U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Northern States Power Company
Facility:	Prairie Island Nuclear Generating Plant
Location:	1717 Wakonade Dr. East Welch, MN 55089
Dates:	August 25-29 and September 8-12, 1997
Inspector:	R. Glinski, Radiation Specialist
Approved by:	G. Shear, Chief, Plant Support Branch 2 Division of Reactor Safety

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EXECUTIVE SUMMARY

Prairie Island Nuclear Generating Plant
NRC Inspection Reports 50-282/97017; 50-306/97017; 72-10/97017

This inspection included various aspects of the licensee's radiation protection program, with emphasis on the following areas:

- Radiological Environmental Monitoring
- Plant Water Quality
- Chemistry Quality Assurance/Quality Control
- Radwaste Handling Systems
- Transportation of Radioactive Materials

The following conclusions were reached:

- The Radiological Environmental Monitoring Program was effectively implemented in accordance with the Offsite Dose Calculation Manual, and the data demonstrated that there was not a discernible impact on the environment from plant operations (Section R1.1).

- Plant water quality and fuel integrity remained excellent, and the chemistry and operations departments cooperated to continually improve water quality. Hideout return data (anions concentrating in steam generator crevices) indicated that there was no significant corrosion of the secondary systems (Section R1.2).

- The radwaste staff training, procedure revisions, and shipment preparations were implemented in accordance with the new Department of Transportation and NRC regulations (Section R1.3).

- Overall, the determination of the radionuclide scaling factors was effective for achieving compliance with 10 CFR Part 61 waste classification. However, radwaste staff did not include the latest data for two radionuclides for scaling factor calculations due to inattention to detail and the lack of independent review (Section R1.4).

- The Independent Spent Fuel Storage Installation (ISFSI) survey requirements and environmental monitoring were well implemented, and the inspector's gamma/neutron survey data was consistent with station data. Preliminary licensee data indicated that there may be a detectable neutron dose rate outside the ISFSI berm. However, the NRC staff determined that there is no health and safety risk and the dose rates are well below Technical Specification and regulatory limits. The regional office will conduct further review of this issue as additional data is collected (IFI 72-10/97017-01) (Section R2.1).

- The implementation of the solid radwaste management programs was successful and the materiel condition of the radwaste building and the equipment utilized for handling and storing radwaste was excellent (Section R2.2).

- Plant personnel were generally knowledgeable of their responsibilities and conducted work activities in accordance with station procedures and good ALARA practices. However, recent inappropriate decisions regarding scaling factor determinations and unconditional release of bulk material by plant staff were based solely on past experience without sufficient consideration for recent plant changes and developments (Sections R1.4 and R4.1).

- The Quality Assurance/Quality Control and materiel condition of the laboratory and process instrumentation were excellent; however, staff experienced problems measuring some analytes at accident concentrations or in the presence of high boron concentrations (Section R7.1).

- Generation Quality Services observation reports were comprehensive and examined significant performance areas and the audit staff identified and followed up issues to ensure station compliance (Section R7.2).

Report Details

IV. Plant Support

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

R1.1 Implementation of the Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope (IP 84750, IP 80721)

The inspector reviewed the 1995 and 1996 Annual REMP reports, representative 1997 REMP data, the Offsite Dose Calculation Manual (ODCM), the 1996 Land Use Census, and the REMP sampling procedures. In addition, the inspector observed air, water, and milk sampling, and interviewed plant staff regarding the REMP program.

b. Observations and Findings

The inspector observed that the air sample collection technique ensured sample integrity, and that the samples were appropriately labeled and packaged for shipment. Review of the air collection worksheet revealed that staff correctly calculated the total air sample volume. Plant staff also verified that there were no air leaks within the sampling apparatus which would invalidate the volume calculation. The inspector did not identify any concerns regarding the materiel condition of the air sampling equipment or the rotameter calibration.

The inspector observed collection of surface and well water. Plant staff flushed the spigots, rinsed the containers, and collected the water in accordance with procedure and accepted sampling practice. At the collection of Plant Well #2, the inspector noted that the pump seal leaked while the pump was operating. REMP staff reported this leak to the control room. Milk collection was also conducted per procedure.

The REMP program included the collection and analysis of air, water (surface, drinking, and ground), milk, vegetation, fish, aquatic inverterbrates, and river sediment. In addition, an inner and outer ring of thermoluminescent dosimeters (TLD) were exchanged quarterly to measure direct radiation. Plant personnel conducted the REMP sampling, analyses, reporting, and Land Use Census in accordance with the ODCM. In particular, the inspector noted that the vendor laboratory analyzed the samples to detection limits which were below the required values.

