U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-305/82-20(DETP)

Docket No. 50-305 License No. DPR-43

Licensee: Wisconsin Public Service Corporation
Post Office Box 1200
Green Bay, WI 54305

Facility Name: Kewaunee Nuclear Power Plant

Inspection At: Kewaunee Site, Kewaunee, WI

Inspection Conducted: October 18-22, November 30, and December 1, 1982

Inspectors: R. A. Paul 12/21/82

W. B. Grant 12/21/82

Approved By: L. R. Greger, Chief 12/21/82
Facilities Radiation
Protection

Inspection Summary

Inspection on October 18-22, November 30 and December 1, 1982 (Report No. 50-305/82-20(DETP))

Areas Inspected: Routine, unannounced inspection of operational radiation protection activities including: effluent control instrumentation, testing of air cleaning systems, reactor coolant water quality, licensee audits, radiation protection procedures, radiological qualification and training, exposure control, in plant radiation protection program, and ALARA. The inspectors also reviewed licensee actions in response to previous inspection findings, status of post-TMI action items and the Performance Appraisal Teams' findings. The inspection involved 106 inspector-hours onsite by three NRC inspectors.

Results: One item of noncompliance was identified concerning container labeling (Section 18).

DETAILS

1. Persons Contacted

C. Luoma, Manager Nuclear Power, WPS
*D. Hintz, Plant Manager
*J. Richmond, Plant Services Superintendent
*M. Reinhart, Health Physics Supervisor
C. Long, Assistant Health Physics Supervisor
*R. Pulec, Nuclear Engineer
R. Snodgrass, Chemist
L. Arno, I&C Supervisor
J. Mueller, Corporate Health Physicist and Director of Training, WPS
G. Holmes, Nuclear Licensing Engineer, WPS
D. Padula, Plant Health Physicist
J. Claus, Chemist
R. Nelson, NRC Senior Resident Inspector

The inspectors also interviewed other licensee personnel.

*Denotes those present at the exit interview.

2. General

This inspection, which began at 8:00 a.m. on October 18, 1982, was conducted to examine the routine aspects of the radiation protection program during normal operations, the status of post-TMI action items, and licensee actions regarding previous inspector findings. The inspectors also reviewed the Performance Appraisal Team's findings.

Several tours of the plant were made. General housekeeping was excellent.

3. Licensee Action on Previous Inspection Findings

(Closed) Bulletin (305/79-19-BB): Packaging of low-level radioactive waste for transport and burial. The licensee has completed all actions required by Bulletin No. 79-19. A QA audit conducted by a licensee contractor and inhouse QA Audits 81-34 and 81-94 were reviewed by the inspectors; the audit results indicated that shipments of low-level wastes are being handled properly.

(Closed) Bulletin (305/80-10-BB): Nonradioactive system contamination. A routine sampling program for potentially contaminated nonradioactive systems has been established by the licensee. Implementation of the program was reviewed previously and is documented in Inspection Report No. 50-305/81-11.

(Closed) Open Item (305/81-11-03): Progress of licensee's new training program. The licensee has developed a systematic training/retraining program for radiation protection personnel. Implementation of this program is scheduled to begin in 1983.

(Closed) Deviation (305/82-14-02): High range radiation monitors were not operational by May 30, 1982. The licensee has corrected the electrical problem affecting operation of the monitors, performed an in situ calibration of both high range monitors and has verified the vendors one-point calibration. An exception to part of the NUREG-0737 calibration requirement has been requested from NRR.

(Closed) Deviation (305/82-14-03): Procedures for the post-accident sampling system were not developed by July 1, 1982. The licensee requested relief from the July 1 date and committed to a November 1, 1982, date by letter dated September 16, 1982. The inspectors were informed by telephone on November 3, 1982, that system modifications had been completed, procedures developed, and three of six chemists trained. This was confirmed by the resident inspector.

(Open) Deviation (305/82-14-01): Procedures for sample collection and analysis for post-accident releases of radioactivity were not developed by July 1, 1982. The licensee has written the procedures. Although the procedures meet the requirement of Clarification Item 2 of Task Action Item II.F.1.2.B.2, they do not meet Clarification Item 1 of the same Task Action Item.

