U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-282; 50-306; 72-10
Licenses No:	DPR-42; DPR-60; SNM-2506
Reports No:	50-282/96011(DRS); 50-306/96011(DRS)
Licensee:	Northern States Power Company 414 Nicollet Mall Minneapolis, MN 55041
Facility:	Prairie Island Nuclear Generating Plant
Location:	1717 Wakondale Dr. East Welch, MN 55089
Dates:	August 26 through October 4, 1996
Inspector:	R. Gilnski, Radiation Specialist
Approved by:	T. Kozak, Acting Chief Plant Support Branch 2

Report Details

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

R1.1 Dose Control and ALARA Practices for Loading a High Integrity Container (HIC) into a Transportation Cask

a. Inspection Scope (83750)

The inspector reviewed the pertinent procedure/work order, attended the pre-job briefing, interviewed personnel, and observed the transfer of a HIC containing spent resin from the Cask Decontamination Area to a shielded transportation cask.

b. Observations and Findings

The dose rates on the HIC ranged up to 40 rem/h (400 millisieverts/hour (mSv/h)). Attendance at the pre-job briefing was mandatory for all personnel involved in this task. In addition to station personnel directly involved in the HIC transfer, those in attendance included RP supervisors and staff, a Quality Services inspector, and a Site Safety Department representative. The pre-job briefing thoroughly covered the procedure for the transfer and included a description of the ALARA and safety considerations for this task.

The inspector observed the transfer of the HIC from the Cask Decon Area to the shielded transportation cask. ALARA practices observed included the following: (1) remote cameras, remote radiation meters, and headsets, (2) a plumb bob to decrease the time required for the crane operator to align the HIC with the cask, (3) extra tow lines to decrease the time to required to stop HIC motion, (4) extra postings around the transfer area and locking or placing guards at doors leading to the loading area to prevent inadvertent access, and (5) the use of shielding for transfer personnel. RP provided extremity monitoring to those individuals who worked near the HIC before and after the transfer.

Data from electronic dosimeters (EDs) on workers associated with the transfer, including transfer preparations, indicated the collective dose for this task was 249 millirem (2.49 mSv). The dose expended was low considering the dose rates on the exterior of the cask.

c. Conclusion

The implementation of radiological controls during the transfer of a HIC containing spent resin was characterized by detailed ALARA initiatives, an effective pre-job briefing and efficient job management.

R1.2 Implementation of the Declared Pregnant Woman (DPW) Program

The inspector reviewed the licensee's Radiation Protection Implementing Procedure (RPIP) 1107, "Unborn Child Protection", interviewed an RP supervisor, and

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R1.2 Implementation of the Declared Pregnant Woman (DPW) Program

The inspector reviewed the licensee's Radiation Protection Implementing Procedure (RPIP) 1107, "Unborn Child Protection", interviewed an RP supervisor, and

interviewed a station radiation worker who recently was trained on the program. The procedural requirements of RPIP 1107 met applicable regulations and established administrative limits for those in the program. The individual recently trained on the program indicated that the information she received was thorough and that the RP staff tracked her job assignments and radiation dose closely. RP records indicated that this individual received 97 mrem during the gestation period, which was well below both the regulatory limit of 500 mrem and the licensee's administrative limit of 180 mrem. The inspector concluded that the licensee effectively implemented their DPW program.

R1.3 Tours of Radiological Controlled Areas Within the Plant

a. Inspection Scope (83750)

The inspector toured the facility with a operator and a Radiation Protection Specialist (RPS) on separate occasions. In addition, the inspector reviewed records and interviewed RP staff.

b. Observations and Findings

During the plant tours, the inspector noted that postings and survey maps appropriately reflected plant conditions. The inspector verified selected survey data with an energy compensated Geiger-Mueller instrument (RamGam) and no incorrectly posted areas were identified. In general, housekeeping was good and no significant radiological impediments to routine work activities existed. The RP staff indicated that there were no areas which were rendered inaccessible due to high contamination levels.

The RP department recently decontaminated several areas. The filter room was partially decontaminated to allow easier access for operators, with only gloves required to manipulate equipment. The containment spray pump, safety injection pump, and spent resin tank rooms were decontaminated and access is unimpeded to these areas. In addition, permanent shielding was installed in the spent fuel pit ion exchange room, and decontamination of this room is planned to be completed later this year.

