

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-266; 50-301  
Licenses No: DPR-24; DPR-27

Reports No: 50-266/96016(DRS)  
50-301/96016(DRS)

Licensee: Wisconsin Electric Power Company

Facility: Point Beach Nuclear Plant, Units 1 and 2

Location: 6610 Nuclear Road  
Two Rivers, WI 54241

Dates: October 28 through December 6, 1996

Inspectors: R. Paul, Senior Radiation Specialist  
K. Lambert, Radiation Specialist

Approved by: T. Kozak, Chief, Plant Support Branch 2  
Division of Reactor Safety

## Report Details

### **R1 Radiological Protection and Chemistry (RP&C) Controls**

#### **R1.1 Deliberate Misuse of Radioactive Material**

##### **a. Inspection Scope (83750)**

The inspectors reviewed various records and procedures, inspected the radiological laundry room, and interviewed several licensee and contract personnel regarding an incident involving the deliberate misuse of radioactive material during the 1995 Unit 1 refueling outage. The inspectors also reviewed the licensee's investigation of this event, which began after the NRC initiated an investigation of these circumstances.

##### **b. Observations and Findings**

On or about April 6, 1995, during the Unit 1 outage, a contract laundry/decontamination technician deliberately taped a radioactive particle to the underside of a table in the radiological laundry room. The technician was processing protective clothing through a laundry radiation monitor when an alarm was received. He located a radioactively contaminated particle in the clothing, cut it out, and, as a prank, taped it on the underside of a table in the laundry room where radiation surveys were normally conducted. Later, the technician told a health physics technician about the prank and the particle was removed and disposed of properly.

Estimates of the activity of the particle ranged from approximately 6,000 counts per minute to 40,000 counts per minute as read by a hand held frisker. Conservatively using the higher estimate, the potential dose to the workers in the vicinity of the particle was calculated by the NRC to be below 1 millirem. A review of employee dose records for this time period did not indicate any abnormal results.

Corrective actions performed by the licensee immediately following the event included counseling the individuals involved and performing a calculation of the dose consequences from the particle. A condition report (CR) was not initiated for this event. The responsible licensee personnel thought that due to the low dose significance of the particle, a CR was not necessary. A review of Point Beach Nuclear Procedure 5.3.1, Revision 1, "Condition Reporting System," indicated that an event such as this should have been documented via a CR; however, the wording of the procedure did not make the documentation a requirement (should versus shall). The failure to initiate a CR was assessed by the inspectors as a weakness in the implementation of the overall problem identification program.

After the initial NRC inspection and investigation began in October 1995, the licensee performed an independent event evaluation. This evaluation included interviews of several involved personnel to recreate the event. The licensee performed a dose calculation to determine the potential radiation dose to individuals in the area; this evaluation was consistent with the NRC results. The licensee also

briefed radiation workers to ensure they understood the significance of using radioactive material for purposes not authorized by the facility operating license.

The NRC concluded that the contract technician deliberately placed the radioactively contaminated particle on the underside of a table in the radiological laundry room, causing the licensee to fail to confine the possession and use of byproduct material to the locations and purposes authorized by the facility operating license. This is a violation of License Conditions 2.C, 2.D, or 2.E (VIO 50-266/96016-01(DRS); 50-301/96016-01(DRS)).

c. Conclusions

The failure to initiate a condition report for the misuse of radioactive material was assessed as a weakness in the implementation of the overall problem identification program. The failure of the licensee to confine the possession and use of byproduct material to the locations and purposes authorized by the facility operating license was a violation.

R1.2 Unit 2 Steam Generator Replacement Project (SGRP) and ALARA Implementation

a. Scope (83729)

The inspectors reviewed the radiological controls implemented and the ALARA goals for the SGRP. The inspectors also reviewed ALARA plans and radiation work permits (RWPs), observed several work evolutions and worker practices, and questioned workers concerning their responsibility to implement good work practices and their understanding of radiological controls.

b. Observations and Findings

Work packages utilized industry lessons learned and contained good ALARA controls to minimize exposure. Contingencies were in place for jobs having the potential for significant changes in radiological conditions and for rework. The resources identified in the ALARA plans (specialized radiation detection equipment, shielding, radiological access control point layouts, etc) were implemented. The inspectors noted that the ALARA controls, including radiological hold points, were authorized by RWPs for changed radiological conditions and work scope, and were discussed at pre-job briefings.