The 1995 and 1996 annual REMP reports were submitted by the appropriate date and contained all the data and deviations required by the ODCM. The reviewed REMP data, including groundwater data from onsite and offsite wells, from 1995 to 1997 indicated that there was no discernable radiological impact on the environment from plant operations and that all the sampling sites were located as described in the ODCM. The inspector noted that the 1996 REMP report listed a milk sampling site which had ceased operations in March 1995. The radiation protection (RP) staff reviewed the status of this sampling site and subsequently removed it from the sample site listing.

c. Conclusions

The REMP was well implemented in accordance with the ODCM, and data showed that plant operations did not have a discernible radiological impact on the environment.

R1.2 Control of Plant water Quality

a. Inspection Scope (IP 84750)

The inspector reviewed the Updated Safety Analysis Report (USAR), procedural chemistry guidelines, and 1997 water quality data for the primary and secondary systems. The inspector also observed water treatment equipment and interviewed staff regarding actions to improve plant water quality.

b. Observations and Findings

Plant water quality during power operation remained excellent. The inspector noted that plant staff maintained the chloride, sulphate, fluoride, and conductivity levels in both systems well below the Electric Power Research Institute (EPRI) Action Level 1 guidelines. The feedwater (FW) iron, dissolved oxygen, and hydrazine levels were also maintained below the EPRI Action Level 1 guidelines, although the FW iron levels were slightly higher than the plant goal. The inspector observed that the recent initiative to use 3-methoxypropylamine (MPA) as the secondary pH control agent, in conjunction with macroreticulate resins, had reduced the FW iron levels. The dose equivalent iodine data indicated that there were no fuel integrity problems.

The inspector noted that the acetate and formate levels in the secondary system were noticeably higher than the inorganic anions. Chemistry personnel indicated that the presence of organic anions was due to amine breakdown and to the injection of a titanium chelate used as a corrosion inhibitor. Chemistry supervision stated that organic anions do not "hideout" (concentrate) in the steam generator crevices, and may add a small benefit as pH buffers. The most recent "hideout return" study showed that the return levels were two - five times higher than the previous Unit 2 cycle, but that the cation to anion ratio was more balanced. Due to the lack of significant "hideout return" prior to achieving low power and temperature, staff concluded that no significant fouling of the Unit 2 systems had occurred during the cycle. The inspector determined that site staff used proper methodology for the "hideout return" study conclusion.

Although plant water quality has remained excellent, chemistry personnel have implemented the following initiatives to further improve water quality: (1) staff use of MPA as the pH control agent and a macroreticular resin in the mixed bed reclaim demineralizer decreased steam generator sodium and FW iron levels, and resulted in a two-to-three fold increase in resin run time; (2) decreasing FW sodium and sulfate levels by treating the condenser tube sheet with a resin coating to plug minute leaks between the condenser tubes and tube sheet; and (3) decreasing sodium levels in makeup water by replacing rather than regenerating the water treatment polishing resin. The use of macroreticular resin also for the spent fuel pool demineralizer has resulted in a decrease in spent fuel pool sulfate and an increase in resin run times of two-to-three fold.

Plant staff from the chemistry and operations departments exhibited excellent communication and cooperation to improve water quality. These departments collaborated to implement the practice of replacing rather than regenerating the water treatment polishing resin to reduce sodium levels. In addition, these plant personnel worked together to maintain appropriate dissolved oxygen levels in the Unit 1 condenser. This condenser had been operated at a pressure which caused chemistry staff to inject oxygen to achieve the oxygen level required to maintain the protective oxide layer and minimize corrosion product transport. Collaboration resulted in condenser operation at a lower pressure which resulted in the proper dissolved oxygen level without the need to inject oxygen.

c. Conclusions

Plant water quality and fuel integrity remained excellent, and the chemistry and operations departments cooperated to continually improve water quality. Hideout return data for the Unit 2 outage indicated a more balanced cation/anion ratio, and no significant corrosion of the secondary systems was identified.

R1.3 Transportation of Radioactive Materials

a. Inspection Scope (IP 86750, TI 2515/133)

The inspector reviewed the radioactive material (RAM) transportation program, including an assessment of training and qualifications of shipping personnel, transportation of low specific activity (LSA) material and surface contaminated objects (SCO), expansion of the radionuclide list, changes in radioactivity limits, and the use of international system (SI) units. Several transportation procedures and shipping manifests were also reviewed to determine compliance with new shipping regulations.

b. Observations and Findings

Department of Transportation (DOT) and NRC regulations for the transportation of RAM were significantly changed on April 1, 1996. The inspector noted that the licensee's training program addressed the updated DOT and NRC regulations and that the program was effectively implemented. The RP staff members authorized to ship RAM successfully completed a 1997 vendor-supplied training course detailing the regulatory changes. Radiation Protection Specialist (RPS) and Nuclear Plant Service Attendant (NPSA) personnel received onsite task specific training regarding radwaste shipments. Overall, the RAM shipping personnel were knowledgeable of the updated transportation regulations.

The inspector reviewed the station procedures for transporting LSA, SCO, and other types of radioactive materials. The RP staff had revised the shipping procedures to achieve compliance with the revised regulations.