4. Reactor Coolant Water Quality

The inspectors reviewed selected records to determine compliance with technical specification requirements for reactor coolant periodic tests, including: gross beta-gamma activity, tritium activity and chemistry (Cl, F,O). Records for CY82 to date were reviewed; no problems were noted.

No items of noncompliance were identified.

5. Effluent Control Instrumentation

Gaseous and liquid effluent monitoring system calibrations, functional tests, and their respective procedures were selectively reviewed for compliance with technical specification requirements for the period January 1982 through September 1982. Monitor calibrations are conducted annually during refueling shutdowns. No problems were noted.

6. Testing of Air Cleaning Systems

In-place filter tests and laboratory methyl iodide tests of plant ventilation systems were performed by a contractor during May 1982. The in-place testing included visual inspections of the filter installations, DOP testing of the HEPA filters, and freon testing of the charcoal adsorbers. The ventilation systems tested include auxiliary building special ventilation (SV-1A and SV-1B), shield building ventilation (SBV-1A and SBV-1B), and the spent fuel pool ventilation (SFP-1A and SFP-1B). All in-place tests indicated greater than 99 percent removal as required by technical Specifications.

Except for SV-1A and SV-1B, all laboratory tests (methyl iodide) of charcoal samples indicated greater than 90 percent removal as required by technical specifications. The methyl iodide test of SV-1A and SV-1B indicated 87.5 percent and 89.15 percent removal, respectively. To correct this problem fifteen of 27 charcoal filters (cells) in each bank were replaced increasing the removal capacity to greater than 90 percent. Following filter replacement, additional in-place testing was conducted and indicated greater than 90 percent removal. There are no technical specification requirements for testing the other plant ventilation filter systems. However, the control room ventilation system was tested in April 1981; the results of the test were acceptable. Procedures have been written to test that system every two years. Other ventilation systems are normally in-place tested after each filter change.

No items of noncompliance were identified.

7. Radiation Protection Group Staffing

The licensee's current radiation protection staff consists of a Radiation Protection Supervisor (RPS), an Assistant RPS, a corporate Health Physicist (HP), a plant HP, a Lead Technologist, a Rad Waste Technologist, eight Radiation Technologists (RTs), three trainee RTs, and five Radiation Helpers.

A review of the licensee's health physics personnel staff qualifications indicated that the RPS and Assistant RPS, both HPs, and all RTs with the exception of one trainee meet the qualifications specified in Sections 4.3.2, 4.4.4, and 4.5.2 of ANSI/ANS 3.1-1978.

8. Retraining

During the Health Physics Appraisal (HPA), it was noted that only a limited amount of formal RT advancement and retraining activity takes place. Lack of opportunity to learn nuclear plant auxiliary systems and to acquire a better understanding of measurement and data systems was recognized as affecting RT job performance. To correct this weakness, the licensee has developed a retraining program. Although the retraining program had been written, it was noted during this inspection that formal retraining of the RTs had not yet begun.

In response to the inspectors' concern regarding the need for implementing the retraining program for RTs, the licensee stated that the corporate HP has been given the responsibility of initiating a plant wide retraining program which includes the RTs. This matter was discussed at the exit interview.

9. Licensee Audits

The inspectors reviewed the annual licensee Quality Assurance Directive (QAD 12.2) audits of February 17, 1981, and January 18, 1982. The audits examined the implementation and adequacy of radiation protection and chemistry procedures to ensure compliance with requirements. The audits do not include a technical evaluation of the effectiveness of the health

physics and chemistry program. Persons conducting the audit are members of the corporate QA staff, which does not include specialists with training in radiation protection and chemistry.

The Technical Review Committee last conducted a technical audit of the radiation protection program in 1979. This committee is comprised of licensee staff with technical backgrounds. According to the licensee, the Technical Review Committee has not conducted more frequent program reviews because of other job demands. This matter was discussed at the exit interview.

