

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report No. 50-285/92-07

Operating License No. DPR-40

Licensee: Omaha Public Power District (OPPD)
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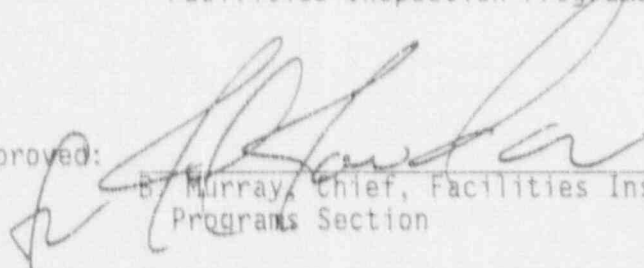
Facility Name: Fort Calhoun Station (FCS)

Inspection At: FCS Site, Fort Calhoun, Washington County, Nebraska

Inspection Conducted: March 23-27, 1992

Inspectors: A. D. Gaines, Radiation Specialist
Facilities Inspection Programs Section

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Facilities Inspection Programs Section

Approved: 

B. Murray, Chief, Facilities Inspection
Programs Section

4/10/92
Date

Inspection Summary

Inspection Conducted March 23-27, 1992 (Report No. 50-285/92-07)

Areas Inspected: Routine, unannounced inspection of the radiation protection program including: audits and appraisals; changes; planning, and preparation; training and qualifications of personnel; external exposure control; internal exposure control; control of radioactive materials and contamination; and maintaining occupational exposures ALARA.

Results: Within the areas inspected, six violations were identified (see paragraphs 3 and 9). Four of the violations were licensee identified. Although numerous, the violations were not considered indicative of a programmatic breakdown.

No deviations were identified.

- o An excellent surveillance program had been established for radiation protection activities that included input by technical experts.

- o A very good Radiological Occurrence Report Program was in place that documented the occurrence and required corrective actions.
- o A well organized planning and preparation program had been established for the 1992 refueling outage.
- o An excellent inventory of radiation protection supplies and equipment were maintained for refueling outage activities.
- o An appropriate number of radiation protection personnel were available to provide health physics coverage.
- o Excellent coordination existed between the radiation protection department and other departments.
- o The external exposure control program was very good. High radiation and very high radiation areas were properly posted and controlled.
- o A good internal exposure control program was in place. The whole body count program was very effective in confirming the effectiveness of the respiratory protection program.
- o Except for the violation for an out-of-calibration airborne radiation monitor, an excellent program had been implemented for the calibration of radiation detection instrumentation.
- o An excellent ALARA program had been implemented. Person-rem exposures and personnel contamination events were below outage goals. The ALARA suggestion program and ALARA prejob briefings were supported by plant personnel.

DETAILS

1. PERSONS CONTACTED

W. C. Jones, Senior Vice President
*W. G. Gates, Division Manager, Nuclear Operations
*R. L. Andrews, Division Manager, Nuclear Services
C. E. Anderson, Coordinator, Radiological Instrumentation and Equipment
A. D. Bilau, Supervisor, Radioactive Waste Operations
J. P. Bobba, Supervisor, Maintenance
A. G. Christensen, Supervisor, Radiation Protection Operations
*D. L. Eid, Station Licensing Engineer
M. Ellis, Supervisor, Instrument and Control (I&C)
*F. F. Franco, Manager, Radiation Services
*J. K. Gasper, Manager, Training
S. W. Gerbers, Coordinator, RWP Surveillance and Alara
R. P. Hodgson, Coordinator, Radiological Operations
*R. L. Jaworski, Manager, Station Engineering
*D. L. Lovett, Supervisor, Radiation Protection
*T. C. Matthews, Nuclear Licensing Engineer
*W. W. Orr, Manager, Quality Assurance/Quality Control
*T. L. Patterson, Manager, Fort Calhoun Station
C. R. Rice, Coordinator, Radiological Engineering
*R. W. Short, Manager, Nuclear Licensing
*C. F. Simmons, Station Licensing Engineer
K. E. Steele, Coordinator, Radiological Operations
*T. G. Therkildsen, Supervisor, Nuclear Licensing
S. B. Warren, Supervisor, Radiological Health and Engineering

NRC

*R. P. Mullikin, Senior Resident Inspector
R. V. Azua, Resident Inspector

The inspectors also interviewed other licensee and contract personnel.