The RP staff utilized a commercial software program for calculating various values to appropriately classify radioactive waste (radwaste) and prepare shipping papers. At the time of this inspection, staff were in the process of incorporating a new revision of this software into plant procedures and practice, therefore the old and new versions were being used concurrently to ensure that the new version performed adequately.

The inspector reviewed the shipping papers associated with three SCO shipments and verified that the determination of SCO-I and SCO-II were based on current regulatory contamination limits. The inspector also reviewed shipping papers associated with representative LSA, Class A, Class B, and Type A shipments, and verified the calculations for determining the proper transportation designation and waste classification. Review of shipping data produced by the software showed that the current scaling factors were utilized by the shipping staff. The station has not transported and has no plans to transport any LSA-III material. The reviewed documents and transport vehicle surveys demonstrated that shipments were conducted as Exclusive Use when applicable.

The shipping manifests and associated paperwork contained the proper information regarding waste classification, reportable quantity, physical and chemical form, radiation levels, emergency response information, volume, weight, total activity (in SI units), the 95% rule for listing nuclides, and were signed by authorized personnel. In addition, the activities of tritium, carbon-14, technecium-99, and iodine-129 for waste disposal shipments were listed as required by 10 CFR 20, Appendix G. When applicable, the licensee utilized the equivalent of NRC Forms 540, 540A, and 541 for RAM shipments. In accordance with procedure, the RP staff possessed the current licenses for the facilities to which RAM shipments were made.

The radwaste personnel possessed the current table of A_1 and A_2 values for the expanded list of radionuclides to ensure that packages would not exceed their allowable quantities. The inspector independently selected A_1 and A_2 values generated from the RP shipping software computer (cobalt-60, zinc-65, cesium-137, antimony-124, and several transuranics) and verified that the new values were utilized. The inspector observed plant personnel retrieve the values from the computer software.

c. Conclusions

The inspector determined that the training, procedure revisions, and shipment preparations were implemented in accordance with the new DOT and NRC regulations.

R1.4 Solid Radioactive Waste Classification

a. Inspection Scope (IP 86750, TI 2525/133)

The inspector interviewed staff, and reviewed the procedures and documentation which controlled sampling and analysis of solid radwaste to ensure compliance with 10 CFR 61 requirements for determining waste classification. The inspector also reviewed the Process Control Program (PCP) and the 1996 waste classification analyses for five waste streams conducted by an independent laboratory.

b. Observations and Findings

Solid radwaste classification involved the periodic collection of samples to radiologically characterize resins, dry active waste (DAW), filter media, and sludge from various waste streams within the plant. These waste samples were collected annually or as available. The 10 CFR 61 samples were analyzed by a vendor laboratory to quantify the radionuclides present, particularly the difficult to measure isotopes (transuranics and pure beta emitters). The radwaste staff entered the concentrations of the detected radionuclides into a commercial software program which incorporated the new data with past waste stream analyses to generate a combined scaling factor. Reactor coolant radiological analyses were monitored by the chemistry staff to ensure that the current scaling factors remained applicable.

The inspector reviewed the most recent combined scaling factor determination which was conducted in February 1996. The 1996 radioanalytical results were similar to data from previous years, therefore the scaling factors were only slightly changed. However, the inspector noted that the 1996 analysis for americium-241 (Am-241) had not been incorporated into the combined scaling factor calculation for the secondary system filter waste stream. This latest Am-241 concentration was slightly higher than the previous analyses, but the change in the combined scaling factor (0.00137) would have been minimal. The inspector determined that this omission of the new Am-241 data from the scaling factor calculation was due to inattention to detail by radwaste personnel.

The inspector also identified that a scaling factor for tellurium-123m (Te-123m) was not calculated, even though this nuclide was detected in four of the five waste streams submitted for analysis. Radwaste staff indicated that a scaling factor was not determined as this radionuclide had not been reported in previous years, and that this result was probably due to the presence of scandium-47 (Sc-47) which has been detected in plant systems. A misidentification is possible, as Sc-47 has a gamma photon near the energy of the Te-123m photon, 159 keV and 160 keV, respectively. However, the inspector noted that the half-life for Sc-47 was only 3.4 days, while the Te-123m half-life was 117 days; and the Te-123m photon had a higher abundance; 84% as compared to 73% for Sc-47.

Further review showed that the secondary resin waste stream sample was collected 62 days prior to the laboratory receipt of the sample, and this elapsed time would have constituted over 18 half-lives for Sc-47 - but only 0.5 half-lives for Te-123m. The only waste stream sample which did not show the presence of Te-123m was the primary resin waste stream which was collected 20 months, or over 5 half-lives for Te-123m, prior to sample receipt by the laboratory. The large elapsed time between the sampling and analysis is due to the fact that primary resins can only be sampled periodically during resin transfers within the plant. Based on all the available information, the inspector questioned whether the radwaste staff had sufficient technical justification to discount the presence of Te-123m in the waste streams. RP supervision indicated that plant systems and waste streams would be re-evaluated for the presence of Te-123m.

