

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-483  
License No.: NPF-30  
Report No.: 50-483/97-04  
Licensee: Union Electric Company  
Facility: Callaway Plant  
Location: Junction Hwy. CC and Hwy. O  
Fulton, Missouri  
Dates: January 27-31, 1997  
Inspector: L. T. Ricketson, P.E., Senior Radiation Specialist  
Approved By: Blaine Murray, Chief, Plant Support Branch  
Division of Reactor Safety  
Attachment: Supplemental Information

## EXECUTIVE SUMMARY

### Callaway Plant NRC Inspection Report 50-483/97-04

This announced, routine inspection reviewed the program to maintain occupational exposures as low as is reasonably achievable (ALARA), training and qualifications of members of the radiation protection organization, and quality oversight of the radiation protection program.

#### Plant Support

- The use of the outage review board instead of an ALARA committee to review and approve ALARA goals was a viable alternative; however, the membership of the outage review board did not include participation by the operations and mechanical maintenance groups (Section R1.1).
- Informal methods were used in some portions of the ALARA program. This resulted in the identification of a Non-Cited Violation for the failure to perform post-job reviews (Section R1.1).
- The ALARA suggestion program had little support and may have been hampered by informal means of communication (Section R1.1).
- A Non-Cited Violation was identified regarding the failure to follow procedural guidance on shielding installations (Section R1.1).
- The latest 3-year person-rem total indicated an increase in personnel exposure. Performance in this area is expected to be roughly equivalent to the national average for pressurized water reactors (Section R1.1).
- Radiation protection procedures generally provided appropriate guidance. However, minor revisions would aid in addressing some potential problem areas (Section R3).
- Good training programs for radiation protection technicians, professionals, and supervisors were implemented. Good management support for the professional advancement of the radiation protection technicians was noted (Section R5).
- Overall, the audit program of radiation protection activities was good (Section R7).
- An unresolved item involving the appropriateness of changes to the offsite dose calculation manual was identified (Section R8.1).

## Report Details

### III. Engineering

#### **E2 Engineering Support of Facilities and Equipment**

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the UFSAR description. While performing the inspection discussed in this report, the inspector reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspector verified that the UFSAR wording was consistent with the observed plant practices, procedures, and/or parameters.

### IV. Plant Support

#### **R1 Radiological Protection and Chemistry Controls**

##### **R1.1 Maintaining Radiation Exposures ALARA**

###### **a. Inspection Scope (83750)**

The ALARA supervisor was interviewed and documentation related to the following items was reviewed:

- Outage review board activities,
- ALARA procedures,
- ALARA suggestion program results,
- Post-job reviews and critiques,
- Temporary shielding packages,
- Hot spot tracking program results, and
- Person-rem totals for 1994, 1995, 1996.

###### **b. Observations and Findings**

The licensee did not have an ALARA committee. Instead, the outage review board reviewed and approved outage ALARA goals. There are no regulatory requirements related to this activity. Therefore, although the licensee's approach is atypical, the inspector concluded that it was a viable alternative. However, the inspector noted, after a review of Procedure APA-ZZ-00150, "Outage Preparation and Execution," Revision 5, that the operations and mechanical maintenance managers were not part of the outage review board. Input from and acceptance of ALARA principles by these managers is typically seen as an important aspect of a well integrated ALARA program. Licensee representatives stated that these managers were invited to each meeting. The inspector reviewed the attendance list provided by the meeting minutes and determined that the operations and mechanical maintenance

managers attended some, but not all meetings. The inspector also noted that the ALARA coordinator was not a member of the outage review board and did not typically attend the meetings. Licensee representatives acknowledged the inspector's comments, but did not commit to specific action.

Post-job ALARA reviews were routinely conducted as part of the ALARA program. Guidance was provided by Procedure HTP-ZZ-01103, "Post-job ALARA Review," Revision 10. Post-job reviews for all activities conducted in Refueling Outage 8 and publication of the formal report of those activities had not been completed at the time of this inspection. Therefore, the inspector reviewed documentation of Refueling Outage 7 activities.