The projected dose for the SGRP was about 200 person-rem. Although some jobs significantly exceeded the estimated dose, it appears that the licensee's dose goal should still be met. The higher than estimated dose was the result of constant work scope expansion on some of the small bore pipe work (added larger dimension pipe), and more time required for aspects of the Reactor Coolant System (RCS) pipe work such as inner diameter grinding, welding, flapping, inspection evolutions, and shielding installation and removal. The inspectors found that the licensee's protocol for projecting dose was sound and that with the exception of the above noted evolutions the estimated dose for the majority of the SGRP was reasonably close to the actual. In general, there was no significant dose from emergent work and

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rework, and effective work planning and implementation helped accomplish the dose goal.

Because of the relatively large number of inexperienced craft workers for the project the licensee maintained close oversight of craft activities and found at the beginning of the project a relatively high number of poor worker practices. Radiation worker practices improved as the project progressed.

The inspectors attended several pre-job briefings. A good level of information was provided to the workers at the briefings. The RP staff clearly communicated RWP requirements and radiological hold points, and questioned whether the workers had the proper tools and equipment available. The briefings included discussions by the job foreman and individual workers on the work to be performed.

The RP staff performed radiation surveys in accordance with RWPs to ensure that radiological hold points were not exceeded. Additional RP staff monitored workers exposures remotely and viewed the work via closed circuit television. The workers proceeded with the tasks and had a good understanding of their work assignments.

The licensee's evaluations of SGRP evolutions determined that respiratory equipment was not needed for a majority of the work. Several low level radioactive material intakes occurred during the work; however, the dose to the workers from the intakes was verified to be low such that the total dose was minimized. Contamination was effectively controlled such that no significant airborne areas were created as a result of RCS pipe cuts.

c. Conclusions

During the Unit 2 SGRP the licensee was effective in implementing work planning, good ALARA practices, and radiation worker contamination control. With the exception of two high radiation boundary control incidents (discussed in Section R1.4), radiological controls were effectively implemented. Several evolutions collectively exceeded their projected dose by about 15 person-rem due to expanded work scope and additional time required to complete these activities, however the overall projected dose goal of 200 person-rem should be achieved.

R1.3 Transfer of Highly Radioactive Filters

The inspectors reviewed an October 18, 1996, licensee-identified event in which workers transferred highly radioactive filters through an area that was occupied by other workers. A shielded transfer cart was loaded with reactor vessel cavity purification filters and transferred through the containment access covered enclosure (CACE). The measured dose rate at 12 inches from the cart was 200 mrem/hr and it was accompanied by a radiation protection technician during the transfer to the waste storage area. During the transfer, the radiation from the filters caused all the portal monitors in the CACE to high alarm. Contractor personnel were located inside the CACE during the transfer which may have caused them to be subjected to unnecessary radiation exposure. While no violations of NRC requirements were identified, the inspectors determined that allowing the

transfer of a highly radioactive filter which had the potential for unnecessary exposure to personnel was a poor radiological work practice.

#### R1.4 High Radiation Area Boundary Incidents

##### a. Inspection Scope (83750)

The inspectors reviewed and discussed with personnel two incidents where unauthorized personnel partially crossed high radiation area (HRA) boundaries in containment during the steam generator replacement.

##### b. Observations and Findings

On October 22, 1996, a worker on the 8' elevation of containment reached across a high radiation area boundary and lifted a plastic curtain to communicate with another worker. This activity was noted by an NRC inspector and a licensee radiation protection technician (RPT). The RPT immediately went over and corrected the individual. The licensee's survey data indicated that the area immediately beyond the boundary, where the individual's head was, had dose rate measurements of < 1 to 4 mrem/hr. The worker was retrained in HRA controls. The inspectors discussed the incident with the individual, a first time nuclear worker, who did not understand that lifting the curtain did not meet licensee management's expectations regarding control of high radiation areas.

On November 16, 1996, a boilermaker on the 66' elevation reached across a HRA boundary with his arm to adjust a welding machine. This was observed by a RPT via remote camera. The RPT immediately went over and corrected the individual. The welding machine was in a HRA area, but not a posted contaminated area. The licensee's survey data indicated that dose rates in the area of the welding machine were 5-6 mrem/hr.

The inspectors concluded that crossing a high radiation area boundary with a small portion of the body was not considered an entry and therefore, was not a violation of NRC requirements regarding high radiation area controls. A review of licensee procedures indicated that these actions were not specifically prohibited in any licensee procedures. Therefore, no violations were identified associated with these events. However, discussions with licensee management indicated that these actions clearly did not meet their expectations concerning high radiation area controls.

After the second incident all SGRP workers were reinstructed on HRA posted areas and HRA controls, including that the plane of the boundary cannot be crossed.

##### c. Conclusions

Two instances of continuing HRA control weaknesses occurred when two workers partially crossed the plane of HRA boundaries. The inspectors determined that a lack of attention to the controls necessary for work in and around high radiation areas continued to occur by some workers.