The omission of Te-123m did not significantly change the waste classification for these waste streams, as the scaling factors would have ranged from 8.5E-4 to 4.7E-3, and there was no health and safety risk. The inspector also identified that the 1996 scaling factor determination did not have any supervisory review, which might have identified the omissions of Am-241 and Te-123m. RP management stated that the combined scaling factor determination would be reviewed by supervisory staff in the future.

The inspector reviewed the station program to determine the radioactivity content of RAM shipments. Spent resin samples were collected by the radwaste staff for radiological analysis to determine the isotopic and activity content of each radwaste stream. Plant staff conducted gamma spectrometry to quantify the key nuclides (cobalt-

60, cesium-137, and cerium-144) designated to establish scaling factors, and these analytical results were then used to determine the radiological content of the shipment. For DAW and filters, the radwaste staff conducted a dose-to-curie analysis using commercial software and the applicable scaling factors.

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

c. Conclusions

Overall, the determination of the radionuclide scaling factors was effective for 10 CFR 61 compliance. However, radwaste staff did not include the latest Am-241 data for one waste stream and there was insufficient technical justification for the omission of Te-123m scaling factors. This did not present a health and safety risk. The inspector noted that both inattention to detail and the lack of review contributed to these omissions.

R2 Status of RP&C Facilities and Equipment

R2.1 Surveillance Activities for the Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope (IP 84750, IP 83726, IP 60855)

The inspector reviewed the ISFSI Technical Specification (TS), and environmental and cask survey data. The inspector also interviewed personnel regarding the ISFSI and conducted a gamma/neutron dose rate survey of the cask area.

b. Observations and Findings

The inspector reviewed thermoluminescent dosimetry (TLD), gamma/neutron, and smear survey data for the past four quarters. This data indicated that the gamma/neutron dose rates and contamination levels of the casks were well below the TS requirements. The data for the TLDs located inside the earthen berm showed an increase from 29.5 millirem per quarter (mem/qtr) for the fourth quarter of 1996 to 52.4 mrem/qtr for the second quarter of 1997, which was due to the placement of the fifth and sixth casks. However, the dose rates measured by the TLDs outside the berm have remained indistinguishable from the control TLD data, 18.9 mrem/qtr and 17.0 mrem/qtr, respectively. The inspector's dose rate survey data at various distances from the casks were consistent with the licensee's data. As indicated in RP survey data, the inspector confirmed that the neutron dose rates around the bottom circumference of these casks, which does not contain neutron shielding, were approximately ten times higher than the dose rates along the sides of the casks. The inspector observed that the TLDs required by the TS, the radiological posting on the ISFSI perimeter fence, and the periodic radiological surveys were in accordance with regulatory and procedural requirements.

During interviews, RP supervisory staff stated that they had conducted a preliminary study with personnel neutron TLDs in an attempt to determine whether there was a measurable neutron dose rate outside the ISFSI earthen berm. The RP staff collected this TLD data from June through September 1996. The data appeared to show that the neutron dose rates outside the berm were detectable, although the results were near the detection limit of the methodology which would include large uncertainties. Due to the preliminary nature of the data, no conclusions can be drawn and NRC staff have determined that there is no health and safety risk. In addition, the plant staff was developing further tests to determine whether there is a measurable neutron dose rate outside the berm which is discernable from natural background. The regional office will review this issue further as an Inspection Followup Item (IFI 72-10/97017-01). All of the data collected to date demonstrate that the ISFSI meets the TS dose rate requirements, and the annual whole body dose limit of 25 millirem to members of the public stated in 10 CFR 72.104.

c. <u>Conclusions</u>

Overall, the ISFSI survey and environmental monitoring requirements were well implemented, and the inspector's gamma/neutron survey data (which was well below the TS limits) was consistent with plant RP data. Preliminary licensee data indicated that there may be a detectable neutron dose rate outside the ISFSI berm. The NRC staff determined that there is no health and safety risk associated with the apparent increased neutron dose rate, and the regional office will review additional data regarding this issue as an Inspection Followup Item.

R2.2 <u>Storage and Handling of Solid Radioactive Waste and Radioactive Materials</u>

a. <u>Inspection Scope (IP 86750)</u>

The inspector reviewed the solid radwaste and RAM management program. The inspector performed walkdowns and radiological surveys of the solid radwaste handling equipment and radwaste storage facilities. The inspector also reviewed the USAR, the PCP, and radwaste procedures, and conducted interviews with radwaste personnel. The radwaste equipment which was observed included the following:

- Boric Acid Evaporator Tank rooms
- Chemical Volume Control System tanks
- Boric Acid Evaporator Concentrator rooms
- Auxiliary Drain and Monitoring tanks
- Dewatering liners, pumps, and hoses
- Reverse Osmosis Main Control Panel and System
- Valve galleries and piping for various radwaste tanks

b. <u>Observations and Findings</u>

Prior to shipment, solid radwaste was stored in the barrel yard of the Radwaste Building (RWB). The inspector observed that RAM stored in the RWB was properly controlled and inventoried. There was only one container of mixed low-level waste currently stored onsite. The inspector's radiation survey indicated that the radiation postings, the container labels, and most recent radiation survey of the RWB were appropriate. There are currently no requirements to periodically inspect the radwaste containers, but RP staff have discussed initiating periodic visual inspections. The RWB was serviced by a particulate-absolute-charcoal (PAC) filtration system and a TS-required effluent radiation monitor. The inspector observed the teasing of a similar PAC filtration system in the auxiliary building and noted that this testing employed appropriate methodology. The RWB equipment and activities were in compliance with the USAR description.

