

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-298/90-17

Operating License: DPR-46

Docket: 50-598

Licensee: Nebraska Public Power District (NPPD)
P.O. Box 499
Columbus, Nebraska 68602-0499

Facility Name: Cooper Nuclear Station (CNS)

Inspection At: CNS Site, Brownville, Nebraska

NPPD, General Office, Columbus, Nebraska

Inspection Conducted: April 16-20, 1990

Inspector:

J. Blais Nicholas
J. B. Nicholas, Senior Radiation Specialist
Facilities Radiological Protection Section

5/4/90
Date

Approved:

Blaine Murray
Blaine Murray, Chief, Facilities Radiological
Protection Section

5/7/90
Date

Inspection Summary

Inspection Conducted April 16-20, 1990 (Report 50-298/90-17)

Areas Inspected: Routine, unannounced inspection of the licensee's radiological environmental monitoring program (REMP) and certain aspects of the water chemistry program.

Results: The inspector determined that the licensee had implemented a REMP in accordance with NRC requirements. The REMP was being conducted in accordance with Technical Specification (TS) requirements. Quality Assurance (QA) audits had been performed as required and were technically comprehensive and performance based. The meteorological monitoring program had maintained an annual joint frequency distribution data recovery for 1988 of 93 percent and for 1989 of 87 percent. The licensee's staff involved with the REMP had experienced a very low turnover of personnel during the last 31 months. The licensee had submitted changes to the Offsite Dose Assessment Manual (ODAM) concerning REMP sample locations and had received NRC approval for these changes. No licensee event reports (LERs) had been written in 1988 and 1989

involving REMP activities. The licensee had submitted their Annual Radiological Environmental Operating Reports for 1988 and 1989 as per TS requirements.

The licensee had implemented a water chemistry control program in accordance with NRC requirements. The water chemistry control program was being conducted in accordance with TS requirements.

Within the areas inspected, no violations or deviations were identified. The licensee had adequately addressed all previously identified inspector followup items in the area of radiological environmental monitoring. Five new inspector observations are discussed in paragraphs 4 and 5.

DETAILS

1. Persons Contacted

NPPD

- *G. R. Horn, Division Manager, Nuclear Operations
- L. J. Cooper, Division Manager of Environmental Affairs
- *R. L. Beilke, Radiological Support Supervisor
- *L. E. Bray, Regulatory Compliance Specialist
- S. W. Dierberger, Instrumentation and Calibration (I&C) Foreman
- *J. W. Dutton, Nuclear Training Manager
- K. L. Fike, Chemist
- *R. L. Gibson, Audit and Procurement QA Supervisor
- H. A. Jantzen, I&C Supervisor
- D. S. Kimball, Health Physics (HP) Technician
- J. M. Kutler, Senior Chemistry and HP Specialist
- **D. G. Luce, Environmental Specialist
- **W. R. Luhring, Environmental Manager, Nuclear Operations
- R. L. Mason, I&C Specialist
- *R. J. McDonald, Chemistry Supervisor
- C. H. Putman, Jr., Senior QA Specialist
- **D. R. Robinson, QA Manager
- E. M. Rotkvic, HP Training Instructor
- *J. V. Sayer, Radiological Manager
- J. M. Skradski, Environmental Specialist
- K. C. Walden, Licensing Manager

NRC

- *W. R. Bennett, Senior Resident Inspector
- G. A. Pick, Resident Inspector

*Denotes those present during the exit meeting at CNS site on April 18, 1990.

**Denotes those present during the exit meeting at NPPD General Offices in Columbus, Nebraska, on April 20, 1990.

2. Inspector Observations

The following are observations the inspector discussed with the licensee during the exit meetings on April 18 and 20, 1990. These observations are not a violation, deviation, unresolved item, or open item. These observations were identified for licensee consideration for program improvement, but the observations have no specific regulatory requirement. The licensee stated that the observations would be evaluated.