Procedure HTP-ZZ-01103, Section 5.1, instructs radiation protection personnel initiating post-job reviews to, "Distribute a post-job evaluation for ALARA Consideration form, CA-#922 (Attachment 2), to the activity coordinator, craft supervisor, and to each individual who signed in on the radiation work permit."

Through a review of selected post-job reviews and an interview with the ALARA supervisor, the inspector determined that the activity coordinators for steam generator work were not sent post-job evaluation forms after Refueling Outage 7, as instructed by procedural guidance. Because they signed on a separate radiation work permit that was unique to the steam generator coordinators and did not sign in on the radiation work permits used by steam generator activity workers, the activity coordinators were overlooked.

Also, Procedure HTP-ZZ-01103, Step 5.4a requires that for radiation work permits or evolutions where the accrued person-rem is greater than five, a post-job critique and review meeting must be held. The inspector determined that a post-job critique and review meeting was not held to discuss work performed in accordance with Radiation Work Permit 95-53323, eddy current testing. Radiation Work Permit 95-53323 accrued 6.222 person-rem. Licensee representatives stated that informal means of collecting information were used.

Additionally the inspector noted that activity coordinators do not routinely complete and return the Post-job Evaluation forms for ALARA consideration.

The inspector identified the failure to distribute post-job evaluation forms to steam generator activity coordinators and the failure to conduct post-job critique and review meetings for work activities accruing greater than 5 person-rem as a violation of Technical Specification 6.8, which requires written procedures be established, implemented, and maintained covering selected activities listed in Appendix of Regulatory Guide 1.33, Revision 2, February 1978. The inspector

identified no actual safety consequences associated with this item. This failure constitutes a violation of minor significance and is being treated as a noncited violation, consistent with Section IV of the NRC Enforcement Policy (50-483/9704-01).

The previous issue notwithstanding, job history files appeared well maintained with appropriate information. Lessons-learned were appropriately captured and maintained for future use.

ALARA suggestions were made through the use of the licensee's site-wide corrective action/suggestion program. The inspector reviewed Procedure APA-ZZ-00500, "Corrective Action Program," Revision 27, and noted that it provided little specific guidance for submission of ALARA suggestions. The ALARA program offered no incentives to individuals who made ALARA suggestions.

Licensee representatives stated that the ALARA suggestion program received six suggestions in 1996. The inspector reviewed the documentation of these six items and noted that some were merely complaints from workers that offered little in the way of an explicit suggestion as to how to reduce exposures. The inspector concluded that the ALARA suggestion program was not well supported by the plant workers. Licensee representatives acknowledged the inspector's conclusion, but added that, again, informal means such as nondocumented conversations were used to gather worker suggestions. The inspector was unable to verify the statement because of the lack of documentation.

The licensee used temporary shielding as a means to maintain lower personnel exposures. Procedure HTP-ZZ-01101, "Administrative Controls for Radiation Shielding," Revision 7, Section 3.2 states, "Temporary shielding must be removed when the job(s) is complete, or a Request for Resolution (RFR) must be submitted for permanent installation of shielding in accordance with APA-ZZ-00600, 'Design Change Control.'"

During tours of the licensee's facility, the inspector identified the use of temporary shielding and reviewed documentation associated with the shielding. Shielding Package 93-049 was installed October 28, 1993. The licensee confirmed that work in the area was complete and that a request to make the shielding permanent had not been submitted. The inspector identified the failure to follow the procedural guidance of Procedure HTP-ZZ-01101 as a violation. The licensee presented information to demonstrate that the situation was recently identified during a program assessment. Licensee representatives discussed with the inspector the corrective actions to be taken. This licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-483/9704-02).

There was no progress in reducing the number of hot spots; however, the hot spots identified were evaluated and a determination was made that there was insufficient benefit to justify the removal of the hot spots. The inspector concluded that the hot spot tracking program was implemented as required.

The licensee's 3-year person-rem average for 1996 indicated a slight increase. It appears that the latest licensee results will be close to the average for similar plants.

	1994	1995	1996
Licensee	14	187	248
Licensee 3-year Average	192	142	150
National PWR Average	131	170	Not yet available

c. Conclusions

The use of the outage review board instead of an ALARA committee to review and approve ALARA goals was a viable alternative; however, the membership of the outage review board did not ensure full participation by the operations and mechanical maintenance groups.