*Denotes those persons that attended the exit interview conducted March 27, 1992.

2. FOLLOWUP ON PREVIOUS INSPECTION FINDINGS (92701)

(Closed) Open Item (285/9018-01): Followup Survey of the Fuel Transfer Tube - This item was previously discussed in NRC Inspection Report 50-285/90-18 and involved the need to survey the fuel transfer tube during the next refueling outage because of a changed fuel design and increased fuel burnup. The inspectors reviewed the licensee's radiation survey records of the fuel transfer tube performed during the 1992 refueling outage. The inspectors determined that no unusual radiation levels were identified during the surveys.

(Closed) Violation (285/9119-01): Failure to Update the Final Safety Analysis Report (FSAR) - This item was previously discussed in NRC Inspection Report 50-285/91-19 and involved the failure to update the USAR to indicate that monitor RM-058 was not installed. The inspectors reviewed the latest update of the Updated Safety Analysis Report (USAR) and noted that it accurately reflected the status of monitor RM-058.

(Open) Open Item (285/9119-02): Failure to Update the USAR - This item was previously discussed in NRC Inspection Report 50-285/91-19 and involved the description of the new radioactive waste processing building in the USAR. The licensee was in the process of preparing their mid-1992 USAR update, which included the description of the new radioactive waste processing building. Because the update was in draft form, the inspectors informed the licensee that this item would not be reviewed at this time. Therefore, this item is still considered to be open pending review of the approved mid-1992 update of the USAR.

3. AUDITS AND APPRAISALS (83750)

The inspector reviewed the licensee's audit and appraisal program, including Radiological Occurrence Reports to determine compliance with TS.

The licensee had not performed any additional audits of the Radiation Protection Program since documented in NRC Inspection Report 50-285/92-02. Therefore, selected surveillances that were performed since the last NRC inspection were reviewed. The surveillances were determined to be comprehensive and surveillance teams included technical experts. The surveillances identified significant findings and the radiation protection department took timely, corrective actions.

The inspectors reviewed selected Radiological Occurrence Reports (RORs) and determined the RORs provided sufficient documentation of the events and outlined measures to prevent recurrence. In particular, the inspectors reviewed ROR 92-09. This report involved the uptake of cesium-137 by three individuals. The amount of cesium-137 that was determined to be inhaled/ingested by each individual was less than 1 MPC-hour.

The inspectors reviewed the Root Cause Analysis Report (RCAR) for ROR 92-09 which detailed what occurred and what procedures had been violated. The RCAR had identified four apparent violations of procedures that the inspectors also noted when they reviewed ROR 92-09. The inspectors did note one additional apparent violation of procedures that was not identified by the licensee in the RCAR. All five apparent violations involved TS 5.8.1.

TS 5.8.1 states, in part, that written procedures and administrative policies shall be established, implemented, and maintained that meet or exceed the minimum requirements of Sections 5.1 and 5.3 of ANSI N18.7-1972 and Appendix A of US NRC Regulatory Guide 1.33.

Regulatory Guide 1.33, Appendix A, Section 7.e.(1) states, in part, that access control to radiation areas by RWP system should be covered by written

procedures. Radiation Protection Administrative Procedure RP-AD-200, Section 4.6, states, in part, that radiation protection technicians are responsible for . . . ensuring that RWP requirements are complied with. The licensee identified that on February 28, 1992, a radiation protection technician instructed personnel to work without respiratory protection on RWP 92-2538, even though the RWP stated that respiratory protection was required. The failure to follow RWP requirements was identified as a violation of TS 5.8.1 (285/9207-01).

