February 10, 2009

EA-08-349

Mr. Michael D. Wadley
Site Vice President
Northern States Power - Minnesota
Prairie Island Nuclear Power Station
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 1 AND 2
NRC INSPECTION REPORT 05000282/2008009; 05000306/2008009
PRELIMINARY YELLOW FINDING

Dear Mr. Wadley:

On January 21, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Prairie Island Nuclear Power Station. The enclosed report documents the inspection findings, which were discussed on January 21, 2009, with members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The enclosed report presents the results of this inspection including a finding that has preliminarily been determined to be Yellow, a finding with substantial safety significance that may require additional NRC inspections. As described in Section 2PS2 of this report, the finding involves an October 29, 2008, radioactive material shipment from your facility, via an exclusive-use open transport vehicle that did not conform to the applicable Department of Transportation (DOT) regulatory requirements when it arrived at the shipping destination. The NRC requires licensees to comply with DOT regulations. Specifically, upon receipt, the external radiation levels on the surface of the affected package were determined to exceed DOT's regulatory specification. The apparent cause was ineffective radiological characterization and packaging of the package contents to assure that, under conditions normally incident to transport, the package would conform with DOT's radiation level limits specified in 49 CFR 173.441(a). Additionally, workers involved in preparing the package were not trained as required by 49 CFR 172.704. After the finding was identified, the licensee's staff evaluated the radiological impact to the public to ensure there was no immediate safety concern and implemented corrective actions, including suspension of all radioactive material shipments to prevent future incidents.

This finding was assessed based on the best available information, using the applicable Significance Determination Process (SDP). The final resolution of this finding will be conveyed in separate correspondence. Preliminarily, we consider this a self-revealing finding having substantial safety significance because the external package radiation level was greater than

five, but less than ten times the radiation level limitation specified in the DOT regulatory requirement. Although the surface of the package with elevated radiation levels would not be routinely accessible to a member of the public during transport, that aspect was fortuitous and not the result of design nor package preparation by the licensee. Additionally, the condition had the potential to adversely affect personnel who would normally receive the package or respond to an incident involving the package with the reasonable expectation that the package conformed to DOT radiation limitations. Accordingly, the finding is also an apparent violation of NRC requirements specified by 10 CFR 71.5, which requires licensees to comply with 49 CFR 172.704 [and 173.441(a)], and is being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current policy is on the NRC's website at http://www.nrc.gov/reading-rm/doc-collections/enforcement.

In accordance with NRC Inspection Manual Chapter (IMC) 0609, we intend to complete our evaluation using the best available information and issue our final determination of safety significance within 90 days of the date of this letter. The significance determination process encourages an open dialogue between the NRC staff and the licensee; however, the dialogue should not impact the timeliness of the staff's final determination. Before the NRC makes a final decision on this matter, we are providing you an opportunity to: (1) attend a Regulatory Conference where you can present to the NRC your perspectives on the facts and assumptions the NRC used to arrive at the finding and its significance; or (2) submit your position on the finding to the NRC in writing. If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one-week prior to the conference in an effort to make the conference more efficient and effective. If a Regulatory Conference is held, it will be open for public observation and a press release will be issued to announce it. If you decide to provide a written response in lieu of the Regulatory Conference, the submission should be sent to the NRC within 30 days of the receipt of this letter. If you decline to request a Regulatory Conference or to submit a written response, you relinquish your right to appeal the final SDP determination, in that by not doing either, you fail to meet the appeal requirements stated in the Prerequisite and Limitation Section of Attachment 2 of Inspection Manual Chapter 0609.

Please contact Steven K. Orth at 630-829-9827 within 10 days of the date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. The final resolution of this matter will be conveyed in separate correspondence.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for this inspection finding at this time. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

Additionally, based on the results of this inspection, one NRC-identified finding of very low safety significance was identified. The finding involved a violation of NRC requirements. However, because of its very low safety significance, and because the issue was entered into your corrective action program, the NRC is treating the issue as an Non-Cited Violation (NCV) in accordance with Section VI.A.1 of the NRC Enforcement Policy.

If you contest the subject or severity of a NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Prairie Island Nuclear Generating Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/***RA***/

Steven West, Director
Division of Reactor Safety

Docket Nos. 50-282; 50-306
License Nos. DPR-42; DPR-60

Enclosure: Inspection Report 05000282/2008009; 05000306/2008009
w/Attachment: Supplemental Information

cc w/encl: D. Koehl, Chief Nuclear Officer
Regulatory Affairs Manager
P. Glass, Assistant General Counsel
Nuclear Asset Manager
J. Stine, State Liaison Officer, Minnesota Department of Health
Tribal Council, Prairie Island Indian Community
Administrator, Goodhue County Courthouse
Commissioner, Minnesota Department of Commerce
Manager, Environmental Protection Division Office of the Attorney General of Minnesota
Emergency Preparedness Coordinator, Dakota County Law Enforcement Center