The inspector conducted a walkdown of the various tanks, valves, and control panels utilized to handle solid radwaste. This equipment was located in the RWB, the resin disposal building, and the auxiliary building. The inspector noted that the equipment for several systems formally used to solidify and package radwaste were still onsite. Plant staff indicated that this equipment remained onsite to provide the staff with several options for handling radwaste and were confident that the systems could be rendered operable with some minor maintenance. The primary solid radwaste processing that is presently conducted onsite is the dewatering of resins in liners. Other radwaste, such as scrap metal and DAW, is processed by various vendors. The inspector did not identify any materiel condition problems or work order tags on the radwaste handling equipment and plant staff stated that the operability of the equipment was excellent.

In 1996, the RAM shipping group conducted six shipments, which were composed of 2480 cubic feet of DAW and 586 cubic feet of dewatered resins with a combined activity of over 250 curies. In 1997, plant staff had planned to utilize a newly developed volume reduction technique supplied through a vendor. However, recent communications have indicated that this technology may not be able to handle the clinoptilolite resin in the waste. Staff stated that all of the spent resin waste will be shipped offsite this year.

Radwaste personnel conduct a monthly inventory and survey of the barrel yard and the records indicate that the station has generated only 458.2 cubic feet of solid radwaste in 1997. Plant safety procedures require that plant personnel minimize radwaste production by using launderable materials, by segregation of clean items, and by reducing the amount of material taken into the radiologically controlled area (RCA). The RP management indicated that these radwaste reduction measures, along with changes in resin run times and usage (See Section R1.2), have successfully reduced radwaste generation. In addition, radwaste staff are continually researching other available volume reduction technologies for the solid radwaste.

The following table summarizes the status of solid radwaste at the time of this inspection for 1997, including radwaste planned for shipment before January 1998 (all volumes in cubic feet):

Waste Type	Stored Onsite	Shipped	To Be Shipped
DAW	2820.0	109.9	2820.0
Spent resin	1082.2	0.0	1082.2
Filter media	802.3	0.0	0.0
Reactor Coolant Pump Oil	300.0	0.0	300.0
Fan Cooler parts	1656.0	0.0	1656.0
Turbine Building Sludge	300.0	0.0	300.0
Low Specific Activity	846.0	0.0	0.0
Carbon Demins	315.0	0.0	0.0
HOT Drums	461.5	0.0	0.0
Other Drums	48.8	0.0	0.0
Total	8631.8	109.9	6158.2

c. Conclusions

The inspector determined that the implementation of the solid radwaste storage and shipping programs was successful. In addition, the materiel condition of the RWB and the equipment utilized for handling and storing radwaste was excellent, as evidenced by the high degree of operability.

R4 Staff Knowledge and Performance in RP&C

R4.1 Personnel Performance for In-Plant Chemistry and REMP Sample Collection, Waste Classification, and Bulk Waste Material Analysis Activities

a. Inspection Scope (IP 84750)

The inspector interviewed RP staff, reviewed supervisor evaluations, and observed REMP and in-plant chemistry sampling and analysis activities. The inspector also interviewed RP supervisory staff and reviewed radioanalytical data regarding waste classification and waste analysis for unconditional release.

b. Observations and Findings

The inspector observed that in-plant and REMP samples were collected in accordance with station procedures. The RPS was experienced and knowledgeable regarding proper sample collection methods. Several supervisor evaluations indicated that REMP sampling and calibration activities generally met management expectations. These evaluations identified needed procedural changes, but no training or performance deficiencies were noted.

The inspector observed a chemistry turnover, and the sampling and analysis of in-plant and quality control samples on a variety of laboratory instrumentation. Also observed was the troubleshooting of a new autosampler, and the response to a liquid spill within the plant. The RPSs performed all of these activities in a competent and timely manner with good ALARA practice, and they were very knowledgable of both chemistry and plant systems. The inspector also observed NPSAs move packaged RAM into the barrel yard and noted that the work was conducted safely and with good ALARA practices.