Regulatory Guide 1.33, Appendix A, Section 7.e.(4) states, in part, that contamination control should be covered by written procedures. Radiation Protection Procedure RP-207, Section 7.4.B., states, in part, that all personnel skin and/or clothing contamination events not attributed to noble gases and/or naturally occurring radionuclides shall be documented on FC-RP-207-1, "Personnel Contamination Report." The licensee identified that on February 28, 1992, three individuals had facial contamination that was not attributed to noble gases and/or naturally occurring radionuclides and the contaminations were not documented on FC-RP-207-1. The failure to follow Radiation Protection Procedure RP-207 was identified as a violation of TS 5.8.1 (285/9207-02).

Regulatory Guide 1.33, Appendix A, Section 7.e.(5) states, in part, that respiratory protection should be covered by written procedures. Radiation Protection Procedure RP-201, Section 7.4.1.A., states, in part, that one is to document respiratory protection equipment selection on Form FC-RP-201-6 and attach to the RWP when respiratory protection equipment is specified on an RWP. On March 27, 1992, the inspectors determined that Form FC-RP-201-6 was not attached to RWP 92-2538 which required respiratory protection equipment. The failure to follow Radiation Protection Procedure RP-201 was identified as a violation of TS 5.8.1 (285/9207-03).

The inspectors discussed with the licensee's representatives the possibility of extending the use of Form FC-RP-201-6. The inspectors noted that the form would be useful for radiation protection technicians in documenting when respiratory protection was deemed not to be necessary. The form would help document reasons for not using respiratory protection and the radiological conditions at the time the decision was made.

Regulatory Guide 1.33, Appendix A, Section 7.e.(5) states, in part, that respiratory protection should be covered by written procedures. Radiation Protection Procedure, RP-203, Section 7.1.2.B., states, in part, that job coverage air samples shall be taken as directed by the Radiation Work Permit during work requiring respiratory protection. The licensee identified that on February 28, 1992, that an air sample was not taken to support RWP 92-2538 work which required respiratory protection. The failure to follow Radiation Protection Procedure RP-203 was identified as a violation of TS 5.8.1 (285/9207-04).

Regulatory Guide 1.33, Appendix A, Section 7.e.(8) states, in part, that the bioassay program should be covered by written procedures. Radiation Protection Procedure RP-207, Section 7.4.3.A. states, in part, that whole body

counts are required for individuals with skin contamination in the area of the mouth or nose measured prior to decontamination. The licensee identified that on February 28, 1992, three individuals alarmed the PCM-1b and exhibited contamination in the area of the mouth or nose and a whole body count was not performed. The failure to follow Radiation Protection Procedure RP-207 was identified as an apparent violation of TS 5.8.1 (285/9207-05).

The inspectors also reviewed RORs 92-02 and 92-08 which were similar to ROR 92-09. All three incidents involved minor uptakes of radionuclides by individuals. The incident in ROR 92-02 occurred prior to the incident in ROR 92-09, and the incident in ROR 92-08 occurred after. However, unlike the incident in ROR 92-09 the incidents in RORs 92-02 and 92-08 did not involve numerous problems with radiation protection procedures. In fact, in both incidents all procedures were followed and they were handled appropriately. The review of RORs 92-02 and 92-08 combined with interviews of individuals that were involved with ROR 92-09, indicated that what occurred in ROR 92-09 was an isolated incident and was not indicative of a programmatic breakdown of the radiation protection program. However, the inspectors indicated their concern to the licensee that the incident in ROR 92-09 contained instances where the problem should have been detected earlier. For example, the counting room technician remarked that paperwork would have to be completed and a whole body count performed on the individuals, because they had exhibited facial contamination. The advice was apparently disregarded by the radiation protection technician who worked with the individuals on RWP 92-2538. Also, the same radiation protection technician had felt uneasy about working on the job without a respirator and requested a whole body count the next day. A quantity of cesium-137 was detected during the whole body count that was below administrative limits. However, even with this positive indication of an uptake of cesium-137, the other workers were not whole body counted.