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Sincerely,

RA/

Steven West, Director
Division of Reactor Safety

Docket Nos. 50-282; 50-306
License Nos. DPR-42; DPR-60

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Regulatory Affairs Manager
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J. Stine, State Liaison Officer, Minnesota Department of Health
Tribal Council, Prairie Island Indian Community
Administrator, Goodhue County Courthouse
Commissioner, Minnesota Department of Commerce
Manager, Environmental Protection Division Office of the Attorney General of Minnesota
Emergency Preparedness Coordinator, Dakota County Law Enforcement Center

See Previous Concurrence

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Letter to Mr. Michael Wadley from Mr. Steven West dated February 10, 2009.

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 1 AND 2
NRC INSPECTION REPORT 05000282/2008009; 05000306/2008009
PRELIMINARY YELLOW FINDING

EA-08-349

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.:	50-282; 50-306
Licensee No.:	DPR-42; DPR-60
Report No.:	05000282/2008009; 05000306/2008009(DRS)
Licensee:	Northern States Power - Minnesota
Facility:	Prairie Island Nuclear Power Station
Location:	Welch, MN
Dates:	November 17, 2008 through January 21, 2009
Inspectors:	Martin J. Phalen, Health Physicist, DRS Mark W. Mitchell, Health Physicist, DRS Peter J. Lee, PhD., CHP, Senior Health Physicist, DNMS
Approved by:	Steven K. Orth, Chief Plant Support Team Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000282/2008009; 05000306/2008009; 11/17/08 - 01/21/09; Prairie Island Nuclear Power Station; Radioactive Material Processing and Transportation.

This report covered a one-week period of on-site inspection followed by in-office reviews of licensee documents and records by regional health physics inspectors. One potential Yellow finding and one Green finding were identified. The significance of most findings is indicated by their color (Green, White, Yellow, and Red) using inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Public Radiation Safety

- Preliminary Yellow: A self-revealing finding with an apparent violation of regulatory requirements was identified involving a failure of the licensee to properly radiologically characterize, prepare, and ship a package containing radioactive material in a manner that assured, under conditions normally incident to transport, conformance with Department of Transportation (DOT) radiation level limitations specified by 49 CFR 173.441(a), (i.e., 200 millirem per hour (mrem/h)) on any external surface of the package as required by 10 CFR 71.5 [and 49 CFR 173.441(a)]. Additionally, the licensee did not provide nor ensure that the individuals involved in preparing this shipment were trained and qualified for the task as specified by 49 CFR 172.704, "Training Requirements." The finding involved an October 29, 2008, radioactive material shipment, via an exclusive-use open transport vehicle that was determined to have radiation levels of 1630 mrem/h on the external surface of a package upon receipt at the shipping destination. As immediate corrective actions, the licensee suspended all radioactive shipment activities. The licensee entered this performance deficiency in their corrective action program; initiated a root cause evaluation; and initiated corrective measures, including various process improvements to prevent recurrence.

  This finding is more than minor since it was associated with the Public Radiation Safety Cornerstone program and process attribute and affected the cornerstone objective to ensure adequate protection of the public from exposure to radioactive materials given that package radiation levels were elevated. Preliminarily, the significance of this finding is considered as having a substantial safety significance (Yellow), since the radiation level was greater than five times the limit (1000 mrem/h) but less than ten times the limit (2000 mrem/h) specified by the DOT regulatory requirement. Although the surface of the package with elevated radiation levels would not be routinely accessible to a member of the public during transport, that aspect was fortuitous and not the result of design nor package preparation by the licensee. The condition had the potential to adversely affect personnel who would normally receive the package or respond to an incident involving the package, with a reasonable expectation that the package conformed to DOT radiation limitations.

Additionally, the cause of this finding had a cross-cutting aspect in the area of Human Performance. Specifically, the licensee failed to appropriately plan the work activity by incorporating risk insights and job site conditions, including conditions which may impact radiological safety (H.3 (a)). This finding is documented within the licensee's corrective action system as RCE 1157726. (Section 2PS2)

Cornerstone: Occupational Radiation Safety

- Green. An NRC-identified finding of very low safety significance with an associated Non-Cited Violation (NCV) of Technical Specification 5.4.1 was identified in the area of occupational radiation safety associated with the licensee's failure to perform adequate job planning to evaluate the radiological hazards, as required by station procedures. Specifically, the licensee failed to properly assess the radiological hazards to workers associated with the decontamination, demobilization and packaging of fuel sipping equipment on the refuel floor. This issue has been entered into the licensee's corrective action program and implemented corrective actions that include changes to procedures to include a holistic risk-based review of radiologically significant work.