The inspector reviewed a radiation occurrence report dated June 26 and 27, 1997 regarding the inappropriate, temporary unconditional release of turbine building sump (TBS) sludge from the radiologically controlled area (RCA). An RPS counted coke/sludge samples from the Unit 1 TBS for free release on the tool monitor and on the gamma spectrometry system with the assumption that the sludge was clean, as past experience had demonstrated. Therefore, the count times were not sufficient to achieve the environmental sediment lower limits of detection (LLD), as stated in NRC guidance for the unconditional release of bulk material. An RP procedure, RPIP 1302 "Unconditional Release of Materials", requires that bulk material which is or is suspected of being contaminated must be counted to the environmental LLDs prior to unconditional release from the RCA. Because the RPS did not suspect that this sludge might be contaminated, the analysis did not achieve the proper LLDs, and therefore no radionuclides were detected. The Unit 1 TBS sludge was then disposed of in an outdoor storage area referred to as the "boneyard".

However, a few days later, other RP staff questioned whether this sludge was actually clean since there had been a small Unit 1 primary to secondary leak and the Unit 2 TBS sludge was previously found to be slightly contaminated. The Unit 1 TBS sludge sample was then counted for a sufficient time (1000 seconds) to achieve the sediment LLDs, and both cesium-134 and cesium-137 were detected at E-7 and E-8 picocurie per gram levels. A subsequent longer count (5000 seconds) also identified cobalt-60 and manganese-54 at these low LLD levels. Plant staff retrieved this sludge from the boneyard and it is presently stored in the barrel yard. Radwaste staff sampled this TBS sludge for 10 CFR 61 analysis in preparation for disposal. In addition, RPIP 1302 was being revised to include TBS sludge as bulk material which should be counted to environmental LLDs, as it may be contaminated.

The inspector discussed with RP management the similarity of the initial analysis of the Unit 1 TBS sludge and the omission of a scaling factor for Te-123m (See Section R1.4). In both instances, plant staff relied solely on past experience and were not sufficiently attentive to recent developments (the contamination in TBS sludge from system leaks and the possible presence of Te-123m in plant systems). The RP management did not agree that these occurrences were related. However, the inspector expressed a concern that RP staff were not thoroughly evaluating recent data or plant conditions in their decision-making process. In addition, the TBS sludge occurrence demonstrated the importance of peer and/or supervisory review of RP activities to ensure proper performance, whereas the scaling factor omission demonstrated that the lack of independent review could result in performance which does not meet station expectations.

Regarding the presence of contaminated TBS sludge outside the plant, the inspector reviewed the file kept to record information for the safe and effective decommissioning as stated in 10 CFR 50.75(g). These records included information about spills and other occurrences which could lead to the spread of contamination that was adequate to comply with this regulatory requirement.

c. Conclusions

The inspector concluded that plant personnel were generally knowledgeable of their responsibilities and conducted the work activities in accordance with station procedures and good ALARA practice. However, the inspector was concerned that two recent decisions by RP staff relied solely on past experience without sufficient consideration of recent plant developments or conditions.

R7 Quality Assurance in RP&C Activities

R7.1 Quality Assurance for Laboratory and Process Instrumentation Analyses

a. Inspection Scope (IP 84750)

The inspector reviewed chemistry quality assurance/quality control (QA/QC) procedures, radiochemical calibrations, and QA/QC data for both laboratory and process instrumentation. The inspector also interviewed chemistry supervisory staff regarding laboratory QA/QC.

b. Observations and Findings

The QC data for chemical and radiochemical laboratory instrumentation indicated that these instruments have remained within statistical control. Although the staff does not utilize long-term QC charts to trend instrument performance, the laboratory practice of comparing the current QC data to the previous 20 QC analyses with a +/- 10% acceptance criteria has demonstrated excellent instrumentation performance. The QC data for the gamma spectrometry system showed that peak area, width, and location were tracked to gauge system performance.

The calibrations of the radiochemical instruments utilized commercial radionuclide standards which were traceable to the National Institute for Standards and Testing (NIST). The inspector noted that the most recent calibrations were conducted in accordance with procedure and comparison to previous calibration data demonstrated that the gamma spectrometry and liquid scintillation instruments have remained stable.

The station utilizes process instrumentation to measure specific conductivity, pH, sodium, hydrazine, cation conductivity, silica, and dissolved oxygen levels in the secondary system. QC checks were conducted by comparing laboratory analysis of grab samples to the process instrument reading. QC data for the past several months demonstrated excellent process instrumentation performance.

The station laboratory participated in commercial QA interlaboratory comparison programs for both chemical and radiochemical analyses. These QA analyses were conducted quarterly. For 1996 and 1997, the plant radiochemistry results were all in agreement with the known values, although the chemistry QA data were in agreement for only 80% of the analytes. The analyses for fluoride, chloride, sulfate, and ammonia were problematic for the laboratory. Chemistry staff stated that many of these problematic QA samples contained analytes at concentrations expected during accident conditions, which were significantly higher than the typical station calibration range. In addition, the presence of high boron concentrations hindered the laboratory's ability to consistently measure the anions accurately. Laboratory supervisors were aware of the analytical problems, and the staff was developing multiple point calibrations and improved cation conductivity methods to address this problem.