The general radiation work permit (RWP) stated that workers whose electronic dosimeter (ED) alarmed were required to leave the area immediately and contact RP. In 1996, the licensee logged about 175 ED alarms, most of which occurred during the outage. Nearly all the ED alarms were for exceeding the dose rate for the RWP; however one reactor coolant filter change-out task resulted in an accumulated dose alarm for one worker, as well as dose rate alarms for six other workers.

When asked about the RP department's response to an alarming ED, RP staff indicated that the practice was to log the incident, but any further evaluations such as to determine if the ED malfunctioned or if additional radiation surveys were warranted was not required. RP procedures did not require an evaluation for alarming EDs. The lack of procedural or other clear guidance on actions to take

when an ED alarm occurred resulted in varied responses to this situation by the RP department.

The inspector discussed the inconsistent response to alarming EDs with RP staff who acknowledged that the inconsistent actions were a concern. The licensee had initiated an action item in August 1996 to address this issue. RP staff have indicated that changes would be made in RP procedures and work control processes to strengthen the RP program in this area.

c. Conclusion

The RP staff has continued to exercise excellent control of radiological conditions within the plant, as evidenced by decontamination activities and good housekeeping. However, the inspector identified a weakness in the RP department's evaluation of ED alarms. This matter will be reviewed during a future inspection (Inspection Follow-Up Item 96011-01).

R1.4 Spent Resin Tank Room Decontamination

a. Inspection Scope (83750)

The inspector interviewed several RP staff regarding the circumstances that led to an unexpected intake and the external contamination of three workers during a modification to the spent resin tank. The following documentation was reviewed: (1) radiological survey data, (2) dose assessments, and (3) an Internal Operating Experience Assessment (ERTF Report 96-13). The inspector also conducted a walkdown of the spent resin tank room.

b. Observations and Findings

On September 18, 1996, to provide access to the spent resin tank (SRT) room from the waste gas decay tank (WGDT) room, two station laborers removed several layers of grouted concrete blocks. After the blocks had been removed, an RPS surveyed the SRT room to determine radiation and loose surface contamination levels. General area radiation levels were determined to be 10 millirem/hour (0.1 millisieverts/hour). Two smears were obtained to determine the loose surface contamination levels in the room and were analyzed by the RPS on the smear counter located at the RCA access control point. The RPS determined that the maximum contamination level was about 45,000 dpm/100cm^2. Based on this result, the RPS determined that no special radiological controls were needed and indicated to the two workers that they could begin their decontamination activities. The RPS provided continuous coverage of the work.

As the decontamination of the SRT room was in progress, an RP supervisor and a lead RPS reviewed the smear counter printout for the two smears. They determined that the level on the highest smear was actually 450,000 dpm/100cm^2 and that the other smear indicated a level of 220,000 dpm/100cm^2. They discussed the controls

which would be needed for the job given the high contamination levels but were unaware that the job was already underway.

RPIP 1121, Revision 13, "RWP Issue" states that process or engineering controls such as double suit-up, extra step-off-pads, or extra boundaries are required when working in areas where contamination levels exceeded 100,000 dpm/100 cm^2. RPIP 1121 also indicates that use of respiratory protection should be considered for work activities likely to create airborne contamination, such as general area contamination levels in excess of 100,000 dpm/100 cm^2.

Once the decontamination was completed, the RPS and the laborers returned to the RCA access control point and performed personal surveys. All three alarmed the friskall and contamination was found on their clothing, skin, and nasal passages. Whole body counts (WBC) of the workers were conducted over the next several days. The licensee determined that one of the individuals received an intake of radioactive material during the work. The station health physicist estimated that each worker received less than 25 millirem from exposure to internal/external contamination. An independent calculation of the dose to the workers by NRC inspectors was in reasonable agreement with the licensee's calculations.

The failure to accurately evaluate the radiological conditions of the SRT room is a violation (VIO 50-282/96011-02; 50-306/96011-02) of 10 CFR 20.1501 which states, in part, that each licensee shall make or cause to be made, surveys that may be necessary for the licensee to comply with the regulations of Part 20 and that are reasonable under the circumstances to evaluate the potential radiological hazards that could be present. In addition, 10 CFR 20.1701 requires that the licensee shall use, to the extent practicable, process or other engineering controls to control the concentrations of radioactive material in air. The inadequate evaluation of the smears led to an inaccurate assessment of the radiological conditions in the SRT room, and, as a result, process or engineering control measures were not used to control the concentrations of radioactive material in air.