  The finding is more than minor because, given the radiological uncertainty of working with fuel handling equipment, if left uncorrected the finding could become a more significant safety concern. The finding was determined to be of very low safety significance because it did not involve unintended collective dose (ALARA planning); there was no overexposure, nor potential for overexposure; and the licensee's ability to assess dose was not compromised. Additionally, the cause of this finding had a cross-cutting aspect in the area of Human Performance. Specifically, the licensee failed to appropriately plan the work activity by incorporating risk insights and job site conditions, including conditions which may impact radiological safety (H.3 (a)). (Section 2OS2)

B. Licensee-Identified Violations

No findings of significance were identified.

REPORT DETAILS

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

.1 Job-In-Progress Reviews

a. Inspection Scope

Radiological work in high radiation work areas having significant dose rate gradients was reviewed to evaluate the application of dosimetry to effectively monitor exposure to personnel and to assess the adequacy of licensee controls.

Specifically, the inspectors reviewed the circumstances involving the decontamination, demobilization, and preparation for shipment of fuel sipping equipment on October 23 and 24, 2008. The inspection was performed both on-site and through in-office reviews of documents generated by the licensee. This review included discussion with various members of the licensee staff, both in person and by teleconference, which provided a common understanding of the events as they occurred. Additionally, select data provided by the licensee was independently reviewed by a technical expert on the NRC staff.

This inspection supplements the sample reported in Inspection Report 05000282/2008002; 05000306/2008002.

b. Findings

One finding of significance was identified.

Introduction: A Green NRC-identified finding of very low safety significance and associated Non-Cited Violation (NCV) of Technical Specification 5.4.1 was identified in the area of occupational radiation safety associated with the licensee's failure to perform adequate job planning to evaluate the radiological hazards, as required by station procedures. Specifically, the licensee failed to properly assess the radiological hazards to workers associated with the decontamination, demobilization and packaging of fuel sipping equipment on the refuel floor.

Description: During a Unit 2 refueling outage in the fall of 2008, potentially degraded fuel assemblies were tested for cladding integrity with vendor fuel sipping equipment. The equipment was provided from the vendor as new, clean equipment. The tests were performed under water in the spent fuel pool. After the outage, the equipment was decontaminated, demobilized and packaged for shipment back to the vendor.

On October 23 and 24, 2008, the equipment was decontaminated at Prairie Island by underwater hydro-lancing, demobilized by personnel, and prepared for shipment back to the vendor. Personal accounts and record review of the work activity indicated that the fuel sipping equipment was rinsed with water and surveyed for gross contamination and

radiological hazards when removed from the spent fuel pool. The staff used hand tools for equipment disassembly. The fuel sipping equipment was then wrapped in plastic and then placed into a designated laydown area near the pool. The radiation protection staff initially posted and controlled the area as a Radiation Area and Contamination Area. No extremity dosimetry nor additional controls were in place for controlling radiological exposure during the "hands-on" demobilization of the equipment. After the fuel sipping equipment was in the laydown area, the work group left the area. The next day the work group loaded the fuel sipping equipment into a vendor supplied container in preparation for shipment.

Station procedures, including FP-RP-JPP-01, "RP Job Planning," Revision 04, required formal job planning when removing items from the spent fuel pool. In the absence of such a pre-job review, the potential exist for not performing the radiological surveys necessary to properly assess the entire scope of radiological hazards present and, subsequently to prescribe the appropriate supplemental dosimetry and/or dosimetry placement requirements to workers associated with the decontamination, demobilization, and preparation of the fuel sipping equipment.

In this case, the licensee planned "hands-on" work with fuel sipping equipment that had a high potential for individuals to come in contact with discrete radioactive particles and high contamination from the fuel sipping equipment. The licensee recognized that when in use underwater, the fuel sipping equipment had detectable underwater contact dose rates up to 40 rem/h on the inside of the fuel sipping canisters and up to 9 rem/h at contact on the outside of the fuel sipping canisters. Radiological surveys taken in the work area on the refuel floor detected discrete radioactive particles ranging from 800 to 35,000 disintegrations per minute (dpm) per 100 cm^2. However, the inspectors identified that the licensee had not performed adequate planning/evaluation to assess the hazard and the potential radiological impact to the workers. As a result of this failure, the licensee had not prescribed the appropriate dosimetry and monitoring commensurate with the hazard, and the licensee had to perform a post-job dose evaluation to fully assess the workers' dose.

Several days later, after the fuel sipping equipment had been shipped off-site, more detailed follow-up surveys of the equipment identified the presence of additional discrete radioactive particles with gamma dose rates of up to 11 rem/h at contact. Isotopic analysis of the particles determined that cobalt-60 was the dominant radionuclide of interest. Once informed of the elevated dose rates of discrete radioactive particles, the licensee performed extremity and whole body dose assessments to determine the actual dose received by the workers that handled the equipment in order to confirm that no significant radiological exposures had occurred.