The materiel condition of the laboratory and process instrumentation was excellent and the inspector noted that all laboratory reagents were within the prescribed shelf life.

c. <u>Conclusions</u>

Overall, the QA/QC and materiel condition of the laboratory and process instrumentation were excellent, as evidenced by QC checks and QA intercomparison data. However, staff experienced problems measuring some analytes at accident concentrations or in the presence of high boron concentrations.

R7.2 <u>Review of Generation Quality Services (GQS) Observation Reports</u>

The inspector reviewed several GQS observation reports pertaining to chemistry TS compliance, self-assessment, and QA; as well as reports which examined the REMP and various aspects of the solid radwaste and transportation programs. The inspector noted that these reports were comprehensive and examined significant performance areas. The reports identified and followed up issues to ensure station compliance.

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management during an interim exit meeting on August 29, 1997, and a final exit meeting on September 12, 1997. The licensee did not indicate that any materials examined during the inspection should be considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Agen, Emergency Planning Senior Consultant
S. Derleth, Radwaste Shipping Coordinator
J. Friedrich, Production Engineer
D. Gauger, Senior Plant Chemist
A. Johnson, Radiation Protection Supervisor
S. Lappegaard, Radiochemistry Supervisor
D. Larimer, Radiochemistry Supervisor
G. Malinowski, Radiation Protection Supervisor
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NRC

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

INSPECTION PROCEDURES USED

IP 84750:	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 80721:	Radiological Environmental Monitoring
IP 60855:	Operation of an ISFSI
IP 83726:	Control of Radioactive Materials and Contamination, Surveys, and Monitoring
IP 86750:	Solid Radioactive Waste Management and Transportation of Radioactive Materials
TI 2515/133:	Implementation of Revised 49 CFR Parts 100-179 and 10 CFR Part 71.

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

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

LIST OF DOCUMENTS REVIEWED

Updated Final Safety Analysis Report Sections;

2.2.4 - Land Use

2.4.4 - Ground Water

2.7 - Environmental Radiation Monitoring System

Table 4.1-9 - Typical Reactor Coolant Water Chemistry

9.4 - Solid Radwaste System

Technical Specifications; Sections 4.14, 4.15, 6.5, 6.7

1995 Annual Radiological Environmental Monitoring Report

1996 Annual Radiological Environmental Monitoring Report

1996 Land Use Census

Tritium Ground Water Sampling Results, dated June 25, 1997

Radiation Protection Implementing Procedure (RPIP) 3004, Rev. 9 , "Chemistry Quality Assurance"

RPIP 3101, Rev. 17, "Tech Spec Chemistry Sampling Schedule"

RPIP 3104, Rev. 11, "Chemical and Instrument Quality Control"

RPIP 3102, Rev. 8, "Reagent Shelf Lives"

RPIP 3106, Rev. 4, "Sampling Techniques"

RPIP 3002, Rev. 5, "Secondary Water Chemistry Guidelines"

RPIP 3006, Rev 3, "Primary Water Chemistry Guidelines"

RPIP 3050, Rev. 0 "Corrosion Monitoring and Control Program"

RPIP 4700, Rev. 6, "Radiological Environmental Monitoring Programs"

RPIP 4715, Rev. 2, "REMP Calibration of Rotameter"

RPIP 4730, Rev. 1, "REMP Sampling Procedures"

RPIP 4731, Rev. 4, "REMP Air Sampling"

RPIP 4732, Rev. 4, "REMP Water Sampling"

RPIP 4733, Rev. 3, "REMP Milk Sampling"

RPIP 4519, Rev. 4, "Radiochemical Cross Check Program"

RPIP 4710, Rev. 3, "Annual Land Use Census and Critical Receptor Identification"

RPIP 4301, Rev. 6, "Calibration of the LS-5801"

RPIP 4501, Rev. 5, "Spectrum Analysis Efficiency Calibration"

RPIP 4502, Rev. 6, "Gamma Spectrum Analysis Energy Calibration"

RPIP 3534, Rev. 11, "Process Instrumentation Comparison Checks"

RPIP 1051, Rev. 0, "ISFSI Cask Radiation and Contamination Monitoring"

RPIP 1118, Rev. 8, "Conducting Radiation Surveys"

RPIP 1119, Rev. 7, "Conducting Contamination Surveys"

RPIP 1050, Rev. 1, "ISFSI Cask Decontamination and Surveys"

RPIP 1302, Rev. 9, "Unconditional Release of Materials"

10 CFR 50.59 report Summary foe Safety Evaluation 468; "Use of Methoxypropylamine (MPA) as a pH Control Chemical in the Secondary System", dated March 1, 1997

Steam Generator Committee Unit 2 Hideout Return Evaluation, dated April 10, 1997

Steam Generator Committee Sulfate Source Term Reduction, dated April 15, 1997

Generation Quality Services (GQS) Observation Report 1996049, "Tech Spec Chemistry", dated January 1, 1996