- a. Corporate Technical Training Program - The licensee had not developed a formal classroom training program for professionals involved in administering and implementing the REMP. (See paragraph 4.)
 - b. HP Technician Training - The licensee had not presented the lesson plan entitled "Radiological Environmental Monitoring" to the CNS HP technicians. (See paragraph 4.)
 - c. Radiological Environmental Sample Result Notification Levels - The licensee's notification levels for certain radionuclides in environmental water samples were less than the required lower limits of detection. (See paragraph 5.)
 - d. Lower Limits of Detection (LLD) - The licensee's contractor laboratory reported less than values in the Annual Radiological Environmental Operating Reports which were greater than the "a priori" calculated LLD. (See paragraph 5.)
 - e. Radiological Environmental Sample Station Location Descriptions - The licensee's environmental sample station location descriptions in the ODAM and Annual Radiological Environmental Operating Reports had several discrepancies. (See paragraph 5.)
3. Organization and Management Controls (84750)

The inspector reviewed the licensee's organization, management controls, staffing, and assignment of REMP responsibilities to determine agreement with commitments in Section XIII of the Updated Safety Analysis Report (USAR) and compliance with the requirements in Section 6.1 of the TS.

a. Organization

The onsite CNS HP staff was responsible for collection, documentation, and shipment of the radiological environmental samples collected around the CNS site except for certain sampling of fish, river water, and shoreline sediment which was performed for the licensee by a contractor.

The environmental affairs staff, located at the NPPD General Office in Columbus, Nebraska, was responsible for the administration of the REMP. All radiological environmental samples and environmental thermoluminescent dosimeters (TLDs) were analyzed and processed by a contractor laboratory.

The inspector verified that the organizational structures of the CNS and environmental affairs staffs, with responsibilities associated with the REMP, satisfied TS requirements. Since the previous NRC inspection of the REMP conducted in September 1987, there had been no organizational or personnel changes in the CNS HP section or the NPPD environmental affairs division which involved the implementation of

the REMP. The current organizational structure and staffing associated with the REMP appeared to be consistent with TS requirements.

b. Management Controls

The inspector verified that the assignment of administrative control responsibilities for the management and implementation of the REMP was as identified in the TS. Selected procedures listed in the Attachment to this report were reviewed.

No violations or deviations were identified.

4. Training and Qualifications (84750)

The inspector reviewed the licensee's training and qualification programs for CNS and NPPD environmental affairs staffs associated with the REMP to determine agreement with commitments in Section XIII of the USAR and compliance with the requirements in Section 6.1.4 of the TS.

The inspector reviewed the education and experience backgrounds of the present CNS HP staff and NPPD environmental affairs staff responsible for implementing the REMP and determined that the technical personnel met the qualifications specified in the USAR, TS, and ANSI N18.1-1971. It was determined that the licensee had an adequately qualified staff to conduct the REMP.

The inspector observed that the licensee had not implemented a formal classroom training program for the technical professional staff in the NPPD General Office. It was determined that this was not required by the TS. The inspector was informed by the licensee that plans were being formulated to develop a formal training program for selected technical professional staff employed at the NPPD General Office.

Training for the CNS HP staff involved with the REMP sampling program was conducted by the CNS nuclear training department and consisted of on-the-job training. Training/qualification of personnel was documented for individual HP technicians by the completion of job performance measures which had to be performed and completed prior to an individual performing each specific task involving the various sampling of environmental media, the processing and shipping of samples, and the maintenance of sampling equipment. The inspector reviewed individual staff training records for selected HP personnel who performed REMP sampling activities. It was noted that the nuclear training department's files and computer record of completed job performance measures for several HP personnel were not complete. Completion of training for several HP personnel was verified by reviewing each HP technician's individual qualification book. During the inspection, the licensee provided the inspector with completed task qualification and certification sheets for the HP personnel and the various environmental sampling tasks which were missing during the initial review of the nuclear training

department's records. The results of the licensee's actions brought the HP technicians' training records up-to-date. The inspector determined that the CNS HP technicians involved in performing REMP activities had received the required training.

