Occurrence Solution 00-0439 to document and correct this item. Some drain rigs were installed in a manner that could spread contamination. For example, a hose in Room 1105 was placed so that it could have allowed contaminated liquid to miss the floor drain. The licensee initiated Suggestion Occurrence Solution 00-440 to document and correct this item.

Bags containing radioactively contaminated items were left in various places that were not intended as storage locations. A bag containing a contaminated sump pump and another bag containing a contaminated resin sampling tool were left in the radwaste chemistry office. The highest dose rates were 35 millirems per hour on contact and 4 millirems per hour at 30 centimeters. A bag containing a contaminated hose was left in the corner of Room 7202 of the radwaste building. The dose rates were 50 millirems per hour on contact and 24 millirems per hour at 30 centimeters. The radioactive material tag indicated that the latter item may have been left in this location since February 17, 2000. The licensee initiated Suggestion Occurrence Solution 00-0455 to document and correct this item.

c. Conclusions

Many minor radiological housekeeping and contamination controls problems were identified, indicating a lack of attention to detail.

R1.3 ALARA

a. Inspection Scope (83750)

The inspectors reviewed the licensee's site dose totals for the three previous years.

b. Observations and Findings

The licensee's dose totals and averages, in person-rems, are compared below with the results from other pressured water reactors.

	1997	1998	1999
Licensee Dose	12.5	201	320
Licensee 3-Year Average		154	178
National PWR Average*	132	92	Not yet available

*From NUREG 0713

The licensee conducted refueling outages in 1998 and 1999. Higher source term and increased outage work scope contributed to the higher doses. The source term problem was exacerbated by a reactor fuel condition known as an axial offset anomaly. During the most recent refueling outage, the licensee worked to reduce the effects of this condition. The results of the licensee's efforts will be known during the next refueling outage.

c. Conclusions

The licensee's 3-year person-rem average was increasing. The 1998 and 1999 3-year averages were significantly higher than the latest pressurized water reactor national

dose average. An axial offset anomaly and expanded outage work scopes contributed to the increasing dose trend.

R3 Radiological Protection and Chemistry Procedures and Documentation

The inspectors reviewed examples of skin dose assessments conducted by the licensee. All assessments were performed correctly in accordance with Health Physics Technical Procedure HTP-ZZ-01490, "Determination of Beta Skin Dose," Revision 21.

R7 Quality Assurance in Radiological Protection and Chemistry Activities

a. Inspection Scope (83750)

The inspectors reviewed the following items:

- 1999 and 2000 quality assurance audits
- Auditor qualifications

b. Observations and Findings

The scope of the combined 1999 and 2000 audits of radiation protection activities represented a comprehensive review of the program. Audit findings demonstrated a sufficient depth of review. The audit team included members with practical knowledge of radiation protection practices. Audit findings were documented through use of the corrective action program. The 1999 audit team concluded that the radiation protection program was implemented well. The 2000 audit team concluded that the program was generally acceptable.

c. Conclusions

The quality assurance organization provided acceptable oversight of radiation protection activities.

R8 Miscellaneous Radiological Protection and Chemistry Issues

R8.1 (Closed) Violation 50-483/9807-01: Failure to Conspicuously Post a High Radiation Area

The inspectors verified the issue was placed into the licensee's corrective action program as Suggestion Occurrence Solution 98-2126.

R8.2 (Closed) Violation 50-483/9807-02: Failure to Understand Radiation Work Permit Requirements/Work Area Conditions

The inspectors verified the issue was placed into the licensee's corrective action program as Suggestion Occurrence Solution 98-2125.

R8.3 (Closed) Violation 50-483/9807-03: Failure to Label Containers of Licensed Material

The inspectors verified the issue was placed into the licensee's corrective action program as Suggestion Occurrence Solution 98-2127.

R8.4 (Closed) Violation 50-483/9807-04: Failure to Post Two Airborne Radioactivity Areas

The inspectors verified the issue was placed into the licensee's corrective action program as Suggestion Occurrence Solution 98-2161.

R8.5 (Closed) Inspection Followup Item 50-483/9807-06: Electronic Radiation Work Permit/Access Control Issue

During Inspection 50-483/98-07, the inspector noted that the licensee identified a number of repetitive problems with workers failing to sign in on the proper radiation work permit and to use the computerized access control system. On April 30, 1998, the inspector reviewed the licensee's preliminary evaluation of these events and noted that in all cases, radiological controls were proper, although, the wrong radiation work permit was used. The licensee assembled a task team to address the electronic radiation work permit/access control issue. An inspection followup item was initiated to ensure further review of task team's findings and the licensee's corrective actions. During Inspection 50-483/98-19, the inspector reviewed the task team's findings and the proposed schedule for implementation of corrective actions.

During this inspection, the inspectors confirmed that the licensee had completed modifications to the access control process which required workers to verify identification information before the process could be completed.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at an exit meeting on March 3, 2000. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Affolter, Plant Manager
R. Farnam, Supervisor, Health Physics Operations
K. Gilliam, ALARA Coordinator, Health Physics Operations
J. Hiller, Engineer, Quality Assurance
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G. Randolph, Vice President and Chief Nuclear Officer
M. Reidmeyer, Supervisor, Regional Regulatory Affairs
R. Roselius, Superintendent, Radiation Protection and Chemistry

NRC

V. Gaddy, Senior Resident Inspector
J. Hanna, Resident Inspector

INSPECTION PROCEDURES USED

83750	Occupational Radiation Exposure

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-483/0007-01	NCV	Improper entries into high radiation areas (Section R1.1)
50-483/0007-02	NCV	Failure to read radiation work permit requirements (Section R1.1)

Closed

50-483/0007-01	NCV	Improper entries into high radiation areas (Section R1.1)
50-483/0007-02	NCV	Failure to read radiation work permit requirements (Section R1.1)
50-483/9807-01	VIO	Failure to conspicuously post a high radiation area (Section R8.1)
50-483/9807-02	VIO	Failure to understand radiation work permit requirements (Section R8.2)

50-483/9807-03	VIO	Failure to label containers of licensed material (Section R8.3)
50-483/9807-04	VIO	Failure to post two airborne radioactivity areas (Section R8.4)
50-483/9807-06	IFI	Electronic radiation work permit/access control issue (Section R8.5)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Health Physics Organization Chart (2/15/2000)

Quality Assurance Department Audit Report AP00-02
Quality Assurance Department Audit Report AP99-006
Quality Assurance Department Audit Report AP99-002

List of Suggestion Occurrence Solutions assigned to the radiation protection organization since June 1998

APA-ZZ–01001	Callaway Plant ALARA Program, Revision 6
HDP-ZZ-06100	Reactor Building Access, Revision 1
HTP-ZZ-01203	RWP Access Control, Revision 26
HTP-ZZ-01490	Determination of Beta Skin Dose, Revision 21
HDP-ZZ-01500	Radiological Posting, Revision 16
HDP-ZZ-06000	Contamination Control Program, Revision 9