GQS Observation Report No. 1996058, "Chemistry Quality Assurance", dated February 12, 1996

GQS Observation Report No. 1996100, "Chemistry Self-Assessment", dated March 12, 1996

GQS Observation Report No. 1997058, "PINGP Response to INPO Finding CY.2-1", dated February 19, 1997

GQS Observation Report No. 1997160, "Radioactive Waste Control", dated April 17, 1997

GQS Observation Report No. 1997164, "Packaging of Radioactive Materials for Transport", dated April 30, 1997

GQS Observation Report No. 1997167, "Training for Radioactive Waste Handling Personnel I", dated May 12, 1997

1996 10 CFR 61 Waste Classification

1996 Effluent and Waste Disposal Annual Report - Solid Waste and Irradiated Fuel Shipments

RPIP 1305, Rev. 5, "Rad Waste Drum Control"

RPIP 1306, Rev. 3, "Drumming of Wet Trash"

RPIP 1307, Rev. 3, "Rad Waste Classification"

RPIP 1309, Rev. 2, "Tracking Rad Waste Shipments"

RPIP 1310, Rev. 3, "Rad Waste Streams/Scaling Factors"

RPIP 1311, Rev. 7. "Resin Liner/PDV Control

RPIP 1312, Rev. 2, "Classification and Inventory of Rad Waste by Computer"

RPIP 1313, Rev. 2, "Computer Generated Scaling Factors"

RPIP 1314, Rev. 3, "Solid Radioactive Waste Annual Report"

RPIP 1316, Rev. 6, "Special Drum Control"

RPIP 1318, Rev. 1, " Dewatering Filter Elements in Hitman High Integrity Containers (HIC)"

RPIP 1319, Rev. 3, "Loading LSA Boxes/Sealand Containers"

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

RPIP 1721, Rev. 5, "Resin Sluicing"

RPIP 1727, Rev. 3, "Disposal of Filter Elements in Hitman High Integrity Containers (HIC)"

RPIP 1730, Rev. 1, "Disposal of Filter Elements in Resin Liners Located in the Cask Decon Sump Pit"

Plant Safety Procedures, F2, Rev. 15, Section 11, "Control of Radioactive Materials and Radwaste"

Operations Manual (OM) D11, Rev. 9, "Radioactive Material Shipment"

OM D11.2, Rev. 19, "Radioactive Materials Shipment Greater Than Type A Quantities in Exclusive Use Vehicles to Barnwell, SC Using Chem-Nuclear Cask and HIC Liner"

OM D11.4, Rev. 19, "Radioactive Materials Shipment Greater Than Type A Quantities in Exclusive Use Vehicles to Barnwell, SC Using SEG Cask and HIC Liner"

OM D11.7, Rev. 10, "Radioactive Materials Shipment - LSA/SCO/LTD QTY Not Exceeding Type A in Exclusive Use Vehicle - to a Licensed Facility"

OM D11.8, Rev. 5, "Radioactive Materials Shipment - Irradiated Non-Fuel Components - Greater Than Type A - In Exclusive Use Vehicle to Barnwell, SC Using a Chem-Nuclear Cask CNS 3-55 and Liner"

OM D11.9, Rev. 5, "Radioactive Materials Shipment - LSA/SCO - Not Exceeding Type A Quantities in Exclusive Use Vehicle to Barnwell, SC"

OM D11.10, Rev. 3, "Mixed Low-Level Radioactive and Hazardous Waste (Mixed LLW) Shipment"

OM D11.11, Rev. 4, "Radioactive Materials Shipment - LSA/SCO/LTD QTY Not Exceeding Type A in Exclusive Use Vehicle - to a Licensed Processing Facility"

OM D59, Rev. 6, "Process Control Program for Solidification/Dewatering of Radioactive Waste from Liquid Systems"

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
DAW	Dry Active Waste
DOT	Department of Transportation
EPRI	Electric Power Research Institute
FW	Feedwater
GQS	Generation Quality Services
HIC	High Integrity Container
ISFSI	Independent Spent Fuel Storage Installation
LLD	Lower Limit of Detection
LSA	Low Specific Activity
MPA	3-methoxypropylamine
NIST	National Institute for Standards and Testing
NPSA	Nuclear Plant Service Attendants
ODCM	Offsite Dose Calculation Manual
PAC	Particulate-Absolute-Charcoal
PCP	Process Control Program
QA/QC	Quality Assurance/Quality Control
RAM	Radioactive Material
RCA	Radiologically Controlled Area
REMP	Radiological Environmental Monitoring Program
RP	Radiation Protection
RPS	Radiation Protection Specialist
RWB	Radwaste Building
SCO	Surface Contaminated Object
SI	International System
TBS	Turbine Building Sump
TLD	Thermoluminescent dosimetry
TS	Technical Specifications
USAR	Updated Safety Analysis Report