Analysis: The inspectors identified a performance deficiency, in that, prior to the start of work, the licensee failed to perform adequate radiological evaluations necessary to properly assess the radiological hazards and to prescribe appropriate radiological controls necessary to evaluate and minimize dose to workers. In accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," the inspectors determined that the issue was more than minor because given the radiological uncertainty of working with fuel handling equipment, if left uncorrected the finding could become a more significant safety concern.

The finding does not involve the application of traditional enforcement, because it did not result in actual safety consequences or the potential to impact the NRC's regulatory function and because it was not the result of willful actions. The finding was evaluated using the Significance Determination Process (SDP) in accordance with IMC 0609, Appendix C, for the Occupational Radiation Safety cornerstone. The finding was determined to be of very low safety significance (GREEN) because the finding did not involve unintended collective dose (ALARA planning), there was no overexposure, nor potential for overexposure, and the licensee's ability to assess worker dose was not compromised.

This finding was caused by inadequate planning of radiological work activities. Consequently, the cause of this deficiency had a cross-cutting aspect in the area of Human Performance. Specifically, the licensee failed to appropriately plan the work activity by incorporating risk insights and job site conditions which may impact radiological safety H.3(a).

Enforcement: Prairie Island Technical Specification 5.4.1 requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 7, requires procedures for the control of radioactivity, including limiting personnel exposure. Station procedure FP-RP-JPP-01, "RP Job Planning," Revision 04, Step 5.5.7, requires formal job planning when removing items from the spent fuel pool.

Contrary to the above, the licensee failed to perform formal job planning when removing items from the spent fuel pool. Specifically, on October 23 and 24, 2008, the licensee disassembled, decontaminated, removed from the spent fuel pool, and packaged fuel sipping equipment without a formal job plan to evaluate the radiological hazards associated with these activities. The licensee documented this condition in its corrective action program (AR 1162343) and instituted corrective measures including changes to procedures to include a holistic risk-based review of radiological significant work. (NCV 05000282/2008009–02; 05000306/2008009–02)

2OS2 As-Low-As-Reasonably-Achievable Planning And Controls (71121.02)

.1 Inspection Planning

a. Inspection Scope

The inspectors reviewed procedures associated with maintaining occupational exposures as-low-as-is-reasonably-achievable (ALARA) and processes used to estimate and track work activity specific exposures.

This inspection constituted one required sample as defined in IP 71121.02-5.

b. Findings

No findings of significance were identified.

.2 Radiological Work Planning

a. Inspection Scope

The inspectors reviewed the ALARA work activity evaluations for fuel sipping equipment decontamination and shipping preparation activities. Specifically, the inspectors reviewed the exposure estimates and exposure mitigation requirements in order to verify that the licensee had established procedures and engineering and work controls that were based on sound radiation protection principles in order to achieve occupational exposures that were ALARA. The inspectors also determined if the licensee had reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

This inspection constituted a partial sample as defined in IP 71121.02-5.

b. Findings

One finding of significance was identified, which is documented in Section 2OS1.1.

Cornerstone: Public Radiation Safety

2PS2 Radioactive Material Processing and Transportation (71122.02)

.1 Radioactive Waste System

a. Inspection Scope

The inspectors reviewed the liquid and solid radioactive waste system description in the Updated Final Safety Analysis Report (UFSAR) for information on the types and amounts of radioactive waste (radwaste) generated and disposed. The inspectors reviewed the scope of the licensee's audit program with regard to radioactive material processing and transportation programs to verify that it met the requirements of 10 CFR 20.1101(c).

This inspection constituted one sample as defined in IP 71122.02–5.

b. Findings

No findings of significance were identified.

.2 Radioactive Waste System Walkdowns

a. Inspection Scope

The inspectors performed walkdowns of the liquid and solid radwaste processing systems to verify, that the systems agreed with the descriptions in the UFSAR, and the Process Control Program, and to assess the material condition and operability of the systems. The inspectors reviewed the status of radwaste processing equipment that was not operational and/or was abandoned in place. The inspectors reviewed the licensee's administrative and physical controls to ensure that the equipment would not

contribute to an unmonitored release path nor be a source of unnecessary personnel exposure.

