

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 50-298/94-33

License: DPR-46

Licensee: Nebraska Public Power District  
P.O. Box 499  
Columbus, Nebraska

Facility Name: Cooper Nuclear Station

Inspection At: Brownville, Nebraska

Inspection Conducted: December 19-23, 1994

Inspectors: L. T. Ricketson, P.E., Senior Radiation Specialist  
Facilities Inspection Programs Branch

T. H. Andrews, Radiation Specialist  
Facilities Inspection Programs Branch

Approved:

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B. Murray, Chief, Facilities Inspection  
Programs Branch

*1/11/95*  
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Date

Inspection Summary

Areas Inspected: Routine, announced inspection of selected portions of the radiation protection program, including audits and appraisals, training and qualifications, and the program to maintain occupational exposures as low as reasonably achievable (ALARA). Followup inspection was conducted on matters related to two licensee event reports and the service water system.

Results:

- The quality assurance audit was not a comprehensive review of the entire radiation protection program; rather, it focused on the implementation of the revised 10 CFR Part 20. This review was tardy, when compared with other sites, but the quality of the audit was good, resulting in the identification of deficiencies and many recommendations for improvement (Section 2.1).
- The condition reporting system was used correctly and effectively by the radiation protection staff to identify and correct problems. There were

no clear, adverse trends noted related to the radiation protection program (Section 2.1).

- The licensee did not act aggressively and effectively in dealing with some issues, such as the stack effluent monitor reliability and repetitive maintenance problems, which were identified through the condition reporting system (Section 2.1).
- A self-identified, noncited violation involving the failure to collect and analyze two tritium vent samples was noted (Section 2.1).
- Improvements were underway in the general orientation and radiation protection technician training programs. The continuing training program for radiation protection professionals was generally good (Section 2.2).
- Person-rem exposure were low in 1994. There has been increased support from the radiation workers for the ALARA suggestion program; however, attendance of ALARA committee meetings indicated a lack of support for the committee by the supervisors of maintenance and engineering groups (Section 2.3).
- The gaseous effluent monitors were operable, in preparation for the plant restart (Section 3.2).
- Appropriate steps were taken to prevent an unmonitored release of radioactively contaminated water from the residual heat removal system via the service water system (Section 4).

#### Summary of Inspection Findings:

- A noncited violation was identified (Section 2.1).
- Licensee Event Report 298/94-003 was closed (Section 3.1).
- Licensee Event Report 298/94-025 was closed (Section 3.2).

#### Attachments:

- Attachment - Persons Contacted and Exit Meeting

## DETAILS

### 1 PLANT STATUS

The plant has not operated since May 25, 1994.

### 2 OCCUPATION RADIATION EXPOSURE CONTROL (83750)

The exposure control program was inspected to determine compliance with Technical Specifications 6.1.4, 6.2, and 6.3.4 and the requirements of 10 CFR Part 20, and agreement with the commitments of Chapter 13 of the Updated Safety Analysis Report.

#### 2.1 Audits and Appraisals

The inspectors reviewed the December 12, 1994 quality assurance audit of the radiation protection organization and noted that it focused on the implementation of revised 10 CFR Part 20. Radiation protection representatives stated during the exit meeting that this audit had been originally scheduled for the first quarter of 1994 and were unsure of the reason for the delay.

The inspectors interviewed the audit team leader and discussed the planning and performance of the audit. Both preparation and execution were good. The quality assurance audit team included a technical expert and a quality assurance auditor from other power reactor sites and a member of the site radiation protection organization. Quality assurance representatives stated that the audit consisted of approximately 25 percent performance-based activities and 75 percent compliance-based activities.

The audit identified 3 deficiencies which resulted in the initiation of condition reports and 15 recommendations for program improvement. Most of the items were identified by the individuals from the other sites. Responses from the radiation protection organization to the findings were not yet due and were not reviewed.

The inspectors evaluated the radiation protection organization's use of the condition reporting system by reviewing selected examples of the reports initiated by and/or assigned to the group. Based on this sampling, the inspectors determined that the radiation protection organization consistently met the assigned response dates with proposed corrective actions. A review of the proposed corrective actions revealed that they were appropriate to address the respective problems.

The licensee did not have an active trending program to identify similarities in the causes of condition reports. The inspectors' selective review did not identify adverse trends with the radiation protection program; however, the inspectors noted that there were numerous condition reports concerning the Kaman gaseous effluent monitors. According to members of the chemistry and engineering groups, there had been a long history of problems with the monitors. Licensee representatives stated that three high range monitors and

five normal range monitors were addressed by the technical specifications but were not safety related.