## R1.5 General Observations of Unit 2 Outage Work Activities

### a. Inspection Scope (83729)

The inspectors observed working conditions and radiological worker practices in the containment and auxiliary building to determine if appropriate radiation protection controls were being implemented.

### b. Observations and Findings

The inspectors observed activities in the reactor containment building and noted that radiological postings and boundaries were well maintained. Two minor exceptions concerning labelling were brought to the attention of the RP staff who resolved the problems. The inspectors also observed good contamination control practices. Workers demonstrated adequate use of ALARA techniques and were aware of the radiological conditions. With some minor exceptions, personnel donned and removed protective clothing correctly. Personnel were wearing the appropriate dosimetry. Inspector measured dose rates in containment were consistent with those posted by the licensee.

The inspectors interviewed approximately 25 individuals regarding training, HRA boundaries, use of low dose waiting areas, use of personnel protective equipment, and use of appropriate dosimetry. Several of the individuals interviewed were first-time radiation workers. All interviewed workers were aware of HRA boundaries and requirements for entry. They also understood that a HRA boundary plane could not be crossed.

Workers indicated that they used low dose waiting areas when possible and did not remain in containment when they did not have work to perform. Two workers indicated they felt pressure to be in containment and look busy without a specific job; however, no workers indicated they were specifically instructed to be in containment and to look busy. Based on the inspectors' observations of work activities in containment, crew sizes were controlled, workers appeared to be busy, and no obvious problems with persons loitering were identified. The licensee indicated it was their expectation for workers to leave containment when work was finished or when long delays were involved. The 66' level of containment was very congested on several occasions, primarily due to management's decision to have additional supervisors oversee work activities. Dose rates measured by the inspectors on the 66' level ranged from 0.1 to 2.0 mR/hr.

### c. Conclusions

Workers observed and interviewed in containment were wearing the appropriate dosimetry and protective clothing. HRAs and contaminated areas were properly posted and controlled. Interviewed workers had a good understanding of high radiation area entry requirements.

R1.6 Use of Protective Clothing and Personnel Contamination Surveys

a. Inspection Scope (83750)

The inspectors reviewed the licensee's procedures for the use of protective clothing and whole body frisking and observed personnel donning and removing protective clothing (PCs) and their use of contamination monitors.

b. Observations and Findings

The licensee's procedures require PCs to be worn in contaminated areas and, with the exception of modesty garments, personal clothing should not be worn under the PCs; however, the practice is not specifically prohibited. In addition, workers are not required to remove their PC coveralls (when only wearing one set) before exiting a contaminated area, nor are they required to perform a personal survey until they leave the RCA, unless specifically required by RWP. In effect, the policy allows workers to leave a contaminated area with potentially contaminated clothing without having to survey until they actually leave the RCA, which is located outside the auxiliary building.

Inspectors observed individuals removing their PCs and using the whole body friskers before leaving the RCA. It was the inspectors' understanding that individuals were allowed to don clothing after removal of their PC coveralls and before monitoring. This practice was observed by the inspectors on at least one occasion. Because of this practice the inspectors expressed concern that low levels of skin or undergarment contamination may not be detected. This matter was discussed with the licensee who stated that this practice was currently being reviewed. The inspectors will review this matter during a future inspection (IFI 50-266/96016-02(DRS); 50-301/96016-02(DRS)).

The licensee's policy for documenting personal contamination events (PCEs) requires that contamination levels less than 100 cpm above background using a hand held frisker be documented in a log and levels above 100 cpm be recorded as PCEs. The inspectors reviewed personnel contamination event logs and reports, and noted they were complete and included licensee and contractor personnel.

c. Conclusion

Personnel generally donned and removed protective clothing and used the whole body contamination monitors correctly. However, personnel were allowed to leave designated contamination areas in protective clothing and don personal clothing prior to using contamination monitors. This could lead to low levels of contamination on personnel being undetected.

R8 **Miscellaneous RP&C Issues**

- R8.1 (Closed) Unresolved Item 50-266(301)/96004-07: Failure to perform quality assurance on chemistry equipment. The licensee identified that a chemistry quality assurance (QA) test had not been performed on a gas chromatograph (GC) prior to the first sample analysis on April 24, 1996 and that the quality assurance records

for the GC were falsified to make it appear that the test was accomplished. The inspectors' review of licensee records (including chemistry log books and GC computer charts) also concluded that the QA test had not been performed as required by licensee procedures and that the records were falsified to make it appear that the test was done. The licensee's corrective actions included a review of select chemistry analyses performed in April 1996 which determined that no other similar failures had occurred. In addition, the involved technician's employment was terminated.