The inspectors noted that the licensee had proceeded with implementation of corrective actions identified in the RCAR to ROR 92-09. The inspectors observed a radiation protection staff meeting that was part of the licensee's corrective actions. The meeting detailed the problems that occurred and the importance of verbatim adherence to procedures.

No deviations were identified.

Conclusions

An exceptional surveillance program had been established for radiation protection activities that included input by technical experts. Radiological Occurrence Reports satisfactorily documented the occurrence and detailed appropriate corrective actions. A review of ROR 92-09 indicated that five violations of licensee procedures occurred. Four of the violations were self identified. Although numerous, the violations were not deemed to indicate a programmatic breakdown of the radiation protection program.

4. CHANGES (83750)

The inspectors noted that the licensee had not made any major changes that would have effected the radiation protection program since the last NRC inspection.

5. PLANNING AND PREPARATION (83750)

The inspectors reviewed representative records, discussed outage planning with licensee representatives, and observed activities to verify that the necessary planning and preparations, including management support, were being implemented.

The licensee had sufficient supplies of protective clothing, respiratory protection equipment, radiologic survey instrumentation, temporary shielding, and portable ventilation equipment to support the refueling outage activities.

The inspectors observed that the licensee had hired contract RP technicians for the outage early enough to be trained and perform work prior to the beginning of the outage. The contract RP technicians were noted to be under supervisory control and review by the licensee.

The licensee, prior to the outage, had placed a RWP writer from the Radiation Protection Department over with maintenance and engineering departments. This allowed for timely processing of RWPs to support plant modifications and work orders.

The inspectors observed that management support for radiation protection planning for the outage was good.

No violations or deviations were identified.

Conclusions

A notable planning and preparation program had been established for the 1992 refueling outage. An excellent inventory of radiation protection supplies and equipment were maintained for refueling outage activities. An appropriate number of radiation protection personnel were available to provide health physics coverage. Excellent coordination existed between the radiation protection department and other departments.

6. TRAINING AND QUALIFICATIONS OF PERSONNEL (83750)

The inspectors noted that the inspection conducted January 27-31, 1992, and documented in NRC Inspection Report 50-285/92-02 reviewed adequately the training program for radiation protection (RP) workers and RP technicians and the qualifications of RP technicians. The inspection report also documented the adequacy of the qualifications, testing, and training of contract RP technicians for the refueling outage. Therefore, the inspectors did not review this area during this inspection.

7. EXTERNAL EXPOSURE CONTROL (83750)

The inspectors reviewed the licensee's external exposure control program to determine compliance with TS 5.8 and 5.11 and the requirements of 10 CFR 19.13, 20.101, 20.102, 20.105, 20.202, 20.401, and 20.408; and the commitments of Chapter 12 of the USAR.

The external radiation exposure control program for the current outage consisted of monitoring whole body exposures using thermoluminescent dosimeters (TLDs), self-reading dosimeters (SRDs), direct surveys, RWPs, and administrative dose limits. The licensee utilized radiological controlled area (RCA) control point clerks to read SRDs and log individuals on the computerized work tracking system.

The inspectors reviewed selected dosimetry records and noted that the appropriate records were maintained for each individual to satisfy Part 20 requirements. The licensee's dosimetry program was accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) in all eight categories. Selected thermoluminescent (TLD) evaluation reports (TERs) and exposure evaluation reports (EERs) were reviewed. TERs were initiated when TLD and SRD comparisons differed substantially or when TLD results were suspect. EERs were initiated when SRDs were lost or suspect, or if an individual had not been monitored properly. The inspectors determined that TERs and EERs had been performed properly.

The inspectors made several tours of the RCA and verified that areas were posted properly and that very high radiation areas (VHRAs) were locked. The inspectors also verified that the licensee had a properly supervised key control program to account for keys to locked VHRAs.

No violations or deviations were identified.

Conclusions

The external exposure control program was noteworthy. High radiation and very high radiation areas were properly posted and controlled.

