U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-266/88003(DRSS); 50-301/88003(DRSS)

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

Licensee: Wisconsin Electric Power Company
231 West Michigan
Milwaukee, WI 53201

Facility Name: Point Beach Nuclear Plant (PBNP)

Inspection At: PBNP; Units 1 and 2, Two Rivers, Wisconsin

Inspection Conducted: January 11-15, 1988

Inspectors: R. A. Paul — 2-12-88 Date

W. J. Slawinski — 2-12-88 Date

Approved By: L. R. Greger, Chief
Facilities Radiation Protection
Section — 2-11-88 Date

Inspection Summary

Inspection on January 11-15, 1988 (Reports No. 50-266/88003(DRSS); No. 50-301/88003(DRSS))
Areas Inspected: Routine unannounced inspection of the radiation protection program including: organization and management controls (IP 83722), audits and appraisals (IP 83722), external and internal exposure controls (IP 83724, 83725), facilities and equipment (IP 83727), and contamination control (IP 83726). Also reviewed were Radiological Event Reports and open items, and the status of spent fuel pool leakage, fuel integrity, and disposition of slightly contaminated sewerage sludge.
Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

*M. Baumann, Radiological Engineer
*R. Bredvad, Plant Health Physicist
*D. Johnson, Superintendent, Health Physics
J. Knorr, Regulatory Engineer, Nuclear Plant Engineering
*J. Zach, Plant Manager

*R. Hague, NRC Senior Resident Inspector
*R. Leemon, NRC Resident Inspector

The inspectors also contacted other plant staff during this inspection.

*Denotes those present at the exit meeting held on January 15, 1988.

2. General

This inspection, which began on January 11, 1988, was conducted to examine the routine aspects of the radiation protection program. The inspection included several tours of the plant, independent surveys, and review of license records and reports. General housekeeping was good.

3. Licensee Actions on Previous Inspection Findings

(Open) Open Item (266/87019-01; 301/87019-01): Actions taken as a result of vendor TLD results that are consistently lower than licensee calculated values for spiked TLDs. (See Section 6 for status of open item)

(Open) Open Item (266/87019-02; 301/87019-02): Results of the licensee's evaluation to determine the adequacy of the RMS surveillance program. The evaluation is currently in progress and is about 75% completed.

4. Licensee Response to NRC Concerns

During previous inspections (Inspection Reports No. 266/86016; 301/86015 and No. 266/87011; 301/87010) and a meeting conducted in Region III on June 18, 1987, programmatic weaknesses concerning the health physics program were identified. In a letter to the NRC dated August 13, 1987, the licensee addressed these matters; including a commitment to implement full time HP coverage. The following is the status of the licensee's actions concerning these weaknesses:

- Whole body frisker contamination monitors have been purchased and installed at the exit from the radiologically controlled zone. The monitors were being calibrated during this inspection and will be operational by the end of January, 1988.

- The Radiation Work Permit (RWP) will be the mechanism used to require frisking of primary protective clothing (PCs) used in areas where excessive contamination may occur. Currently there is no frisking requirement for primary PCs to be surveyed near the step-off-pad (SOP) after the secondary PC's have been removed.

- Additional hand held frisker stations have been installed at work locations having a high risk potential for personal contamination. More stations will be installed during outages.

- Approximately 105 health physics procedures which were identified as requiring inclusion or modification of precautionary statements have been revised.

- Radiation monitoring calibration procedures currently being reviewed for adequacy will have step-by-step task sequencing revisions made by January 30, 1988.

- Formal training of appropriate Nuclear Power Department personnel has been completed concerning the appropriate management approvals for direct supervision for jobs involving radiological controls.

- Training and qualification of grandfathered supervisors in those areas of identified need has been completed.

- To meet the commitment to provide 24-hour health physics coverage and to reduce the impact of staff turnover and unavailability, the RCO/RCOT staff has been increased from 12 in April 1987 to 20 in January 1988. Of the 20 RCO/RCOTs, seven are qualified RCOs. The licensee expects to have 11 qualified RCOs by October 1988, and although their commitment to provide 24-hour coverage is for January 1, 1989, they may be able to implement coverage by late 1988.

- The corporate review of the plant health physics organization to identify appropriate staffing levels, evaluate the organizational structure, recommend program efficiency improvements, and determine if management control systems are adequate has been completed. Actions to be taken on the recommendations will follow.

- The evaluation of the RCO position by the Labor Relations Division has been completed. Based on the findings of this evaluation it appears the licensee intends to upgrade both title and salary of RCOs.

5. Organization, Management Controls, and Staffing (IP 83722)

The inspectors reviewed the licensee's organization and management controls for radiation protection, including changes in the organizational structure and staffing, effectiveness of procedures and other management techniques used to implement the program, and experience concerning self-identification and correction of program implementation weaknesses.