In order to evaluate the licensee's corrective actions with regard to the monitors, the inspectors interviewed licensee personnel familiar with the Kaman monitors and the monitors' associated problems. The licensee had previously concluded that, even though the monitors were troublesome, there were no better monitors available and replacement would not be cost effective. The inspectors determined that the licensee arranged to have an expert from another site perform a review of the use of the monitors and address questions of reliability and repetitive maintenance. The consultant visited the licensee's site on November 15, 1993, and his recommendations were distributed to cognizant staff members in a memo dated December 6, 1993. On December 7, 1993, the licensee then initiated the Kaman Monitor Upgrade Program, and a team was appointed to consider and address the recommendations of the consultant. The monitor upgrade team consisted of representatives from various plant departments, and it met several times. According to members of the team, the team presented its recommendations to plant management on April 29, 1994.

The inspectors noted that the monitor upgrade team operated informally. There was no charter for the team to outline its objectives or authority. The team assigned a number of tasks to its team members and established an action item list, but did not track the status of the items using a site action item tracking system. The inspectors noted that many of the action items were still open according to the latest action item list available (dated March 1, 1994). The team leader could not provide a current status for the action items. The team had not met since the April 29 presentation, and there had been no further attempt to update the list. There was no official record of the team's April 29 presentation of its recommendations to plant management. (The inspectors reviewed an outline used to make the presentation.)

Licensee personnel discovered that, in addition to the reliability problems, they also had configuration problems because of the way in which the monitors were mounted and calibrated. (Licensee Event Report 94-025 deals with the monitor configuration problems and is discussed further in Section 3.) Several condition reports were initiated to address these new problems. Subsequently, Condition Report 94-1117 was initiated on December 1, 1994, because of inadequate corrective actions and because continuing Kaman monitor problems were being addressed by several individuals, rather than through an organized, team approach, as before.

The inspectors spoke to the monitor upgrade team leader who stated that he had suffered health problems from the end of April until mid-June 1994. He also stated that licensee's management considered the monitor upgrade program too low a priority to pursue during the current outage, which began May 25, 1994.

The inspectors noted that Condition Report 94-1178, initiated on December 14, 1994, identified that tritium sampling on the Radwaste/Augmented Radwaste Building vent and the Reactor Building vent was not performed within 92 days (plus or minus 25 percent), in violation of Technical Specification

Table 4.21.C.1. (In accordance with Technical Specification 3.21.e, this item was not reportable pursuant to 10 CFR 50.73.)

The licensee determined that the root cause of the violation was that an inadequate self verification process was used to ensure that sampling was completed as required. As corrective action to prevent recurrence, the surveillance tracking system will be used to track the sample due date. This system was not used previously because tasks, such as sampling, were recorded on the Chemistry Analysis Schedule Board, and a specific due date was not listed. Samples taken after the required sampling dates indicated that no tritium levels were above the licensee's lower limit of detection. Licensee documents indicated that no tritium above the lower limit of detection has been identified since the implementation of the Radiological Effluent Technical Specifications in 1986. This violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII.B.2 of Appendix C to 10 CFR Part 2.

## 2.2 Training and Qualifications

The inspectors confirmed that the licensee had completed and issued, in December 1994, new lesson plans and student handouts, incorporating the requirements of the revised 10 CFR Part 20. This matter was discussed in NRC Inspection Report 50-298/94-21 and was the subject of a condition report.

The licensee's radiation protection staff remained constant, so there had been no need to conduct initial training for newly-hired radiation protection technicians.

The inspectors reviewed the topics covered during continuing training of radiation protection technicians and noted that the licensee could not show when specific items had been addressed in current events training. Training Policy Directive 0407 stated that health physics industry events training was to be given "continuously." Training representatives stated that there was no definition of continuously; however, the practice was for the health physics operations supervisor to discuss industry events during daily meetings with the radiation protection technicians. The Radiological Department Training Effectiveness Review Committee recommended changes which would result in better recordkeeping and clearer definitions. These changes will be reviewed further during a future inspection.