A review of the Training Program Description 0410, for HP Technician Level 1, indicated that the position required the completion of Lesson Plan INT010-02-01, "Radiological Environmental Monitoring." This is the only indication for this lesson plan requirement in the HP department training program. Since the licensee has never had an individual qualified for the HP Technician Level 1 position, the lesson plan on radiological environmental monitoring had never been taught. According to the radiological environmental control course description and lesson plan, the radiological environmental monitoring lesson plan was designed to provide knowledge on the sources of radiation, material pathway to man, and the types of environmental surveys to be performed. The licensee's radiological environmental control course was intended to be presented to CNS radiological department personnel and NPPD general office environmental personnel who would require the skills and knowledge found in the radiological environmental control course to perform the operational environmental monitoring program. Since this course had never been presented and the fact that the NPPD general office environmental affairs professional staff did not have a formal training program, the inspector discussed this observation with the licensee during the exit meeting on April 18, 1990. The licensee indicated that they would evaluate the necessity of presenting this lesson plan on radiological environmental monitoring to the NPPD environmental affairs professional staff and the CNS HP technicians involved in performing radiological environmental monitoring activities in addition to the completion of the specific job performance measures related to environmental sampling.

No violations or deviations were identified.

5. Radiological Environmental Monitoring Program (84750)

The inspector reviewed the licensee's REMP to determine agreement with commitments in Section II.6 of the USAR and compliance with the requirements in Sections 3/4.21.F, 3/4.21.G, and 6.5.1.E of the TS.

The inspector reviewed the licensee's procedures for the administration of the REMP and collection and shipment of radiological environmental samples and determined that they were written with sufficient detail to ensure TS compliance. Selected REMP sample logs, sample receipt forms, and sample data reports for 1988 and 1989 were reviewed. The procedures reviewed are listed in the Attachment to this report.

The inspector reviewed the annual radiological environmental reports for 1987, dated April 18, 1988; -1988, dated April 14, 1989; and -1989, dated March 27, 1990; and determined that the TS sampling and analysis requirements had been met. The inspector noted that the annual land use

census had been conducted for 1987, 1988, and 1989 in accordance with TS requirements and the results of the censuses were included in the respective Annual Radiological Environmental Operating Reports.

The inspector observed that the notification levels for reporting analytical results immediately to the licensee by the contractor laboratory published in Appendix D of the 1988 and 1989 Annual Radiological Environmental Operating Reports for iodine-131, cesium-134, and cesium-137 in ground water and river water were less than the LLDs for the respective radionuclides per Table 3.12.F.2 of the TS. The notification levels for all other radionuclides in the various environmental sample media were greater than the LLDs. This observation was discussed with the licensee at the exit meeting on April 20, 1990. The licensee stated that the inspector's observation would be evaluated.

The inspector observed that several individual gamma spectral analyses of the river water and ground water samples during 1988 and 1989 indicated less than value results which were sometimes greater than the contractor laboratory's "a priori" calculated LLD of 9 pCi/liter for iodine-131 in water. The contractor laboratory's "a priori" LLD of 9 pCi/liter for iodine-131 in water meets TS requirements. An "a priori" LLD is, by TS definition, the smallest concentration of radioactive material in a sample that will be detected with a 95 percent probability above system background. It should be recognized that the LLD is defined as an "a priori" (before the fact) limit representing the capability of a measurement system and not as "a posteriori" (after the fact) limit for a particular measurement. Analyses should be performed in such a manner that the stated LLDs will be achieved under routine conditions. However, occasionally, background fluctuations, unavoidable small sample sizes, the presence of interfering radionuclides, or other uncontrollable circumstances may cause certain LLDs to become unachievable. In such cases, the contributing factors should be identified. The contractor laboratory is not required by TS to perform a radiochemical analysis specifically for iodine-131 in water as the TS require for milk and broadleaf vegetation. This radiochemical analysis provides a much lower LLD value. Therefore, the laboratory reports the LLD for iodine-131 in water from the individual sample gamma spectral analysis which sometimes does not meet the "a priori" calculated LLD. This observation was discussed with the licensee during the exit meeting on April 20, 1990. The licensee agreed to evaluate the inspector's observation and discuss the matter of LLDs for gamma spectral analyses with the contractor laboratory.

The inspector reviewed the licensee's ODAM and determined that it contained the required REMP information in accordance with the TS. It was determined that no changes had been made to the REMP except for the addition and deletion of several TLD and broadleaf vegetation sample stations listed in Appendix C of the ODAM.

The inspector inspected selected environmental media sampling stations associated with the REMP. The following types of sampling stations were

inspected: airborne, river water, ground water, TLD, milk, fish, shoreline sediment, and broadleaf vegetation. The required equipment at the selected sampling stations was in place, calibrated, and operational. During the inspection of the various environmental sampling stations, the inspector verified that the sampling locations were as described in the ODAM and the Annual Radiological Environmental Operating Reports. The inspector observed that several station location descriptions were different between that indicated in the ODAM and the Annual Radiological Environmental Operating Reports due to typographical errors and amendments to the ODAM which had not been incorporated into the annual report sample stations' descriptions. These discrepancies were noted in the location descriptions for Sample Stations 7, 35, 42, 61, 67, 83, 84, 90, and 98. This observation was discussed with the licensee during the exit meeting on April 20, 1990, and the licensee stated that they would review the inspector's observation.

The inspector reviewed the maintenance and calibration records for the REMP air samplers. Calibration and maintenance of these air samplers were being conducted semiannually by the CNS HP department in accordance with an approved procedure. The licensee's radiological environmental air sampler maintenance and calibration program was found to be satisfactory.

The inspector reviewed the CNS environmental TLD program. The CNS HP technicians place and collect the environmental TLDs quarterly and send them to their contractor laboratory for processing. The licensee's environmental TLD results were compared to the NRC TLD results for collocated TLD sites for 1987, 1988, and 1989 and the results were in satisfactory agreement.

The licensee's contractor laboratory participates in the U.S. Environmental Protection Agency's (EPA) Environmental Radioactivity Laboratory Intercomparison Program. The inspector reviewed the contractor laboratory's results of the EPA's crosscheck sample analysis comparisons for 1987, 1988, and 1989, and verified that the results were normally within the EPA's acceptance criteria of three standard deviations of the known EPA values.

No violations or deviations were identified.

6. Meteorological Monitoring Program (34750)

The inspector reviewed the licensee's meteorological monitoring program to determine agreement with the recommendations of Regulatory Guides 1.23 and 1.97 and American National Standards Institute (ANSI/ANS) Standard 2.5-1984.

The meteorological tower data monitoring and recording instrumentation calibration procedures and records were reviewed. It was verified that the meteorological tower instrumentation was being calibrated and maintained semiannually by I&C technicians. I&C technicians, in addition to the semiannual calibration and maintenance program, performed monthly

translator module calibrations in accordance with procedure on the 13 translator modules on the 100-meter tower and the 5 translator modules on the 10-meter tower for a total of 18 modules including the 3 power supplies. The licensee's calibration and maintenance records for the meteorological tower instrumentation were satisfactory. The licensee has no TS requirements for calibration and maintenance of the meteorological tower instrumentation.

The inspector reviewed the licensee's meteorological monitoring system data recovery for 1988 and 1989 and determined that the data recovery for the individual meteorological parameters exceeded the 90 percent recovery level recommended in Regulatory Guide 1.23 with the exception of the 100-meter wind speed and the 10-meter dew point temperature for the 12-month time period during calendar year 1989. The inspector noted that the recovery rate for these parameters during 1989 was 88 percent and 79 percent, respectively. The low data recovery for these meteorological parameters during the calendar year 1989 was the result of equipment problems.

No violations or deviations were identified.

7. QA Program (84750)

The inspector reviewed the licensee's QA audit program for the REMP to determine agreement with commitments in Section XIII of the USAR and compliance with the requirements in Section 6.2 of the TS.

The inspector reviewed the audit reports of QA activities performed during 1988 and 1989 in the areas related to the REMP. The QA audits reviewed are listed in the Attachment to this report. It was noted that the QA audits were designed to determine compliance with the TS, CNS procedures, and the NPPD environmental affairs division procedures. The inspector reviewed the licensee's audit plan, checklist, and findings and confirmed that identified findings were reviewed by licensee's management and that responses and corrective actions to findings had been completed and documented in accordance with QA procedures. The QA audits were performed by qualified auditors who were knowledgeable in radiological environmental monitoring activities at nuclear power facilities. The licensee's QA audits had been performed in accordance with CNS QA procedures and schedules. The inspector verified that the REMP audits were comprehensive and contained sufficient depth to satisfy the TS requirements. The checklists used during the 1988 and 1989 QA audits included a review of the meteorological tower monitoring instrumentation in response to an inspector observation made in the previous NRC inspection of the CNS REMP during September 1987. It was also noted that the QA audit checklist now includes environmental monitoring program sample station checklists.

No violations or deviations were identified.

8. Light Water Reactor Chemistry Control and Chemical Analysis (79501, 79701, 79502)

The inspector reviewed the licensee's water chemistry control and analysis program including establishment and implementation of a water chemistry control program, water sampling, facilities and equipment, and establishment and implementation of a quality control (QC) program for chemical measurements to determine agreement with commitments in Section IV of the USAR and compliance with the requirements in Section 3/4.6 of the TS.

The inspector's review of the water chemistry program found that the licensee had approved administrative procedures, surveillance procedures, chemistry control procedures, sampling procedures, instrument calibration and QC procedures, and analytical procedures. A review of selected procedures revised and approved since the previous NRC inspection of the water chemistry program in October 1988, chemistry logs, analytical data, and 1989 chemistry parameter trend charts indicated that the CNS chemistry section had established sufficient programmatic procedures to meet the requirements of the USAR and TS. The procedures reviewed are listed in the Attachment to this report.

The inspector reviewed selected chemistry section procedures for operation, calibration, and QC of laboratory and in-line process analytical instrumentation. The chemistry analytical instruments had been calibrated in accordance with approved procedures and an instrument QC program had been implemented. The licensee was using independent chemical standards for calibration and QC measurements of chemistry analytical instrumentation. The inspector reviewed 1989 monthly calibration data for the reactor water in-line pH monitor and the 1989 weekly calibration data for the reactor water in-line conductivity monitor. The reactor water in-line process analytical instrumentation had been calibrated properly and in accordance with procedure and TS requirements.

The inspector inspected the facilities and equipment used by the CNS chemistry staff. The chemistry laboratory was equipped with the necessary chemicals, reagents, labware, and analytical instrumentation to perform the required chemistry analyses. The laboratory facility inspected had not changed since the previous NRC inspection of the area in October 1988.

The inspector reviewed chemistry data forms and plots of chemistry parameter data for 1989 to determine compliance with TS requirements. It was verified that TS-required chemistry sampling and analyses had been performed. The review included inspection of the plotted chemistry parameter trends of the reactor water and auxiliary water system's water quality data. The inspector reviewed the records for out-of-specification chemical parameters and the licensee's corrective actions taken when chemical parameters did not meet established chemical control limits. The inspector reviewed the effectiveness of the chemistry control program and determined that the licensee's chemical limits were established according to General Electric fuel warranty specifications, the TS, and the Electric

Power Research Institute chemistry guidelines for boiling water reactors. Operation action levels had been defined in the TS and in plant chemistry control procedures for the various plant operating modes. The licensee had implemented a strong chemistry control program which was substantiated by the very infrequent times chemistry parameters exceeded control limits and how quickly out-of-specification chemistry conditions were returned to normal operating conditions.

No violations or deviations were identified.

9. Contractor Activities (84/50)

The licensee used a contractor laboratory to perform the TS-required radiological environmental sample analyses and the processing of the environmental TLDs. The licensee's program for the oversight of contractor laboratory activities and the QC of analytical measurements by the contractor laboratory were reviewed and found satisfactory. The licensee performed vendor audits biannually with annual evaluations to retain current status on the CNS qualified suppliers' list. The inspector reviewed the latest QA audit performed by the licensee on the contractor laboratory and found the audit satisfactory. The QA audit reviewed is listed in the Attachment to this report.

No violations or deviations were identified.

10. Reportable Occurrences (84750)

The Annual Radiological Environmental Operating Reports in 1987, 1988, and 1989 were reviewed to determine compliance with reporting requirements of Section 6.5.1.E of the TS. The annual reports contained all the information necessary to meet TS requirements. The inspector noted that the licensee was currently including in the reports individual sample data tables which provided detailed analytical data for each environmental sample. This data presentation provided sufficient information to verify the licensee's compliance with Tables 3.21.F.1 and 3.21.F.2 of the TS. The presentation of the individual sample data was in response to an inspector observation made in the previous NRC inspection of the CNS REMP during September 1987. No reportable events were identified from the documents reviewed and discussions with the NPPD environmental affairs division personnel. The inspector determined that the licensee had not written any LERs involving REMP activities since the previous NRC inspection of the CNS REMP in September 1987.

No violations or deviations were identified.

11. Exit Meeting (30703)

The inspector met with the senior resident inspector and CNS representatives denoted in paragraph 1 on April 18, 1990, and with NPPD General Office personnel denoted in paragraph 1 at the conclusion of the

inspection on April 20, 1990. The inspector summarized the scope and findings of the inspection and discussed the inspector's observations for program improvement. The licensee did not identify as proprietary any of the material provided to, or reviewed by, the inspector during the inspection.

ATTACHMENT

Cooper Nuclear Station

NRC Inspection Report 50-298/90-17

Documents Reviewed

<u>Title</u>	<u>Revision</u>	<u>Date</u>
1. <u>Environmental Affairs Department Procedures</u>		
1.0, CNS Environmental Radiation Monitoring Program	9	08/15/89
1.2, Annual Review of Broadleaf Vegetation Sampling Stations	0	05/28/87
1.3, CNS Land Use Census	0	03/01/89
5.0, Cooper Nuclear Station - Action Levels for Environmental Samples	0	08/21/89
7.4, CNSMET - Data Validation	2	01/05/90
7.8, Producing the Semi-Annual Operating Report	2	01/05/90
7.9, Producing the Annual Meteorological Report	2	01/05/90
Cooper Nuclear Station - Environmental Radiation Surveillance Program Sample Collection Schedule	2	01/01/90
Cooper Nuclear Station - Environmental Radiological Monitoring Program Sampling Manual	16	01/01/90
2. <u>Instrument and Control Procedures</u>		
14.3.3, Meteorological Maintenance Procedure	1	02/03/89
14.3.4, Translator Module Calibration Procedure	0	04/28/88
14.3.5, Dew Cell Maintenance	1	05/10/88
14.3.8, Wind Speed and Wind Direction Transmitter Maintenance	0	04/22/88
14.11.9, Esterline-Angus Model MS 424C Recorder Calibration and Maintenance	1	07/09/87
14.11.10, Esterline-Angus Speedservo Recorder Operation and Maintenance	0	03/26/87

	<u>Title</u>	<u>Revision</u>	<u>Date</u>
3.	<u>Health Physics Procedure</u>		
	9.7, CNS Environmental Program	9	08/10/88
4.	<u>Chemistry Procedures</u>		
	8.2.1, Chemistry Analysis and Instrument Calibration Schedule	16	04/09/90
	8.3, Control Parameters and Limits	10	11/06/89
	8.5.3.3, pH Calibration of Reactor Water	4	04/15/87
	8.5.3.4, Conductivity Calibration	7	01/27/88
5.	<u>Quality Assurance (QA) Audits</u>		
	QA Audit Schedules 1988-1990		
	QA Audit Report 88-0, QAP-900: Environmental Radiation Monitoring, performed November 14, 1988, through November 28, 1988		
	QA Audit Report 88-20, QAP-900: Environmental Radiation Monitoring, performed October 3, 1989, through November 14, 1989		
	QA Vendor Audit SA88-40, Teledyne Isotopes, performed October 18-19, 1988		
6.	<u>Cooper Nuclear Station Annual Radiological Environmental Operating Reports</u>		
	January 1 through December 31, 1987		
	January 1 through December 31, 1988		
	January 1 through December 31, 1989		