The inspectors reviewed changes to the waste processing system to verify that the changes were reviewed and documented in accordance with 10 CFR 50.59 and to assess the impact of the changes on radiation dose to members of the public. The inspectors reviewed the current processes for transferring waste resin into shipping containers to determine if appropriate waste stream mixing and/or sampling procedures were utilized. The inspectors also reviewed the licensee's methods for waste concentration averaging to determine if representative samples of the waste product were provided for the purposes of waste classification, as required by 10 CFR 61.55.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

.3 Waste Characterization and Classification

a. Inspection Scope

The inspectors reviewed the licensee's radiochemical sample analysis results for each of the licensee's waste streams, including dry active waste (DAW), spent resins, and filters. The inspectors also reviewed the licensee's use of scaling factors to quantify difficult-to-measure radionuclides (e.g., pure alpha or beta emitting radionuclides). The reviews were conducted to verify that the licensee's program assured compliance with 10 CFR 61.55 and 10 CFR 61.56, as required by Appendix G of 10 CFR Part 20. The inspectors also reviewed the licensee's waste characterization and classification program to ensure that the waste stream composition data accounted for changing operational parameters and thus remained valid between the annual sample analysis updates.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

.4 Shipment Preparation and Shipping Manifests

a. Inspection Scope

The inspectors reviewed the documentation of shipment packaging, radiation surveys, package labeling and marking, vehicle inspections and placarding, emergency instructions, determination of waste classification/isotopic identification, and licensee verification of shipment readiness for five non-excepted material and radwaste shipments made from 2006 to 2008. The shipment documentation reviewed consisted of:

- One LSA-I Shipment of Resins to a Radwaste Vendor; and
- Four SCO-II Shipments to a Fuel Analysis Vendor.

For each shipment, the inspectors determined if the requirements of 10 CFR Parts 20 and 61 and those of the Department of Transportation (DOT) in 49 CFR Parts 170-189 were met. Specifically, records were reviewed and staff involved in shipment activities was interviewed to determine if packages were labeled and marked properly, if package and transport vehicle surveys were performed with appropriate instrumentation, if radiation survey results satisfied DOT requirements, and if the quantity and type of radionuclides in each shipment were determined accurately. The inspectors also determined whether shipment manifests were completed in accordance with DOT and NRC requirements, if they included the required emergency response information, if the recipient was authorized to receive the shipment, and if shipments were tracked as required by 10 CFR Part 20, Appendix G.

This inspection constitutes one sample as defined by IP 71122.02–5.

Selected staff involved in shipment activities were observed and interviewed by the inspectors to determine if they had adequate skills to accomplish shipment related tasks and to determine if the shippers were knowledgeable of the applicable regulations to satisfy package preparation requirements for public transport with respect to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," and 49 CFR Part 172 Subpart H.

This inspection constitutes one sample as defined by IP 71122.02–5.

b. Findings

One finding of significance was identified.

Introduction: A preliminary Yellow self-revealing finding of substantial safety significance with associated apparent violation was identified involving the licensee's failure to properly prepare and ship a package containing radioactive material in a manner that assured, under conditions normally incident to transport, conformance with Department of Transportation (DOT) radiation level limitations specified by 49 CFR 173.441(a), (i.e., 200 millirem per hour (mrem/h)) on any external surface of the package.

Description: On October 29, 2008, a Surface Contaminated Object (SCO) shipment of fuel sipping equipment was surveyed, radiologically characterized, prepared, packaged and shipped from the licensee's site to Westinghouse Corporation in Waltz Mill, Pennsylvania. The shipment was made on an exclusive use open transport vehicle with no over-pack, barrier, or barricade restricting access to the radioactive package (transport box). Prairie Island's final shipment surveys indicated that all applicable survey parameters were below required DOT regulatory limits, with the maximum radiation level on any package surface at 170 mrem/h (telepole measurement). However, upon receipt at Waltz Mill, Pennsylvania, the package containing the fuel sipping equipment was surveyed and found to have surface radiation levels on the package underside (bottom) in excess of DOT regulatory limits. Westinghouse Corporation notified the licensee and the State of Pennsylvania.

On November 3–4 and 12–14, 2008, Prairie Island Nuclear Generating Plant personnel were on-site at the Waltz Mill facility to facilitate incident investigation. Members of the Prairie Island and corporate health physics staff detected similar radiological conditions as those initially reported by Westinghouse Corporation surveys. Final survey results determined that the package surface radiation levels were 1630 mrem/h (telepole measurement). Under controlled conditions at the Waltz Mill facility and under the observation of Prairie Island radiation protection personnel, qualified individuals opened the package containing the fuel sipping equipment to determine the source of the elevated radiation levels. Upon examination, the licensee's staff identified that a small radioactive particle was embedded into the umbilical cable to the lid of the fuel sipping canister. The fuel sipping equipment (lid and umbilical cable) was found to be not properly braced, nor secured as required; apparently, the lid and the umbilical cable shifted from the time of the Prairie Island shipping package departure survey to the time of the Westinghouse Waltz Mill shipping package receipt survey (i.e., during transport). Additionally, two other discrete radioactive particles were detected inside the shipping box. Radiological surveys indicated that the particle embedded into the lid's umbilical cable exhibited a radiation level of about 11,000 mrem/h; and the two other discrete radioactive particles exhibited radiation levels at a nominal 2000 mrem/h. Isotopic analyses of the discrete radioactive particles identified cobalt-60 as the sole radioactive isotope. The licensee's staff found the fuel sipping canister lid and associated umbilical cable in a location in the shipping package, that coincided with the elevated radiation levels on the external surfaces of the package, as identified on the Westinghouse Waltz Mill receipt radiation survey.