The inspectors determined that the failure to perform QA was an isolated occurrence and that the licensee's corrective actions were appropriate. Licensee Technical Specification 15.6.8.1 requires, in part, that the plant be operated and maintained in accordance with approved procedures. Major procedures, supported by minor procedures (such as chemistry analytical procedures) shall be provided for operations where these operations involve nuclear safety. Procedure CAMP-107, Revision 22, dated December 5, 1995, Steps 6.1 and 6.21 required a QA check of Hewlett Packard GC (HP5890) before the first analysis was performed each day. The failure to perform the QA check on the GC before the first analysis on April 24, 1996, is a violation of the above technical specification requirements. In considering the appropriate enforcement action for this violation, the minor safety consequences of the violation, the termination of the involved individual, and the non-supervisory level of the involved individual were considered. Based on this, it was determined that this licensee identified and corrected violation would be treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-266/96016-03(DRS); 50-301/93016(DRS)).

#### **X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on December 6, 1996. The licensee acknowledged the findings presented.

The licensee did not identify any information discussed as being proprietary.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

S. Johnson, Site Manager SGRP  
P. Tindall, Health Physics Manager  
E. Lange, Supervisor Health Physics  
E. Epstein, Health Physics Specialist  
D. LeClair, Supervisor Health Physics  
S. Thomas, Acting Radiation Protection Manager  
M. Moseman, SGRP HP Oversight - SGRP HP Coordinator  
C. Wend, SGRP Health Physics Manager, SGT

## INSPECTION PROCEDURES USED

IP 83750 Occupational Radiation Exposure  
IP 83729 Occupational Exposure During Extended Outages  
IP 92904 Followup - Plant Support

## LIST OF ITEMS OPENED AND CLOSED

### Opened

50-266/(301)-96016-01	VIO	Failure to ensure that byproduct material was possessed and used in accordance with License Conditions 2.C, 2.D, or 2.E.
50-266/(301)-96016-02	IFI	Weaknesses in the protective clothing program.
50-266/(301)-96016-03	NCV	Failure to perform quality assurance on chemistry equipment.

### Closed

50-266/(301)-96016-01	VIO	Failure to ensure that byproduct material was possessed and used in accordance with License Conditions 2.C, 2.D, or 2.E.
50-266/(301)-96016-03	NCV	Failure to perform quality assurance on chemistry equipment.

## LIST OF DOCUMENTS REVIEWED

Condition Report No. 96-1138

Condition Report No. 96-1220

Condition Report No. 96-1319

RWP Dose Summary

Point Beach Technical Specification 15.6.11, "Radiation Protection Program"

Health Physics Manual HP 2.1.2, Revision 11, "Personnel Monitoring Requirements for Radioactive Contamination"

Health Physics Manual HP 3.2.3, Revision 13, "RCA Radiation Area and High Radiation Area Posting Requirements"

Health Physics Manual HP 3.2.5, Revision 9, "Radioactive Material Posting Requirements"

Health Physics Implementing Procedures HPIP 2.29, Revision 4, "Personnel Monitoring Requirements for Radioactive Contamination Using the Personnel Contamination Monitor"

Nuclear Manual NP 4.2.19, Revision 1, "General Rules for Work in a Radiologically Controlled Area"

Nuclear Manual NP 4.2.22, Revision 3, "Requirements for Use of Protective Clothing"

Nuclear Manual NP 4.2.23, Revision 1, "Routine Use of Protective Clothing Requirements"

Nuclear Manual NP 4.2.24, Revision 2, "Non-Routine Use Protective Clothing Requirements"

Steam Generator Replacement History and Listing of Lessons Learned

Steam Generator Replacement Project

## SYNOPSIS

This investigation was initiated by the Nuclear Regulatory Commission (NRC), Office of Investigations (OI), Region III (RIII), on October 30, 1995, to determine if a contract employee of NSS NUMANCO (NSS) employed at the Point Beach Nuclear Plant (Point Beach), Two Rivers, Wisconsin, had deliberately exposed his coworkers to radiation from a contaminated particle, as a result of a prank by the contract employee. The investigation was also to determine if the licensee, Wisconsin Electric Power Company (WE), deliberately failed to control the radioactive material, i.e., the contaminated particle and engaged in a cover up of the incident by failing to initiate a Condition Report on the matter. Further, the alleged claimed being discriminated against for bringing to NSS and WE management information regarding the contaminated particle incident.

Based on the evidence developed during the investigation, it is concluded that a NSS contractor deliberately exposed his coworkers to a radioactively contaminated particle in violation of NRC License Conditions and regulations.

The investigation also determined that there was no regulatory requirement to initiate a Condition Report on the incident of misuse of radioactive material by the contract employee.

Further, based on the evidence developed during the investigation, it is concluded that there is insufficient evidence to substantiate the alleged employment discrimination against the NSS contract employee.