The inspectors reviewed training records of continuing technical training of health physics professionals and noted that in most cases the individuals attended professional technical meetings related to health physics or visited other plants on short assignments to work with their counterparts. However, there were isolated instances in which the licensee took credit for nontechnical courses such as root cause analysis and safety concept training. The fact that these were not health physics continuing training courses was highlighted by the fact that the courses were presented to supervisors from many departments. Generally, the inspectors noted that the licensee provided professionals opportunities to attend continuing training.

### 2.3 ALARA

The inspectors reviewed selected areas of the ALARA program and determined that in 1994, the licensee had accrued approximately 78 person-rems. ALARA representatives estimated that the total exposure for 1994 would be approximately 85 person-rems. The 1994 goal was 95 person-rems.

A review of the licensee's exposure history for the last 5 years showed the following person-rem results:

	1989	1990	1991	1992	1993
CNS	343	379	405	73	391
BWR AVE	439	433	314	360	367

During NRC Inspection 50-298/94-05, the inspector identified that the ALARA suggestion program received relatively poor support from the workers in 1993 and that only five suggestions were submitted. This total was down from the 13 to 15 suggestions noted in previous years. During this inspection, the inspectors determined that 11 suggestions were submitted in 1994, indicating some improvement in worker involvement in the ALARA program.

The ALARA committee had conducted three quarterly meetings in 1994. Another meeting was scheduled for the week following the inspection. The inspectors reviewed the minutes of the 1994 meetings and noted that attendance by the representatives of plant engineering, operations engineering, engineering programs, and maintenance organizations was poor. Only one representative had attended one of the three meetings in 1994.

### 2.4 Conclusions

The quality assurance audit was not a comprehensive review of the entire radiation protection program; rather, it focused on the implementation of the revised 10 CFR Part 20. This review was tardy, when compared with other sites, but the quality of the audit was good, resulting in the identification of deficiencies and many recommendations for improvement.

The condition reporting system was used correctly and effectively by the radiation protection staff to identify and correct problems. There were no clear, adverse trends noted related to the radiation protection program.

The licensee did not act aggressively and effectively in dealing with some issues, such as the Kaman monitor reliability and repetitive maintenance problems, that were identified through the condition reporting system. Use of an informal tracking system resulted in a technical specification violation that was identified and promptly corrected by the licensee.

Improvements were underway in the general orientation and radiation protection technician training programs. The continuing training program for radiation protection professionals was generally good.

Person-rem exposure for the plant will be low in 1994. There has been increased support from the radiation workers for the ALARA suggestion program; however, attendance of ALARA committee meetings indicated a lack of support for the committee by the supervisors of maintenance and engineering groups.

### 3 ONSITE REVIEW OF LICENSEE EVENT REPORTS (92700)

#### 3.1 (Closed) Licensee Event Report 298/94-003: Technical Specification Violation for Inoperable Monitors Caused by Improperly Assembled Particulate/Iodine Filter Assemblies

On February 15, 1994, the radwaste building high range gaseous effluent radiation monitor was declared inoperable after discovering that a missing O-ring in the lower portion of the sample assembly could have resulted in an inaccurate sample, if the monitor were required to operate. Additional investigation by the licensee revealed that another O-ring was missing in the upper portion of the sample assembly. The turbine building high range gaseous effluent radiation monitor and the elevated release point high range gaseous effluent radiation monitor were found to have the same problem and were declared inoperable on February 22, 1994. The missing upper O-ring was attributed to the use of an alternate particulate/iodine sampling cartridge. The lower O-ring was omitted during the previous calibration.

Immediate corrective actions included the replacement of the O-rings and the leak testing of the systems before returning the monitors to service. To prevent recurrence, appropriate personnel were made aware of the situation and the procedures for replacement of the cartridge and filter in the gaseous effluent radiation monitors were revised to include guidance on the replacement of the O-rings and the required leak testing following the cartridge and filter replacement. The inspectors reviewed Chemistry Procedure 8.8.8, "Particulate, Iodine, and Noble Gas Sample Collection for Effluent Monitors, and Control Room and Drywell Air Monitors," Revision 14.2, and confirmed that the added guidance had been included.

#### 3.2 (Closed) Licensee Event Report 298/94-025: Improper Installation and Calibration of Kaman Normal and High Range Gaseous Activity Detectors Due to Personnel Error

While attending a Kaman Monitor User Group meeting in September 1994 (the first such meeting the licensee personnel had attended since 1989), licensee personnel discovered that, in addition to the monitor reliability problems, there were configuration problems caused by the way in which the detectors in the Kaman gaseous effluent monitors were mounted and calibrated. These problems effected the accuracy of the monitors. It was also discovered that an improper method of calibration had been used on the monitors. The root cause was determined to be personnel error as a result of not fully understanding the system configuration and not translating vendor requirements into station procedures.