The detection of the highly radioactive fuel sipping canister lid umbilical cable and the associated discrete radioactive particles indicated that Prairie Island's on-site efforts to decontaminate and radiologically characterize the fuel sipping equipment prior to shipment was not completely successful. The on-site radiological surveys were not sufficient for detecting highly radioactive small particles; and that the fuel sipping equipment was not properly braced nor secured in its package for shipment under conditions normally incident to transport. Additionally, the phenomena of the redistribution of highly radioactive particles and the potential for loads shifting during the transportation of radioactively contaminated equipment are neither uncommon or unknown to the industry.

The inspectors determined that, in the configuration used to transport the package, the elevated radiation levels on the bottom external surface of the package would not be routinely accessible to a member of the public. However, the licensee determined through event reconstruction, that there were elevated radiation levels on the underside of the transport trailer, that were unanticipated by the licensee at time of transport. Further, the NRC concluded, that the elevated radiation levels, although on the underside of the package, had the potential to adversely affect personnel who would normally receive the package and/or respond to an incident involving the package with the reasonable expectation that the package conformed to DOT radiation limitations. Redistribution of the canister lid and associated umbilical cable likely occurred as a result of conditions normally incident to transport. The inspectors concluded that it was fortuitous and not the result of design nor package preparation, that the material was deposited in such manner that effectively limited the potential for public exposure.

The inspectors identified issues associated with the surveying, preparation, and packaging of the fuel sipping equipment. In addition to the ineffective radiological characterization and packaging of the fuel sipping equipment, the inspectors determined that the licensee did not provide nor ensure that the individuals involved in packaging the shipment were trained and qualified for the task as required by 49 CFR 172.704 "Training Requirements." None of the licensee's staff involved in the loading and preparation were trained, and only some of the Westinghouse personnel involved in loading, preparing, and packaging of the fuel sipping equipment for transport were trained and qualified for the task. Specifically, nine of the thirteen people involved in preparing this package for radioactive shipment and transport had not received the required function specific training. Two of the remaining four individuals had not received the required recurrent training within the last three years.

As a follow-up to this issue, the licensee performed a dose assessment to evaluate potential effective dose to a member of the public for a person reasonably close to the radioactive point source. This review concluded that the potential for an exposure above the NRC annual limit for a member of the public was minimal given the radiation source's location and an individual's necessary orientation to come in sustained contact with the radiation field. The inspectors reviewed the licensee's data and concluded that an overexposure to a member of the public would not be plausible based on the location of the radiation levels and the corresponding dose rates. However, the inspectors concluded that the licensee's assessment did not provide any information that applied to the applicable regulatory requirement concerning radiation levels on the surface of the package.

Analysis: The inspectors concluded that the issues concerning the shipment constituted a performance deficiency. Specifically, the licensee failed to characterize the distribution of radioactive material on the equipment and to package the equipment in such a manner that radioactive material would not shift nor redistribute within the package under normal transportation conditions as required by 10 CFR 71.5 and 49 CFR 173.441 for the transportation of radioactive licensed materials. Additionally, the licensee did not provide nor ensure that the individuals involved in this shipment were trained and qualified for the task as required by 49 CFR 172.704.

The inspectors concluded that the failures were within the licensee's ability to foresee, correct, and should have been prevented, particularly, since the potential for loads to shift and the redistribution of highly radioactive particles during transportation of radioactively contaminated equipment is not uncommon and is known to the industry. However, the matter had no actual safety consequence (i.e., no overexposure to any member of the public) or impact on the NRC's ability to perform its regulatory function, and there were no willful aspects associated with this finding. Also, after the finding was identified, the licensee's staff evaluated the radiological impact to the public for the event, and implemented corrective actions including the suspension of all radioactive material shipments to ensure that the finding did not present an immediate safety concern. This finding was considered more than minor since it was associated with the Public Radiation Safety Cornerstone program and process attribute relative to DOT package radiation limits and affected the cornerstone objective to ensure adequate protection of the public from exposure to radioactive materials released into the public domain in that package radiation levels were elevated. Application of Manual Chapter 0609, Appendix D, the Public Radiation Safety Significance Determination Process is

applicable since the finding involved an occurrence in the licensee's radioactive material transportation program that was contrary to DOT regulations, (i.e., 49 CFR 173.441(a)).

The cause of this finding had a cross-cutting aspect in the area of Human Performance. Specifically, the licensee failed to appropriately plan the work activity by incorporating risk insights and job site conditions, including conditions which may impact radiological safety (H.3 (a)). This finding is documented within the licensee's corrective action system as RCE 01157726.