Informal methods were used in some portions of the ALARA program. This resulted in the identification of a noncited violation for the failure to perform post-job reviews according to procedural requirements.

The ALARA suggestion program had little support and may have been hampered by informal means of communication.

A noncited violation was identified regarding the failure to follow procedural guidance on shielding installation.

The latest 3-year person-rem total demonstrated an increase in personnel exposure. Performance in this area is expected to be roughly equivalent to the national average for pressurized water reactors.



**R3 Radiological Protection and Chemistry Procedures and Documentation**

a. Inspection Scope (83750)

The inspector reviewed selected procedures shown in the attachment to this report.

b. Observations and Findings

Procedure APA-ZZ-01001, "Callaway Plant ALARA Program," Revision 5, discusses the responsibilities of individuals or groups with relation to the ALARA program. Steps 5.7.9 and 5.7.10 state that it is the responsibility of department heads to review and evaluate pre-job ALARA packages and post-job ALARA reviews for radiation work permits which accumulate greater than 10 person-rem. Steps 5.8.1 and 5.8.2 state that it is the responsibility of the outage review board to evaluate pre-job ALARA packages and post-job ALARA reviews for radiation work permits which accumulate greater than 20 person-rem.

During the review of post-job ALARA reviews, the inspector did not identify work activities which exceeded person-rem threshold values. The licensee acknowledged that it has been years since there were jobs that accrued a dose high enough to require these kinds of reviews. Licensee representatives acknowledged the inspector's observation and stated they would evaluate the procedural guidance to determine if there would be benefit in revising the procedure to include lower threshold values.

Procedure HTP-ZZ-02005, "Handling and Control of Radioactive Material," Revision 20, Step 4.2.1.1 gives the criteria for unconditionally releasing items from the licensee's control. It indicates that items with removable beta/gamma contamination levels of less than 1000 disintegrations per minutes per 100 centimeters squared meet the release criteria. Therefore, according to this portion of the procedure, items with removable contamination levels of 1 to 999 disintegrations per minutes per 100 centimeters squared are releaseable. This is not in accordance with guidance in NRC Health Physics Position Papers 071 and 072 or Information Notice 85-92. Licensee representatives indicated that it was not their intent to allow the release of items with 1 to 999 disintegration per minute, per 100 square centimeters. It was their intent that items to be released be checked with instrumentation capable of detecting at least 1000 disintegration per minute, which does follow the guidance of NRC health physics position papers. Licensee representatives stated they would review the wording of this procedure to ensure it provided clear guidance to radiation protection technicians.

Procedure HDP-ZZ-04000, "Health Physics Instrumentation Program," Revision 14, requires the instrument supervisor to evaluate instruments with "as found" readings greater than  $\pm 20$  percent of the comparison value to determine if corrective actions are needed. Corrective actions are needed if the instrument was used to assign personal dose, as per 10 CFR Part 20.

The inspector noted the procedure does not address situations such as instruments that were used to establish the need or lack of need for high radiation boundaries, etc. Licensee representatives stated they would review the wording of the procedure to determine if additional guidance was necessary to address other potential situations.

c. Conclusions

Radiation protection procedures generally provided appropriate guidance. Minor revisions would aid in addressing some potential situations.

**R5 Staff Training and Qualification**

a. Inspection Scope (83750)

The inspector interviewed the radiation protection technician and radioactive waste technician instructors and reviewed the following items:

- Training curriculum for radiation protection technicians,
- Attendance records for randomly selected classes, and
- Instructor classroom performance evaluations.

b. Observations and Findings

There was one radiation protection technician instructor and one radioactive waste technician instructor. Because the instructors had applied work experience in radiation protection, the inspector concluded that the individuals were qualified to address radiation protection topics. The inspector verified that the instructors were evaluated by their supervisors, as required by procedures.

The information presented in radiation protection technician continuing training was appropriate. Industry events and selected reactor systems were among the topics discussed. Radiation protection representatives met regularly with training personnel to discuss training needs of radiation protection personnel.

Licensee representative stated that it was management's expectation that radiation protection supervisors attend the continuing radiation protection technician training also. The inspector noted some examples of supervisors failing to attend the randomly selected classes. No attempt was made by the inspector to determine the reason for the supervisors' absences because there were no regulatory requirements associated with this observation. Licensee representatives acknowledged the inspector's observation.