10. Radiation Protection Procedures

The inspector reviewed the following radiation protection procedures:

RC-HP-27	Revision D	Personnel Dosimetry
RC-HP-32F	Revision B	Dose Prediction Program
RC-HP-32I	Draft	Inverse Dose Program
RC-HP-38A	Revision E	Radioactive Material Receipt, Storage and Transfer
RC-HP-38B	Revision 0	BC-48-220 Cask Shipping Procedure
RC-HP-38C	Revision A	14-195H Cask Shipping Procedure
RC-HP-38D	Revision 0	21-300 Cask Shipping Procedure
RC-HP-44	Revision A	Whole Body Counting
RC-HP-58B	Revision A	SPING-4 Iodine Cartridge Changeout

Procedures RC-HP-27, 32I, and 44 each describe certain parts of the whole body counting program. It appeared that improved clarity and ease of implemention would result from incorporating these parts into a single procedure. Procedure RC-HP-32I, as drafted, cannot be used to predict MPC-hours based on whole body uptakes. Procedure RC-HP-58B needs revision before it can be used to meet the requirements of NUREG Task Action Item II.F.1.2. These matters are discussed in Sections 13 and 21.

11. Exposure Control - External

The licensee's external exposure control program is essentially the same as the program described in the Health Physics Appraisal (HPA)[1]

A review of the licensee's whole body exposure records for CY82 indicate the highest personal exposure through September was 2.084 rems. The total cumulative dose for the same period was 92.44 person rems of which 73.76 person rems were received during the refueling outage during April and May 1982.

The licensee has an informal QA/QC program for comparing vendor and in-house TLD results. The program consists of five TLD badges, randomly selected from each supply, which are paired and exposed to a known dose of gamma radiation. The ratio of the TLD doses between the vendor and in-house TLDs is used to identify potential problems in the program. In addition, the licensee intends to compare the TLD results from each system

[1] Inspection Report No. 50-305/82-26.

with the calculated dose from the gamma sources, which are verified yearly using NBS traceable calibrated R-chambers.

12. Exposure Controls - Internal

The licensee controls internal exposures through engineering controls, air sampling and contamination surveillance programs, and use of approved respiratory protection equipment. A bioassay program is utilized to evaluate program effectiveness.

The whole body counter (WBC) and counting program is essentially the same as described in the Health Physics Appraisal.[2] The inspectors selectively reviewed whole body count results for 1982; no results exceeding the 40 MPC-hour control measure were noted. The WBC is vendor calibrated every two years. The last calibrations were in May 1980 and March 1982.

A review of the licensee's WBC program during a previous inspection indicated that the licensee's whole body counting procedures did not relate whole body counting data to MPC-hours. The licensee has since developed a draft procedure (RC-HP-32I) for that purpose. However, a review of the procedure indicated it could not be used to compute MPC-hours from whole body/organ burdens. It was also noted that the Airborne Evaluation Sheet used to compute worker stay times had incorrect MPCs listed for particulates with greater than eight-day half-lifes. These matters were discussed at the exit interview.

13. In-Plant Radiation Protection Program

a. Surveys

The inspectors selectively reviewed radiation, contamination, and airborne radioactivity surveys conducted to meet surveillance requirements and determine radiation work permit requirements. No problems were noted.

b. Posting and Access Controls

The inspectors reviewed radiation, high radiation, and contamination area postings within the plant controlled area. In addition to the postings required by 10 CFR 20.203, the licensee posts dose rate and contamination levels at the entrance to the controlled area. No problems were noted.

14. Solid Radwaste

During the Health Physics Appraisal,[3] it was noted that solid radwaste operations account for a high percentage of the total station staff radiation dose. The radwaste operator usually has the highest annual dose of the station staff. Among other things, the Health Physics Appraisal determined the cause to be insufficient ALARA engineering support to the radwaste area.

[2] Ibid.
[3] Ibid.

In response to this weakness, the licensee hired a degreed HP whose duties include radwaste operations and ALARA engineering. During this inspection, it was noted that the radwaste operator's whole body exposure was still among the highest of the station staff. According to the plant HP, the following ALARA actions have been taken to reduce exposures associated with solid radwaste operations.

a. Purchase of a fork lift carrier which allows remote filling and capping of 55-gallon drums containing high activity letdown filters.

b. An evaluation of volume reduction systems.

c. The cement used with the solidification system allows easier cleanup and therefore individuals spend less time in the radwaste area.

d. A review of operational problems.

e. Training of radwaste operator in methods to reduce exposure.

This matter was discussed at the exit interview.

15. Contamination Control Monitors

The licensee has two G-M type portal monitors in the gatehouse to detect low-level personal contamination. Independent measurements were made by the inspectors to check the sensitivities of the portal monitors. Cesium-137 check sources, totaling 3 µCi's, placed at different locations on an inspector's body did not alarm either monitor. Also, a 1 µCi cesium-137 source placed on the floor plate of the monitor did not alarm the units. The results of these tests were discussed at the exit interview.

16. Instrument Calibration

Technical Specification 4.1-1 requires annual calibration of portable radiation survey meters. Procedure RC-HP-42 requires survey instruments to be calibrated at six-month intervals. The inspectors reviewed instrument calibration records for the period CY 1982 to date. No problems were noted.

17. Computerized Record Systems

The licensee uses a computerized radiation protection information management system which allows the entry and retrieval of radiation protection information. Data retrieved from the system can be shown on the computer display screen or on a reproduced hard copy.

At the request of the inspectors, the licensee reproduced hard copies of selected daily air sample results from computer storage. A question remains regarding the ability to authenticate computer records. This matter will be reviewed further during a subsequent inspection. (305/82-20-02)

18. Performance Appraisal Inspection (50-305/81-27)

The Performance Appraisal Section (PAS) of the Division of Reactor Programs performed an appraisal inspection of the licensee on December 7-18, 1981 and January 5-8, 1982. The inspection included an examination of radiation protection procedures and records, observations of radiological work activities, and interviews with management personnel. Four potential enforcement findings (PEF) were identified concerning radiation protection activities.

One PEF was related to unlabeled containers of radioactive material found during routine tours of the auxiliary building. The inspectors reviewed this finding and confirmed that unlabeled plastic bags containing radioactive materials were present in the auxiliary building. Radiation levels on one such bag, measured during the PAS inspection, were as high as 35 mrem/hr. The containers did not bear radioactive material caution labels as specified in 10 CFR 20.203(f). All such containers were within the licensee's radiologically controlled area. This was identified as an item of noncompliance. (305/82-20-01)

A second PEF was related to failures to follow licensee procedures concerning signing the "Control Area Log Sheet" and initiating an RWP before entering a controlled area. The inspector reviewed this matter and found that: (1) The violations were identified by the licensee and recorded in the Health Physics Log; (2) These violations were not reportable to the NRC; (3) Corrective measures to prevent recurrence were taken; (The corrective measures consisted of strongly emphasizing the need for procedural adherence with the persons who violated the procedures.) (4) These types of violations have had little recurrence; and (5) No programmatic weaknesses or breakdown led to the violations. No further problems of this type were identified during this inspection.

A third PEF concerned licensee activities related to 10 CFR 20 requirements which were conducted without approved plant procedures. These activities included the operation of the computerized radiation protection information system; the calculation and compilation of liquid effluent data; and the quantitative fit testing of respiratory protection devices. The inspectors' review of this matter found: (1) A formalized procedure (RC-HP-32-C) has been developed and implemented to control the administration of the quantitative fit testing program of respiratory devices. (2) The licensee's documented system description manual which is used to control the operation of the computerized radiation protection information system will be incorporated into a formal procedure. The procedure will include all current programs, describe what the system does, and how to use the system. (3) The licensee uses Surveillance Procedure (Liquid Waste Discharge Procedure, SP-136) to control effluent discharges. The procedure requires that the "Radiological Liquid Waste Discharge Permit Form" be completed prior to a liquid discharge to ensure regulatory requirements are not exceeded. Minor revisions to the procedure will be made concerning the posting of calculated discharge values onto the effluent discharge log and onto the semiannual effluent reports. No significant problems have been noted in the implementation of activities in these three areas during this, or previous, inspections. This matter will be reviewed further during a future inspection and was discussed at the exit meeting. (Open Item 305/82-20-03)

The fourth PEF concerned 10 CFR 71, Appendix E requirements (Criteria 5 and 10) for shipments of greater than Type A quantities of radioactive materials without approved plant procedures to control the filling, labeling, inspection, and radioactivity content determination of waste containers, and without a documented quality control inspection program for radwaste packaging and shipment. A review of this finding indicated that the licensee has approved operating procedures for the filling of waste containers and for determining the curie content of each container. The inspectors also found that Quality Assurance Directive 7.2 provides for an annual audit of low-level radiation shipments, which includes Type B shipments. The purpose of this audit is to ensure that low-level radiation shipments are conducted in accordance with established and approved procedures. The licensee also uses a check-off list, which is part of each Type B cask shipping procedure (RC-HP-38B, 38C, and 38D), for each Type B shipment. The check-off list requires that specific phases of the shipment are inspected. The list is verified by a person other than the one involved in the actual preparing of the shipment, thereby providing a check on the quality of the shipping operation. Some functions concerning shipments of greater than Type A quantities of radioactive material could be better documented. In recognition of this, the licensee intends to develop an Administrative Control Directive (ACD) which will include the rad waste procedures and outline the steps and responsibilities of each group involved in the shipping, packaging, and auditing of Type B shipments. Procedures, including label verification requirements, an expansion of the check-off list inspection activities for shipping and cask loading, and QA criteria will be formalized. These matters will be reviewed further at a future inspection and were discussed at the exit meeting. (Open Item 305/82-20-04)

Additional radiation protection program weaknesses identified during the Performance Appraisal Section inspection included (1) coverage of plant administrative control directives, (2) personnel selection and qualification criteria, (3) evaluation of program effectiveness in QA audits, (4) formal ALARA program including a commitment by corporate managemant, and (5) formal system to identify violations of radiological control procedures. The inspectors reviewed the licensee's action in response to these weaknesses. The licensee intends to complete a formal written program by the end of 1982 which will include Radiation Protection, Respiratory Protection, and Radiation Protection Training Manuals. In addition, specific actions have been taken to improve and strengthen certain observed weaknesses. According to licensee personnel, changes are not presently planned regarding the ALARA program and the informal method of identifying and correcting violations of radiological control procedures.

19. Transportation Activities

The inspectors reviewed Health Physics Procedures No. 38A through 38D, which cover the licensee's program for radioactive material receipt, storage, transfer, and cask shipping. The procedures appear to contain sufficient instructions to satisfy the requirements of 49 CFR Parts 170-189 and 10 CFR 71.

Selected records of shipments made from January 1, 1982, to date were reviewed. The following problems were identified from the records review and discussions with licensee personnel: (1) record inconsistencies in shipment classification as Type A or Type B quantity; (2) erroneous definition of Type B quantities; (3) failure to clearly define "package" in shipment records; (4) erroneous drum identification in shipping record; (5) erroneous calculational method for determining activity concentration in liquid filter packages; and (6) failure to implement procedures to ensure performance of required package maintenance.

No noncompliance with regulatory requirements was identified as a result of these problems. One reason for this is that the licensee normally ships the radwaste drums in an NRC certified cask even though use of the cask is not required by regulation. However, the total of these problems appears indicative of a need for improvements in the licensee's radioactive waste transportaiton program. This matter was discussed at the exit interview.

20. TMI Action Plan Items II.B.2.2, II.F.1.1.B.2 and II.F.1.2.B.2

a. Plant Shielding (II.B.2.2)

The inspectors reviewed procedure EP-RET 3C, (Post-accident operation of the High Radiation Sample Room) and traced the planned path from the Radiation Analysis Facility in the technical support center to the High Range Sample Room and back to the Radiation Analysis Facility in order to evaluate the potential sources of radiation under post-accident conditions. During this walk-down, the inspectors discussed potential post-accident sources of radiation with the licensee representatives and made observations concerning stay times for the personnel involved in the implementation of this procedure. The inspectors also reviewed the licensee's calculated doses, provided in an attachment to a letter from the licensee to NRR dated September 14, 1982.

Based on these reviews, it appears the licensee can implement Procedure EP-RET 3C to obtain and analyze post-accident reactor coolant samples without radiation exposures to any individual exceeding the criteria of GDC 19 (5 rems whole body, 75 rems extremity).

b. Noble Gas Effluent Monitor (II.F.1.1.B.2)

The licensee has installed two SPING-4 extended range noble gas effluent offline monitors. One SPING-4 samples the containment/shielding building vent stack and the other samples the auxiliary building vent. Each monitor contains three noble gas detectors (low, intermediate, and high ranges). The monitors readout in the Radiation Safety Office and the Radioanalytical Facility near the Technical Support Center.