8. INTERNAL EXPOSURE CONTROL (83750)

The inspectors reviewed the licensee's program for control of internal radiation exposure to determine compliance with TSs 5.8 and 5.11 and the requirements of 10 CFR 20.103, 20.201, and 20.401; and agreement with the commitments in Chapter 12 of the USAR and the recommendations of Regulatory Guide 8.15, NUREG-0041, Industry Standards ANSI Z88.2-1980 and ANSI/GCA G-7.1-1989.

The program to control internal exposure during outage activities included engineering controls, airborne sampling and contamination surveillance, use of National Institute of Occupational Safety and Health/Mine Safety, and Health Administration (NIOSH/MSHA) approved respiratory devices. The engineering controls included the use of portable ventilation units with HEPA filters to

exhaust and clean air from certain areas where it was possible for work activities to produce a radioactive airborne problem.

Whole body counting was used to verify the effectiveness of the respiratory protection program. The licensee also performed random whole body counts of individuals who entered the RCA. The random whole body counting program appeared to be very effective in that the licensee would not have discovered the uptakes of cesium-137 reported in ROR 92-09 if the program were not in place.

The inspectors reviewed records of respirator usage, and inspected the respirator testing, maintenance, and issue areas. Before issuing respiratory protection equipment, radiation protection representatives checked individuals' qualifications by either reviewing qualified user cards carried by the individuals or by reviewing a computer generated list of all qualified users. The inspectors verified the qualifications of individuals issued respiratory protection equipment and confirmed that they were qualified and issued the proper equipment.

No violations or deviations were identified.

Conclusions

A good internal exposure control program was in place. The random whole body count program was very effective in confirming the effectiveness of the respiratory protection program.

9. CONTROL OF RADIOACTIVE MATERIALS AND CONTAMINATION, SURVEYS, AND MONITORING (83750)

The inspectors reviewed the licensee's program for surveying/monitoring and controlling radioactive materials to determine compliance with TSs 5.8 and 5.11 and the requirements of 10 CFR 19.12, 20.201, 20.203, 20.205, 20.207, 20.301, and 20.401; and with the commitments in Chapter 12 of the USAR.

The inspectors reviewed the calibration, repair, and response check of radiation detection instrumentation. Portable instruments were maintained, calibrated, and response checked by the radiation protection department. The Instrument and Control (I&C) Department was responsible for calibration and maintenance of fixed monitors such as effluent, area radiation, and air monitors.

The licensee had established a good inventory of instruments. The licensee maintained approximately 700 instruments which included friskers, alarming dosimeters, air samplers, and portable radiation survey meters.

On March 24, 1992, during a tour of the RCA, the inspectors noted that Particulate Iodine and Noble Gas (PING) 1A, S/N 212, located in Corridor 4, had expired calibration on March 12, 1992. The unit had been response tested daily from March 12 through March 24, 1992, but had not been tagged out of

service. Calibration of the PING was the responsibility of the I&C department, and radiation protection performed the daily response check.

TS 5.8.1 states, in part, that written procedures and administrative policies shall be established, implemented, and maintained that meet or exceed the minimum requirements of Sections 5.1 and 5.3 of ANSI N18.7-1972 and Appendix A of US NRC Regulatory Guide 1.33. Regulatory Guide 1.33, Apperdx A, Section 8.b.(1)(aa) states, in part, that specific procedures for surveillance tests, inspections, and calibrations should be written for area, portable, and airborne radiation monitors. Radiation Protection Procedure RP-402, Section 7.2.3 A. states, in part, that when in service, instruments shall be calibrated at least semiannually. Section 7.2.4 B., states, in part, that schedules may be adjusted + or - 25 percent . . . To extend a calibration due date attach a second calibration label to the instrument which reflects the new due date. Since the licensee had not extended the calibration due date by attaching a second calibration label, the inspectors determined that PING-1A, S/N 212 was out-of-calibration. This observation was discussed with the radiological instrumentation and equipment coordinator and was agreed upon that the instrument was out-of-calibration according to their procedures. The failure to maintain current calibrated air monitors was identified a violation of TS 5.8.1 (285/9207-06).