The inspector and NRC Senior Resident Inspector toured the SRT room. This room had been inaccessible from the initiation of commercial operation until September 1996. The inspectors noted the tank was constructed of stainless steel and there was no indication of any rust or other types of corrosion.

c. Conclusions

One violation concerning the inadequate evaluation of radiological conditions in the SRT room was identified. The inspectors concluded that a lack of adequate communication to the RP access control point that the SRT room work was initiated contributed to the problem.

R2 Status of RP&C Facilities and Equipment

R2.1 Calibration and Function Checks of Radiation Detection Instrumentation

a. Inspection Scope (83750)

The inspector reviewed the calibration procedures, records, and activities for the EDs, portable survey meters, friskers, friskalls, portal monitors, tool monitors, and the whole body counter (WBC). The inspector also interviewed personnel primarily responsible for calibrations and observed calibration activities.

b. Observations and Findings

A review of calibration records for the past two years indicated that the various calibrations have been conducted in accordance with station procedures with regard to frequency, radiation range, and material condition. The inspector observed that the RPS primarily responsible for calibrations was experienced and knowledgeable. The calibration facility was well maintained, the RPS conducted calibrations as specified, and out-of-service meters were physically segregated to prohibit their use. During the various aspects of this inspection, all the instruments observed throughout the plant were within calibration.

The inspector observed that the functional checks of the radiation detection instruments were performed according to station procedures. The inspector also noted that functional checks for most of the fixed monitors was conducted with sources having activity comparable to the alarm set points, ensuring that the instrument would alarm as required. The alarm set points for the friskalls were tested immediately after calibration and were subsequently source checked with a potassium chloride source.

The WBC was calibrated with a radionuclide mix traceable to the National Institute for Science and Technology (NIST). The current calibration was comparable to the previous calibration, indicating that the WBC has remained stable. The inspector noted that the WBC functional checks were performed as specified and that both the peak location and source activities were logged.

Interviews with the RP staff indicated that there have been very few operability problems with the radiation detection instrumentation.

c. Conclusions

Observation of calibration activities and the performance history for regular function checks indicated that calibration and operability of the radiation detection instruments has remained excellent.

R2.2 Surveillance Activities for the Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope (83750)

The inspector reviewed the ISFSI Technical Specifications (TS) and environmental survey data, interviewed staff regarding the ISFSI, observed the performance of radiation surveys, and conducted a gamma survey of the casks.

b. Observations and Findings

The inspector reviewed Pressurized Ion Chamber (PIC), thermoluminescent dosimetry (TLD), and smear data in the ISFSI area for 1996. The data indicated no removable activity on the casks or pads and the radiation levels were consistent with expectations. The PIC data was slightly elevated in June due to the placement of Cask #4. The data from the TLDs mounted on the inner fence indicated, on average, radiation levels less than twice the natural background radiation level (control value). The exposure data from TLDs located beyond the earthen berm was indistinguishable from the control value.

The inspector observed an ISFSI radiation survey, which consisted of a gamma/neutron survey and smears of the casks and pads. The survey was performed in accordance with procedure. The presence of TLDs required by the TS were verified by observation. The inspector also conducted a limited gamma survey of the casks with a RamCam and the radiation levels detected were consistent with the licensee's survey data.

c. Conclusion

The TS radiation survey requirements and monitoring procedure for the ISFSI were well implemented as demonstrated by environmental and RP survey data, and observation of various ISFSI activities.

R5 Training and Qualification in RP&C

R5.1 Initial and Continuing Training for RPS Staff

a. Inspection Scope (83750)

The inspector interviewed the RP Instructor, RP supervisors, and RP staff regarding initial and continuing training. The inspector also observed several RPSs' conduct a variety of RP activities.

b. Observations and Findings

The RP staff and instructor indicated that initial qualification generally required about one year of classwork and on-the-job training (OJT). The RP instructor was a Senior RPS just prior to assuming the training position, which enabled him to bring his RP

experience to the training department. The classwork covered basic RP concepts and communication skills, and the OJT covered tasks conducted by an RPS.