Clarification Item 4(b) requires the use of procedures or calculational methods for converting instrument readings to release rate per unit time based on, among others, radionuclide spectrum distribution. The licensee assumed the use of energy compensated

Geiger-Mueller (G-M) tubes in the intermediate and high range detectors would allow them to meet this requirement. However, the operational characteristics of the energy compensated G-M tubes have not been substantiated as meeting Clarification Item 4(b) requirements. This Task Action Item remains open pending resolution of this matter.

c. Sampling and Analysis of Plant Effluents (II.F.1.2.B.2)

The sampling system discussed in Section 20.b is also used to collect particulate and iodine samples for isotopic analysis.

Clarification Item 2 for this Task Action Item requires that radiation exposures not exceed 5 rem whole body and 75 rem extremities during sample removal, replacement, and transport for the duration of the accident. During a previous inspection,[4] the licensee's failure to develop procedures to meet Clarification Item 2 requirements was identified. The licensee has since written a procedure (RC-HP-58B) addressing this matter. The procedure would allow the licensee to meet Clarification Item 2 exposure limits by interrupting the sample flow to the SPING-4 particulate and iodine collection media until the media is replaced. However, the ability to continuously sample plant effluents, required by Clarification Item 1, will not be satisfied if the SPING-4s sample flow is interrupted. This matter was discussed at the exit interview. This Task Action Item remains open pending resolution of this concern.

21. TMI Action Plan Task II.B.3 Post-Accident Sampling

The high range sample system (HRSS) supplied by Sentry Equipment Company and NUS Corporation is essentially complete. As stated in a previous inspection report.[5] the reactor coolant sampling and analysis portion of the system has been tested and is considered operational. Modifications of the containment atmosphere sampling system which will permit dilution and analysis of samples of containment air were in progress during the inspection. The licensee expected to complete them by November 1, 1982. NRR is conducting a postimplementation review of this system from information submitted by the licensee by letter dated September 14, 1982.

The licensee informed Region III by telephone on November 3, 1982, that system modifications testing had been completed, procedures modified, and training of three of six chemists accomplished. This was confirmed by the resident inspector.

This item remains open pending completion of NRR review.

22. Exit Interview

The inspectors met with licensee representatives (denoted in Section 1) on October 21 and at the conclusion of the inspection on October 22, 1982. The inspectors summarized the scope and findings of the inspection. In response to certain items discussed by the inspectors during these meetings, the licensee:

[4] Inspection Report No. 50-305/82-14.
[5] Ibid.

a. Stated that ALARA engineering in the radwaste area would continue. A design Change Request (DCR) would be issued for a shield wall in the solidification area. (Section 14)

b. Stated that retraining of RTs will begin in 1983. (Section 8)

c. Stated that the Technical Review Committee will attempt to make more frequent HP program audits. (Section 9)

d. Stated that procedure (RC-HP-32I) will be revised so that it can be used to compute MPC-hours from whole body count data. Also, the Airborne Evaluation Sheet will be corrected to reflect the proper MPCs for particulates with greater than eight-day half-lifes. (Section 12)

e. Stated that the purchasing of a more sensitive portal monitor is being considered. (Section 15)

f. Stated a review of Procedure RC-HP-58B as written, will be made to determine if it can be used to meet the continuous sampling requirements of Task Action Item II.F.1.2.B.2. Also, a review will be made to determine if airborne radioactivity will limit access to the SPING-4 during accident conditions. (Section 21)

g. Stated that those sections of Procedures RC-HP-27, RC-HP-32I and RC-HP-44 which describe certain parts of the whole body counting program will be incorporated into one procedure. (Section 10)

h. Stated that a formal procedure would be developed by October 1, 1983, covering the radiation protection computerized information system and that Procedure SP-136 would be revised by January 1, 1983. (Section 18)

i. Stated that formalized radwaste procedures would be developed and an ACD generated covering package, shipping and auditing of Type B shipments prior to the next shipment of Type B quantities. (Section 18)

j. Acknowledged the inspector's comments regarding the radioactive material transportation activities and stated that increased management attention would be directed to this area.