When informed of the out-of-calibration PING, the licensee took immediate action and tagged the instrument out. The licensee then reviewed all instrumentation for calibration due dates and determined that three portal monitors were out-of-calibration. The licensee immediately tagged out these instruments. Before the inspectors exited with the licensee, all instruments that had been found to be out-of-calibration were calibrated.

The inspectors examined selected radiological surveys of direct radiation and surface contamination and airborne radioactivity which had been performed in the RCA. The inspectors also made several tours of the RCA and performed confirmatory surveys of direct radiation levels. The results of these surveys were in agreement with the licensee's recorded values.

Sufficient supplies of protective clothing were available. The licensee also made such items as straps for glasses, headbands and faceshields with headbands available in an effort to reduce personnel contaminations. The inspectors reviewed selected personnel contamination reports and noted that they were handled appropriately.

The inspectors discussed with the licensee's representatives the adequacy of radioactive material release surveys when considering nuclides that decay by electron capture. The licensee performed a preliminary review of this concern and noted that FCS has three radionuclides (cobalt-58, chromium-51, and manganese-54) of potential significance that decay by electron capture. The licensee determined from their preliminary experiment that the possibility of some loss of net counting efficiency due to the presence of radionuclides decaying by electron capture may exist. The licensee stated that they would perform additional experiments to further categorize this concern.

Conclusions

Except for the violation for an out-of-calibration airborne radiation monitor, a notable program had been implemented for the calibration of radiation detection instrumentation.

10. MAINTAINING OCCUPATIONAL EXPOSURES ALARA (83750)

The inspectors reviewed the licensee's program to maintain occupational exposure ALARA to determine compliance with requirements of 10 CFR 20.1(c) and agreement with the recommendations of Regulatory Guides 8.8 and 8.10.

Demonstration of support for the ALARA concept was shown by the licensee through the activities of an Executive ALARA Committee which was composed of senior corporate and departmental management. The inspectors attended an Executive ALARA Committee meeting on March 25, 1992. The meeting reinforced managements serious commitment to ALARA goals and the implementation of the onsite ALARA program.

The inspectors reviewed the licensee's 1992 ALARA goals and selected ALARA package summaries. ALARA packages were reviewed, found to be good quality, included adequate checklists, estimates of projected man-hours, radiation survey information, radiation exposure projections, and lessons learned from previously accomplished, similar work. As of March 24, 1992, the outage exposure total was approximately 162 person-Rem which was below the goal of 210 person-Rem for the outage. Also as of March 24, 1992, the licensee had 96 personnel contamination events which was below the goal of 144.

The inspectors noted that ALARA staffing was good. ALARA personnel prepared RWPs and reviewed design changes, procedure changes, and maintenance work requests projected to exceed 1 rem, cumulative exposure. The inspectors reviewed selected RWPs and ALARA procedures and determined that they were good.

The ALARA suggestions program received 33 suggestions in 1991 and approximately 28 to date in 1992. Many of the suggestions were implemented, and some were under evaluation. The increased amount of suggestions indicated the support of the ALARA program by the workers.

The inspectors observed prejob ALARA briefings and noted that they were conducted in a professional manner. Job details and radiological conditions, including precautions, were explained in detail. Questions were answered in sufficient detail for worker understanding.

The licensee used a camcorder to film jobs in progress for post-job review and for future review for use as an ALARA tool.

No violations or deviations were identified.

Conclusions

An excellent ALARA program had been implemented. Person-rem exposures and personnel contamination events were below outage gr-1s. The ALARA suggestion program and ALARA prejob briefings were commendable.

11. EXIT INTERVIEW

The inspectors met with licensee representatives denoted in paragraph 1 at the conclusion of the inspection on March 27, 1992, and summarized the scope and findings of the inspection as presented in this report. The licensee did not identify as proprietary any of the materials provided to, or reviewed by, the inspectors during the inspection.