The licensee has developed a Program Advisory Committee (PAC) to advise the training department regarding topics for continuing RPS training. The PAC (composed of the General Superintendent for Radiation Protection, an RP supervisor, the RP instructor, and a training supervisor) surveyed the RPS staff and applicable industry events for training topics. The PAC also identified subject matter experts to provide training. The trainer indicated that plant events such as the spent resin tank room survey problem are normally covered during RPS continuing training.

c. Conclusion

The initial and continuing training program for an RPS ensured that these individuals were qualified to perform the assigned tasks competently.

R7 Quality Assurance in RP&C Activities

R7.1 Quality Assurance for Personnel Dosimetry

a. Inspection Scope (83750)

The inspector reviewed quality control (QC) records for personnel dosimetry and interviewed the Health Physicist (HP) regarding the quality of the dosimetry analyses.

b. Observations and Findings

The station HP indicated that the TLDs used by the plant for personnel dosimetry were processed by a vendor laboratory. The inspector verified that the vendor has maintained its National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for TLD dosimetry for Categories I-IX. A review of the vendor's Quality Assurance and Status reports indicated that the overall quality of the vendor's dosimetry capabilities has remained excellent.

The inspector also reviewed the licensee's TLD quality control data. The licensee's TLD QC program consisted of having their vendor analyze TLD badges that had been exposed to known quantities of radiation by an independent third-party laboratory. The results of the QC tests were also excellent.

c. Conclusion

The licensee continued to ensure that the capability of their dosimetry vendor has remained excellent.

R8 Miscellaneous RP&C Issues

R8.1 (Closed) Follow-Up Item 50-282(306)/96002-10: Identification of foreign material in ventilation systems. An NRC inspector had conducted a walkdown of ventilation

systems and identified foreign material, which consisted of an unknown liquid in the control room special ventilation system and an ink pen in the shield building ventilation system.

The licensee removed the material and also replaced a light bulb in the control room filter housing. The licensee's corporate laboratory conducted a variety of analyses and determined that the liquid was primarily dioctyl phthalate, the chemical used for HEPA filter testing. The system engineer indicated that various portions of the ventilation systems were now examined on a weekly basis. The inspector walked down these ventilation systems and noted that there was no foreign material. This item is closed.

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management during an interim exit meeting on August 30, 1996 and a final exit meeting on October 4, 1996. The licensee did not indicate that any materials examined during the inspection should be considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Wadley, Plant Manager
D. Schuelke, General Superintendent of Radiation Protection and Chemistry
P. Wildenborg, Health Physicist
G. Malinowski, Radiation Protection Supervisor
A. Johnson, Radiation Protection Supervisor
D. Gauger, Senior Plant Chemist
J. Hill, Manager of Quality Services
F. Englett, Radiation Protection Instructor

NRC

S. Ray, Senior Resident Inspector, Prairie Island

Inspection Procedure Used

IP 83750, "Occupational Exposure"

Items Opened and Closed

Opened

50-282, 306/96011-01	IFI	Inconsistent RP response to ED alarms.
50-282, 306/96011-02	VIO	Inadequate survey of spent resin tank room.

Closed

50-282, 301/96002-10	IFI	Identification of foreign material in ventilation systems.

LISTING OF DOCUMENTS REVIEWED

Updated Safety Analysis Report Section 7, Table 7.5-3.

Prairie Island Independent Spent Fuel Storage Installation Technical Specifications Revision 1, Surveillance Requirements 4.6.2, dated 3/17/94.

Prairie Island Radiation Protection Implementing Procedure (RPIP) 1501, Revision 6, "Radiation Protection Instrument Calibrations".

Prairie Island RPIP 1518, Revision 4, "Integral Tool Monitor - Description, Operation, and Calibration".

Prairie Island RPIP 1524, Revision 6, "NNC Friskall - Description, Operation, and Calibration".

Prairie Island RPIP 1125, Revision 7, "Radiation Occurrences".

Prairie Island RPIP 1051, Revision 0, "ISFSI Cask Radiation and Contamination Monitoring".

Prairie Island RPIP 1107, Revision 1, "Unborn Child Protection".

Prairie Island Work Order #9607632, "Procedure to Load HIC from Shield Cask into 10-142A Transport Cask".

Prairie Island RPIP 1302, Revision 8, "Unconditional Release of Materials".

Prairie Island RPIP 1121, Revision 13, "RWP Issue".