Management support for the training of radiation supervisors and professionals was good. These individuals were provided ample opportunities to attend professional meetings, offsite training, or participate in peer reviews.



Ten out of 11 radiation protection supervisors were registered by the National Registry of Radiation Protection Technologists. Seven out of 20 radiation protection technicians within the radiation protection operations group were registered. Licensee representatives explained that the radiation protection operations group was part of the career pathway for individuals in the radiation protection or radioactive waste organizations. Consequently, individuals often were registered while serving in the radiation protection operations group and advanced to other positions. The inspector confirmed the existence of a large group of individuals outside the radiation protection organization with National Registry of Radiation Protection Technologists registration. The inspector concluded that the number of registered personnel indicated good support for the professional advancement of the radiation protection technicians.

The inspector determined through interviews that the radiation protection supervisors and professionals, on average, had more than 10 years of radiation protection experience. Supervisors had college degrees. There were no certified health physicists in the radiation protection organization.

c. Conclusions

Good training programs for radiation protection technicians, professionals, and supervisors were implemented. Good management support for the professional advancement of the radiation protection technicians was noted.

**R7 Quality Assurance in Radiological Protection and Chemistry Activities**

a. Inspection Scope (83750)

The inspector interviewed quality assurance personnel and reviewed the following:

- 1994, 1995, 1996 quality assurance audits of the radiation protection program, and
- Quality assurance surveillances.

b. Observations and Findings

The inspector noted that the 1996 audit reviewed selected areas of the radiation protection program rather than reviewing the program in its entirety. Licensee representatives stated that the program was designed to review the radiation protection program completely, in 3 years. The inspector expanded the scope of the inspection to include the 1994 and 1995 audits and determined that the audits together were sufficient to comply with 10 CFR 20.1101(c), which requires an annual review of the radiation protection program.

Members of the audit team were appropriately qualified and most had radiation protection experience.

The radiation protection organization responses to audit findings were timely and addressed the issues appropriately.

c. Conclusions

Overall, the audit program of radiation protection activities was good.

**R8 Miscellaneous Radiological Protection and Chemistry Issues**

**R8.1 (Closed) Violation 50-483/9516-01: Control Air Sampler Station Location**

The violation was identified when the control air sampler station did not agree with the location required by the licensee's offsite dose calculation manual. Region IV requested a review of the matter from the Office of Nuclear Reactor Regulation. In the response to Region IV Task Interface Agreement 96TIA003, "Control Location for the Environmental Air Sampling Network at Callaway," dated June 14, 1996, the Office of Nuclear Reactor Regulation supported the violation and provided three options to correct or justify the location of radiological environmental monitoring program control stations that do not meet NRC criteria.

As corrective action, the licensee elected to follow Option 2. The option required the licensee to turn the control station into an indicator station and develop a procedure that requires an evaluation whenever there is a positive indication of radioactive material at any indicator station. The evaluation would determine if the radioactive material is of plant origin or "natural/fallout."

The inspector confirmed that these corrective actions were implemented.

However, during an in-office review of documents related to the licensee's corrective actions, NRC representatives identified changes made to the offsite dose calculation manual that appeared to decrease the requirements of some of the included sampling programs.

Technical Specification 6.14 requires the licensee, when making changes to the offsite dose calculation manual, to retain documentation containing sufficient information to support the changes together with the appropriate analyses or evaluations justifying the changes.

On February 7, 1997, Region IV personnel requested copies of information, from the licensee, supporting the changes to the offsite dose calculation manual and the analyses or evaluations justifying the changes.

In order to determine if these changes were appropriately justified, Region IV will request, through a task interface agreement, that the Office of Reactor Regulation review the changes and the licensee's evaluations.

The issue of whether the licensee changed the offsite dose calculation manual in accordance with the requirements of Technical Specification 6.14 is an unresolved item, pending review of the offsite dose calculation manual changes and the licensee's justification by the Office of Nuclear Reactor Regulation (50-483/9704-03).