Corrective actions included the review of all such monitors and the proper reinstallation and calibration of the detectors. To prevent recurrence, the licensee revised the associated procedures. The inspectors reviewed the

calibration procedures for the monitors in the reactor building, radwaste building, and turbine building and confirmed that they had been revised.

With regard to the possible effect of the monitor configuration problems on past effluent releases, licensee personnel stated that positioning errors could have resulted in a 55 percent error and that calibration errors could have resulted in an additional 9 percent error. However, the licensee used a monitor setpoint of 10 percent of the technical specification limit. Therefore, even assuming a 64 percent error, effluent releases were far below technical specification limits. For example, using figures from the 1983 through 1994 Semiannual Radioactive Effluent Reports and making corrections for the maximum error, the highest percentage of a quarterly limit for gamma air dose was 18.2 percent during the second quarter of 1990. The highest percentage of instantaneous release limit was 0.20 percent in December 1987.

The inspectors determined that the operability of the monitors was a licensee startup item and that the monitors were operable at the time of the inspection. Through interviews and reviews of licensee documentation, the inspectors determined that the operability figures for the monitors were above 90 percent through 1993. Licensee personnel estimated that the monitors were operable approximately 80 to 85 percent of the time in 1994.

### 3.3 Conclusions

Appropriate corrective actions were taken to address the specific problems discussed in the licensee event reports.

The gaseous effluent monitors were operable, in preparation for the plant restart.

## 4 FOLLOWUP - PLANT SUPPORT (92904)

During NRC Inspection 50-298/94-04, the team discovered that the service water system was operated inconsistently with its design basis as stated in the Updated Safety Analysis Report and the service water system design criteria document.

Operating procedures directed the operator to supply the service water system side of the residual heat removal heat exchanger without running the residual heat removal/service water system booster pumps. (Operating the booster system in this mode was referred to as "windmilling" the booster pumps.) "Windmilling" the booster pumps appeared to be in conflict with system design Criterion 5 of the service water system design criteria document and the Updated Final Analysis Report description of the service water system operation, which stated that operation of the booster pumps maintains the service water system pressure higher than the residual heat removal system pressure to ensure that there is no leakage of potentially contaminated water into the service water system and, subsequently, into the environment. Violation 298/9404-01 was issued for failure to revise the Updated Safety Analysis Report.

As a followup to this item, the inspectors verified that the licensee had instrumentation readouts in the control room to allow monitoring of the service water discharge from the residual heat removal heat exchanger. The alarm setpoint was set to correspond with  $3E-6$  microcurie per milliliter. This was the value specified in the technical specifications.

This monitor is required to be operable per Technical Specification 3.21. If the monitor is not operable, the licensee is required to perform a grab sample at least once every day and analyze it for gross radioactivity (beta or gamma). The effluent releases are limited to  $1E-6$  microcurie per milliliter during this period.

The inspectors concluded that appropriate steps were taken to prevent a release of radioactively contaminated water from the residual heat removal system via the service water system from being unmonitored.

## ATTACHMENT

### 1 PERSONS CONTACTED

#### 1.1 Licensee Personnel

- \*A. Alford, Licensing Engineer
- \*R. Beilke, Acting Radiological Manager
- \*T. Chard, Health Physics Supervisor
- J. Dykstra, Electrical Engineer
- C. Gaines, Events Analysis Manager
- \*R. Godley, Nuclear Licensing and Safety Manager
- \*J. Herron, Plant Manager
- \*E. Mace, Senior Manager, Site Support
- R. McDonald, Chemistry Supervisor
- J. Murphy, Acting Department Manager, Projects and Construction
- D. Oslo, ALARA Coordinator
- H. Roup, Quality Assurance Specialist
- \*E. Rotkvic, Lead Instructor, Technical Programs
- \*J. Sayer, Technical Assistant to the Plant Manager
- \*G. Smith, Quality Assurance Operations Manager

#### 1.2 NRC Personnel

- \*R. Kopriva, Senior Resident Inspector

\*Denotes personnel that attended the exit meeting. In addition to the personnel listed, the inspector contacted other personnel during this inspection period.

### 2 EXIT MEETING

An exit meeting was conducted on December 23, 1994. During this meeting, the inspector reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspector.