U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-282; 50-306
License Nos:	DPR-42; DPR-60
Report Nos:	50-282/98014(DRS); 50-306/98014(DRS)
Licensee:	Northern States Power Company
Facility:	Prairie Island Nuclear Generating Plant
Location:	1717 Wakonade Dr. East Welch, MN 55089
Dates:	July 20-24, 1998
Inspector:	R. Glinski, Radiation Specialist
Approved by:	G. Shear, Chief, Plant Support Branch 2 Division of Reactor Safety

EXECUTIVE SUMMARY

Prairie Island Nuclear Generating Plant
NRC Inspection Reports 50-282/98014; 50-306/98014

This announced inspection included a review of the licensee's Process Control Program (PCP), the processing and storage of solid radioactive waste, the shipment and disposal of radioactive material (RAM), and the study conducted to determine the neutron dose rate beyond the berm of the Independent Spent Fuel Storage Installation (ISFSI). In these areas, the following conclusions were made:

- The overall implementation of the RAM transportation program remained effective, as licensee documentation and inspector observations confirmed that the licensee met station and regulatory requirements. (Section R1.1)

- Plant personnel continued to effectively implement the solid radwaste program. In particular, the dewatering equipment was highly reliable and the radwaste storage area surveillances were comprehensive. Plant personnel developed radwaste processing initiatives to improve the efficiency of resin useage and filter drum disposal. (Section R1.2)

- The licensee's program to sample and analyze waste streams for the determination of radionuclide scaling factors remained effective and enabled the staff to appropriately classify radwaste for shipment. Previously identified issues regarding scaling factor determinations and data review were adequately addressed. (Section R1.3)

Report Details

IV. Plant Support

R1 Status of Radiation Protection and Chemistry (RP&C) Controls

R1.1 Transportation of Radioactive Materials

a. Inspection Scope (IP 86750)

The inspector reviewed the applicable procedures which governed the transportation of radioactive material (RAM), and shipping papers associated with specific RAM shipments. Interviews with plant personnel regarding the implementation of the RAM shipping program were also conducted.

b. Observations and Findings

The inspector noted that the RAM shipping personnel were very knowledgeable of transportation processes and federal regulations. The licensee developed several procedures for transporting radioactive waste and materials, and these procedures were clearly written and provided comprehensive guidance to the staff regarding the proper shipment of RAM. All of the shipments reviewed by the inspector were conducted in accordance with the station procedures.

The inspector reviewed the preparation of shipments of radioactive materials and waste, as well as various shipping papers prepared by plant personnel. The inspector verified the calculations for determining the proper transportation designation and waste type associated with representative Type A and Type B shipments. In addition, the shipping manifests and associated paperwork contained the appropriate information regarding waste classification, reportable quantity, physical and chemical form, radiation levels, emergency response information, volume, weight, total activity, the 95% rule for listing nuclides, and were signed by authorized personnel. The inspector also noted that the appropriate radiation surveys were performed, the current scaling factors were used, and a commercial software program was utilized to accomplish the dose-to-curie determination for the applicable shipments.

Plant personnel listed activities of tritium (H-3), carbon-14, technetium-99, and iodine-129 for waste disposal shipments as required by 10 CFR 20, Appendix G. When appropriate, licensee staff utilized the equivalent of NRC Forms 540, 540A, and 541 for the RAM shipments. The radiation protection (RP) staff maintained the current RAM licenses for waste processors and disposal facilities which received their RAM shipments.

c. Conclusions

The implementation of the RAM transportation program remained effective, as licensee documentation and inspector observations confirmed that the licensee met station and regulatory requirements.

R1.2 Solid Radioactive Waste Management

a. Inspection Scope (IP 86750)

The inspector reviewed the storage, processing, documentation, and implementation of the solid radwaste management program. The inspector also conducted walkdowns of the Radwaste Storage Building and the Resin Disposal Building, reviewed the Process Control Program (PCP), and interviewed various radwaste personnel.

b. Observations and Findings

The RAM in the barrel yard of the Radwaste Storage Building (RSB) and in the Resin Disposal Building was appropriately stored, posted, and labeled. The inspector did not identify any housekeeping, materiel condition, or radiological issues. The RP staff has planned to institute a new procedure for processing certain types of liquid waste. The new process involves the evaporation of dilute aqueous solutions of soap (from laundry and decontamination activities), wax, and solvents/cleaning agents, as well as turbine building sump sludge. The resultant solid waste could then be incorporated with other compatible solid wastes. In the past, these solutions have significantly reduced the life of various resin beds. The staff has constructed a fumehood over the evaporation area, and the associated ductwork channels the vapor past the RSB ventilation radiation monitor and through the filtered RSB ventilation system. This process has been approved and incorporated into the PCP, but the plant procedure to govern the implementation was being developed.

Plant personnel have also planned to reinstitute the use of the hydraulic baler to compact old filter storage drums. The baler would require preventative maintenance prior to use for this purpose. After compaction, the staff planned to dispose of these drums as low specific activity waste. Interviews with plant personnel indicated that the dewatering equipment used in both the cask decon sump pit and the barrel yard has remained reliable. A significant portion of the licensee's shipments have been to radwaste processing vendors. Through various technologies, the vendors have reduced the disposed solid radwaste volume by 80%, on average.

The RP staff conducted monthly visual inspections of stored RAM, and monthly radiological surveys of the Radwaste Storage Building and the Resin Disposal Building. The inspector interviewed staff and reviewed the applicable documentation associated with these surveillances for the past several months and noted that these actions were comprehensive. These licensee activities had not identified any problems recently.

c. Conclusions

The inspector determined that the implementation of the solid radwaste management program continued to be effective. In particular, the dewatering equipment was highly reliable and the radwaste storage area surveillances were comprehensive. The staff has developed radwaste processing initiatives which should improve the efficiency of resin useage and filter drum disposal.

R1.3 Solid Radioactive Waste Classification

a. Inspection Scope (IP 86750)

The inspector interviewed staff, and reviewed the procedures and documentation for the sampling and analysis of solid radwaste required by 10 CFR 61 for determining waste classification. The inspector also reviewed the PCP and the most recent 10 CFR 61 waste classification analyses for several waste streams.

b. Observations and Findings

The latest round of samples collected for 10 CFR 61 waste classification analyses included high level and low level resins, dry active waste (DAW), filter media, sludge, and sand blasting grit. The various waste stream samples were taken annually, or when available, to coincide with the generation of a particular waste stream. The resin samples were collected from various batches during sluices, the filter media samples were representative sections cut from exhausted filters, sludge was collected after sump clean up, and the DAW samples consisted of smears taken from the residual heat removal pumps and hot sample chemistry sinks. These samples were then analyzed by a vendor laboratory to quantify the radionuclides present and generate isotopic ratios (scaling factors) for quantifying the difficult to measure isotopes such as transuranics and pure beta emitters. Reactor coolant radiological analyses were monitored by the chemistry staff to ensure that the current scaling factors remained applicable. The radwaste staff entered the radiochemistry data into a commercial software program, which incorporated the new data with past waste stream analyses to generate a combined scaling factor. The inspector concluded that the 10 CFR 61 determinations were appropriate, and the licensee had adequately addressed the scaling factor and data review issues that were identified previously (Inspection Report 97017).

The inspector reviewed the station program to determine the radioactivity content of RAM shipments. To determine the total radioactivity in spent resin for RAM shipments, samples were taken from each resin batch during sluices. The gamma spectrometry was conducted by the chemistry laboratory and the key nuclides (cobalt-60 for activation products, cesium-137 for fission products, and cerium-144 for transuranics) designated to establish scaling factors for difficult to measure nuclides were used to determine the activity of the various nuclides for each shipment. For DAW, the radwaste staff conducted a dose-to-curie analysis using commercial software and the DAW scaling factors. The inspector concluded that the waste classification methodology was appropriate.

The inspector also reviewed the lower limits of detection for the difficult to measure nuclides and determined that the station was in compliance with the guidance in the NRC's "Final Waste Classification and Waste Form Technical Position Papers."

c. Conclusions

The plant's program to sample and analyze waste streams for the determination of radionuclide scaling factors remained effective and enabled the staff to appropriately classify radwaste for shipment. In addition, previous issues regarding scaling factor determinations and data review were adequately addressed.

R8 Miscellaneous RP&C Issues

R8.1 (Closed) IFI 72-10/97017-01: possibility of detectable neutron dose rates outside the Independent Spent Fuel Storage Installation (ISFSI). Preliminary licensee data indicated that measurable neutron dose rates existed outside the ISFSI. In response to this data, the plant personnel implemented a study to measure the neutron dose rate using both personnel and environmental thermoluminescent dosimeters (TLDs) calibrated for gamma and neutron radiation, with and without phantoms (to determine any albedo effects), and at various distances up to 365 meters. There were also control TLDs about 11 miles from the ISFSI and a TLD supplied with cadmium to determine whether the incident neutrons were thermal or of higher energy. Three sets of TLDs were placed out for the last quarter of 1997, the first quarter of 1998, and for the entire six month period, respectively. The licensee employed a contractor with neutron dosimetry expertise to analyze the data and determine the neutron dose associated with the ISFSI. Although the contractor determined that the doses were higher than those listed in the ISFSI Safety Analysis Report, the contractor's analysis also concluded that the neutron dose rate to the nearest actual resident to the ISFSI was well below the direct radiation dose limit specified in 10 CFR 72.104(a). The licensee has planned to revise the ISFSI Safety Analysis Report to incorporate these findings. The inspector conducted independent calculations and also determined that the potential direct radiation dose to an individual was well below the 25 mrem whole body dose limit. This item is closed.

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management on July 24, 1998. The licensee did not indicate that any materials examined during the inspection should be considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Friedrich, Production Engineer
D. Shuelke, General Superintendent of Radiation Protection and Chemistry
J. Sorensen, Plant Manager
P. Wildenborg, Health Physicist

NRC

P. Krohn, Resident Inspector, Prairie Island
S. Ray, Senior Resident Inspector, Prairie Island
S. Thomas, Resident Inspector, Prairie Island

INSPECTION PROCEDURES USED

IP 86750, "Solid Radioactive Waste Management and Transportation of Radioactive Materials"
IP 92904, "Followup - Plant Support"

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

72-10/97017-01	IFI	Possibility of detectable neutron dose rates outside the ISFSI

PARTIAL LISTING OF DOCUMENTS REVIEWED

Process Control Program for Solidification/Dewatering of radioactive Waste from Liquid Systems, Revision 7, D59, dated 6/11/98.

Radiation Protection Implementing Procedure (RPIP) D11.4, Revision 19, "Radioactive Material Shipments Greater Than Type A Quantities in Exclusive Use Vehicles to Barnwell, SC Using SEG Cask and HIC Liner".

RPIP D11.9, Revision 7, "Radioactive Material Shipments - LSA/SCO - Not Exceeding Type A Quantities in Exclusive Use Vehicles to Barnwell, SC".

RPIP 1320, Revision 0, "Monitoring of Rad Waste in Interim Storage".

RPIP 1322, Revision 0, "Radman for Windows to Generate Scaling Factors".

Shipping Packages for shipments 97-028, 97-029, 98-002, and 98-011

Condition Report 19980981, "TN-40 SAR neutron skyshine dose rates error; Skyshine II used for neutron dose rates at long distances reported air-rad, rather than tissue-rad, so it is 100-130 times low.

"MCNP Calculated Near-field Neutron Doses Using a Refined Cask Model", dated 6/1/98.

"Neutron Skyshine Analysis for the Northern states Power Company Prairie island Independent Spent Fuel Storage Installation", dated 7/15/98.

LIST OF ACRONYMS USED

DAW	Dry Active Waste
ISFSI	Independent Spent Fuel Storage Installation
PCP	Process Control Program
RAM	Radioactive Material
RP	Radiation Protection
RPIP	Radiation Protection Implementing Procedure
RSB	Radwaste Storage Building
TLD	Thermoluminescent Dosimeter