#### V. Management Meetings

##### **X1 Exit Meeting Summary**

The inspector presented the inspection results to members of licensee management at an exit meeting on January 31, 1997. The licensee acknowledged the findings presented.

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

## LIST OF DOCUMENTS REVIEWED

Organization chart of the radiation protection organization

List of Suggestion Occurrence Solution reports assigned to the radiation protection organization from 1/1/95 to 1/27/97

### Quality Assurance Documents

1994, 1995, and 1996 Quality Assurance Audits of Radiation Protection Activities

SP96-093 - Surveillance Report of Radioactive Material Shipments During Refuel 8

SP96-094 - Surveillance Report of Management of Radwaste and Radioactive Material

1996 Outage Review Board Schedule

Outage Review Board Checklist

Refuel-8 Outage Review Board Meeting Minutes (4/4 - 10/3/96)

1995 Annual Report - Corporate Radiation Protection Committee

### Procedures

APA-ZZ-00150, "Outage Preparation and Execution," Revision 5

APA-ZZ-00500, "Corrective Action Program," Revision 27

APA-ZZ-01001, "Callaway Plant ALARA Program," Revision 5

HDP-ZZ-04000, "Health Physics Instrumentation Program," Revision 14

HTP-ZZ-01101, "Administrative Controls for Radiation Shielding," Revision 7

HTP-ZZ-01103, "Post-Job ALARA Review," Revision 10

HTP-ZZ-01104, "Hot Spot Trending Program," Revision 3

HTP-ZZ-02005, "Handling and Control of Radioactive Material," Revision 20

HTP-ZZ-06018, "Reactor Building Access," Revision 9

OTN-GT-00001, "Containment Purge System," Revision 13

## ATTACHMENT

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

R. Affolter, Plant Manager  
M. Evans, Superintendent, Health Physics  
R. Farnam, Supervisor, Health Physics Operations  
K. Gilliam, ALARA Coordinator  
C. Graham, Health Physics Technical Support  
G. Hamilton, Supervising Engineer, Quality Assurance  
J. Little, Engineer, Quality Assurance  
G. Randolph, Vice President, Nuclear Operations  
M. Reidmeyer, Engineer/NRC Interface, Quality Assurance  
R. Roselius, Superintendent, Chemistry and Radioactive Waste

#### NRC

F. Bush, Resident Inspector

### INSPECTION PROCEDURE USED

83750 Occupational Radiation Exposure

#### ITEMS OPENED AND CLOSED

##### Opened

50-483/9704-01	NCV	Failure to follow procedural guidance when performing post-job reviews
50-483/9704-02	NCV	Failure to remove temporary shielding or evaluate it for permanent placement
50-483/9704-03	URI	Appropriateness of offsite dose calculation manual changes

##### Closed

50-483/9704-01	NCV	Failure to follow procedural guidance when performing post-job reviews
50-483/9704-02	NCV	Failure to remove temporary shielding or evaluate it for permanent placement
50-483/9516-01	VIO	Control air sampler station location

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1994, 1995, and 1996 Quality Assurance Audits of Radiation Protection Activities

SP96-093 - Surveillance Report of Radioactive Material Shipments During Refuel 8

SP96-094 - Surveillance Report of Management of Radwaste and Radioactive Material

1996 Outage Review Board Schedule

Outage Review Board Checklist

Refuel-8 Outage Review Board Meeting Minutes (4/4 - 10/3/96)

1995 Annual Report - Corporate Radiation Protection Committee

### Proced

APA-ZZ-0C150, "Outage Preparation and Execution," Revision 5

APA-ZZ-00500, "Corrective Action Program," Revision 27

APA-ZZ-01001, "Callaway Plant ALARA Program," Revision 5

HDP-ZZ-04000, "Health Physics Instrumentation Program," Revision 14

HTP-ZZ-01101, "Administrative Controls for Radiation Shielding," Revision 7

HTP-ZZ-01103, "Post-Job ALARA Review," Revision 10

HTP-ZZ-01104, "Hot Spot Trending Program," Revision 3

HTP-ZZ-02005, "Handling and Control of Radioactive Material," Revision 20

HTP-ZZ-06018, "Reactor Building Access," Revision 9

OTN-GT-00001, "Containment Purge System," Revision 13