Preliminarily, the significance of this finding is considered as having a substantial safety significance, since the radiation level was greater than five times the limit (1000 mrem/h), but less than ten times the limit (2000 mrem/h) specified by the DOT regulatory requirement. This determination is also reinforced by the determination that, though the potential for public exposure was limited during transportation, that aspect was fortuitous, and not the result of design nor package preparation by the licensee, and that the condition had the potential to adversely affect personnel who would normally receive the package or respond to an incident involving the package with a reasonable expectation, that the package conformed with DOT radiation limitations.

Enforcement: An apparent violation associated with the preliminary Yellow performance deficiency in the public radiation safety cornerstone was identified. Title 10 CFR 71.5, "Transportation of Licensed Material," requires licensees to comply with the Department of Transportation (DOT) regulations in Title 49 CFR Parts 170 through 189 relative to the transportation of licensed material. Specifically:

(1) Title 49 CFR 173.441(a) requires that each package of radioactive material offered for transportation must be designed and prepared for shipment, so that under conditions normally incident to transportation, the radiation level does not exceed 2 mSv/h (200 mrem/h) at any point on the external surface of the package.

    Contrary to these requirements, on October 29, 2008, Northern States Power - Minnesota (Prairie Island) shipped a package containing radioactive material that was not sufficiently designed nor prepared to assure that, under conditions normally incident to transportation, the radiation level on the external surface of the package would not exceed 200 mrem/hour. When received and surveyed at the shipping destination (Westinghouse in Waltz Mill, Pennsylvania), on October 31, 2008, the external surface of the package exhibited radiation levels of 1630 mrem/h [i.e., package radiation levels greater than five and less than ten times the regulatory limit].

(2) Title 49 CFR 172.704 'Training Requirements' requires that individuals involved in the transport of hazardous materials receive function specific training relative to their specific tasks, and that these individuals receive recurrent training at least once every three years.

    Contrary to the above, nine of the thirteen people involved in preparing this package for radioactive shipment and transport had not received the required function specific training. Also, two of the remaining four individuals had not received the required recurrent training within the last three years.

Following identification of the apparent violation, Prairie Island Nuclear Generating Plant documented the condition and initiated a root cause review (RCE 01157726); and instituted corrective measures, including the suspension of radioactive material shipments that were susceptible to discrete radioactive particle contamination. Pending determination of a final safety significance, this finding is identified as an apparent violation, (AV) 05000282/2008009-01; 05000306/2008009-01, Radioactive Material Shipment Package Radiation Levels Exceeded.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed condition reports, audits and self-assessments that addressed radioactive waste and radioactive materials shipping program deficiencies since the last inspection, to verify that the licensee had effectively implemented the corrective action program, and that problems were identified, characterized, prioritized and corrected. The inspectors also verified that the licensee's self-assessment program was capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors reviewed corrective action reports from the radioactive material and shipping programs since the previous inspection, interviewed staff and reviewed documents to determine if the following activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- Initial problem identification, characterization, and tracking;
- Disposition of operability/reportability issues;
- Evaluation of safety significance/risk and priority for resolution;
- Identification of repetitive problems;
- Identification of contributing causes;
- Identification and implementation of effective corrective actions;
- Resolution of NCVs tracked in the corrective action system; and
- Implementation/consideration of risk significant operational experience feedback.

This inspection constituted one sample as defined in IP 71122.02–5.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 21, 2009, via a telephone conference call, the inspectors presented the inspection results to Mr. M. D. Wadley, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
S. Derleth, Radiation Protection Specialist
B. Hite, Station Radiation Protection/Chemistry Manager
M. Kent, Radiation Protection Supervisor
K. Kono, Radiation Protection Specialist
S. Nelson, Corporate Radiation Protection Manager
S. Rupp, Radiation Protection Specialist
C. Sweet, Radiation Protection Specialist

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000282/2008009-01; 05000306/2008009-01	AV	Radioactive Material Shipment Package Radiation Levels Exceeded. (Section 2PS2)
05000282/2008009-02; 05000306/2008009-02	NCV	Failure to Perform Formal Job Planning to Evaluate the Radiological Hazards. (Section 2PS2)

Closed

05000282/2008009-02; 05000306/2008009-02	NCV	Failure to Perform Formal Job Planning to Evaluate the Radiological Hazards.

Discussed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

2OS1 Access Control to Radiologically Significant Areas

AR 1123112; Various Boxes in Radiological Controlled Area Not Labeled; January 8, 2008

AR 1126185; 121 Spent Resin Tank Inlet Won't Open; February 5, 2008

AR 1144127; Two Gauges Found in Hot Instrument Shop without RAM Labels; July 14, 2008

AR 1127294; Safety and Radiation Issues Regarding Resin Sluices; February 14, 2008

AR 1131225; Accumulated Trash Results in Increased Dose Rates; March 15, 2008

AR 1131673; Adverse Trend – Resin Sluicing Issues, March 19; 2008

AR 1137541; Continued Issues with Waste Gas System; May 13, 2008

AR 1145069; Elevated Dose Rates on Resin Sluice Line; July 23, 2008

AR 1150471; Unexpected Dose Readings During Resin Sluice; September 12, 2008

AR 1150626; Iron-55 Elevated In Rad Waste Tanks; September 15, 2008

AR 1151006; Pressurized Drums of Floor Mop Slop; September 18, 2008

AR 1152117; 2R-25 Personnel Contamination Event During Steam Generator Manway Insert Removal; September 25, 2008

AR 1152179; Radiation Protection Sign-Off Steps Missed in D67 Incore Instrumentation; September 26, 2008

AR 1156041; Workers Entered High Radiation Area Without Required Brief; October 17, 2008

AR 1157246; Frisker Source Removed From Site; October 29, 2008

AR 1162343; ALARA Planning Not Performed for 2R25 Fuel Sipping; December 12, 2008

FP-RP-BP-01; Bioassay Program; Revision 05

FP-RP-JPP-01; RP Job Planning; Revision 04

FP-RP-RWP-01; Radiation Work Permit; Revision 06

FP-RP-SD-01; Special Dosimetry; Revision 04

Fuel Sipper Lid Hot Particle Extremity and Whole Body Dose Evaluation; December 12, 2008

Fuel Sipping Removal Sentinel Exposure Tracking for 22-25 October 2008; dated December 12, 2008

RPIP 1121; RWP Issue; Revision 23

RPIP 1122; Hot Particle Program; Revision 13

RPIP 1126; Contamination Monitor Alarm Response and Personnel Decontamination: Revision 24

RPIP 1130; On the Job Dose Monitoring and Timekeeping; Revision 19

RPIP 1135; RWP Coverage; Revision 19

Qualification History Reports; December 08, 2008

Work Order Package 00367253; September 24, 2008

2PS2 Radioactive Material Processing and Transportation

Shipment Number 06-026; Refueling Equipment to Westinghouse; May 26, 2006

Shipment Number 06-028; Refueling Equipment to Westinghouse; June 5, 2006

Shipment Number 06-066; Refueling Equipment to Westinghouse; December 13, 2006

Shipment Number 070-011; Spent Resin to Studsvik; July 10, 2007

Shipment Number 08-069; Refueling Equipment to Westinghouse; October 29, 2008

AR 1119827; NRC Radioactive Materials Inspection: Process Control Program and Updated Safety Analysis Report Do Not Accurately Reflect Current Plant Practice; December 3, 2007

AR 1121239; Effluent and Waste Disposal Annual Report; December 14, 2007

AR 1121243; D59, Revision 8 Process Control Program for Solidification; December 14, 2007

AR 1157726; PI Shipment Arrives at Consignee Above DOT Rad Limits; October 31, 2008

AR 1158879; Sea land Dose Rates; November 12, 2008

AR 1160011; Radiation Survey Not Complete; November 21, 2008

AR 1160060; NRC Observation – D11 Procedures Need Work; November 11, 2008

C21.1.3.7; Spent Resin; Revision 15

D11; Radioactive Material Shipment; Revision 16

D11.4; Radioactive Material Shipment Greater Than Type A Quantities in Exclusive Use Vehicle to Barnwell, SC Using RWE Nukem Cask and High Integrity Container Liner; Revision 23

D11.7; Radioactive Material Shipment LSA/SCO/LDT Quantity to a Licensed Facility; Revision 15

D20.12; Sluicing Resin From 11 Mixed Bed Ion Exchanger to 121 Spent Resin Tank; Revision 19

D20.24; Sluicing Resin From 11 Steam Generator Blowdown Ion Exchanger to Barrels; Revision 16

D20.17; Sluicing Resin From 11 Evaporator Feed Ion Exchanger to Low Level Resin Liner; Revision 11

Radiological Survey Records; Various Dates

RPIP 1310; RadWaste Streams Scaling Factors; Revision 8

RPIP 1314; Solid Radioactive Waste Annual Report; Revision 9

RPIP 1319; Loading LSA Boxes/Sealand Containers; Revision 10

RPIP 1325; Shipping RAM using Radman/Radship Software; Revision 3

RPIP 1322; Radman for Windows to Generate Scaling Factors; Revision 5

RPIP 1721; Resin Sluice; Revision 17

LIST OF ACRONYMS USED

ALARA	As-Low-As-Is-Reasonably-Achievable
AR	Action Request
AV	Apparent Violation
CFR	Code of Federal Regulation
DOT	Department of Transportation
FP	Fleet Procedure
IMC	Inspection Manual Chapter
IP	Inspection Procedure
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
RP	Radiation Protection
RPIP	Radiation Protection Implementing Procedure
RWP	Radiation Work Permit
SDP	Significance Determination Process