A corporate staff health physicist has assumed the Superintendent-Health Physics (S-HP) position and reports to the General Superintendent with a direct reporting path to the Plant Manager as necessary for radiological matters. The Plant Health Physicist (HP), the Radwaste Supervisor and three Nuclear Specialists report to the S-HP. Reporting to the Plant HP are four HP supervisors and 20 RCOs/RCOTs. There was no significant staff turnover in 1987.

6. External Exposure Control and Personal Dosimetry (IP 83724)

The licensee's TLD quality control program remains essentially as previously described (Inspection Reports No. 266/87019; 301/87019). The licensee normally spikes ten TLDs to each of three exposure ranges using their TLD irradiator, which contains a nominal 600-microcurie cesium-137 source. Five TLDs at each of three exposure ranges are similarly spiked for the licensee by the National Bureau of Standards (NBS). Both of these sets of TLDs are sent to the licensee's dosimetry vendor for processing; the vendor is not informed of the source(s) used for TLD spiking.

Vendor analysis of TLDs spiked in 1986 were typically 20-25% less than both licensee and NBS spiked (calculated) values. In 1987, similar biases were noted in the vendor's analysis. In addition to using their TLD calibrator, the licensee also began spiking TLDs using their instrument calibrator containing a nominal 400-curie cesium-137 source in 1987. This resulted in similar biases of somewhat lesser magnitude. These negative biases suggest possible vendor processing related problems.

To investigate this discrepancy, the licensee's Corporate QA group plans to audit the vendor in the Spring of 1988. The vendor was last audited by the licensee in 1985. In addition, the licensee recently began expanding the TLD QC program to include graphical and tabular recording of TLD spike results and plans to (beginning in April 1988) randomly choose the dose equivalent exposure levels within the test range. As part of the expanded program, the licensee plans to expose extremity monitoring devices and occasionally spike TLDs to beta and neutron emitters. The inspector suggested the licensee spike TLDs with other beta-gamma emitters to ascertain if similar biases are noted with isotopes of various energies, and to question the vendor regarding calibration factors for energy spectrum compensation. These matters will continue to be reviewed during a future inspection (Open Item 266/87019-01; 301/87019-01).

The inspectors selectively reviewed dosimetry records for 1987 including vendor TLD and licensee SRD results. A review of Forms NRC-4 was made for selected individuals issued dosimetry in 1987. No exposures greater than 10 CFR 20.101 limits were noted; however, two individuals were noted to have exceeded the licensee's administrative quarterly whole body exposure limit of 2500 mrem. The two contract specialist workers received 2600 mrem and 2650 mrem, respectively, while performing steam generator

tube sleeving work during the station's Unit-2 outage in October and November 1987. Due to the scope of the work and radiation levels in the area, the workers were expected to receive exposures approaching the administrative limit. TLDs were sent for vendor processing after cumulative SRD data indicated 2175 mrem for Worker No. 1 and 2450 mrem for Worker No. 2. Vendor TLD analyses showed 2600 mrem (nearly 20% higher than SRD) and 2500 mrem for Workers No. 1 and No. 2, respectively. The licensee subsequently added 150 mrem to the exposure record for Worker No. 2 to include additional unaccounted dose resulting from uncertainties in TLD placement on the worker. A Condition Report (CR) was issued and the licensee is currently evaluating the event; a response to the CR is due to the site QA group by February 1, 1988. The licensee's evaluation of this matter will be reviewed during a future inspection (Open Item 266/88003-02; 301/88003-02).

Total (station) exposure for 1987 through November is approximately 530 person-rems. This exceeds the licensee's goal of approximately 370 person-rems but is less than the licensee's 700 person-rem average over the previous five years and about equals the average over the proceeding three years. In 1987, both units underwent major refueling/ maintenance outages. The Unit-2 outage in October and November 1987 accounted for about 325 person-rems. The major modifications performed on Unit-2 during the refueling outage were: repiping the resistance temperature detector (RTD) bypass manifolds to reduce future exposure while doing loop maintenance; sleeving of 89 steam generator tubes which indicated 36% or more through wall defects; and moisture preseparator installation. Total RTD work accounts for nearly 120 person-rems and steam generator sleeving for about 150 person-rems. These activities were not planned to be performed in 1987 and were not factored into 1987 exposure goals. The 1988 exposure goals had not yet been established.

The licensee also used the newly acquired ultrasonic fuel assembly defect detection equipment to inspect all assemblies which were to be reused in the core reload. The equipment was installed on the floor of the refueling cavity which eliminated the need to send each assembly to the spent fuel pool for inspection. This saved a significant amount of time and reduced assembly manipulations to a minimum.

No violations or deviations were identified.

7. Internal Exposure Control (IP 83725)

The inspectors reviewed the licensee's internal exposure control and assessment programs, including changes to procedures affecting internal exposure control and personal exposure assessment; determination whether engineering controls, respiratory equipment, and assessment of individual intakes meet regulatory requirements; planning and preparation for maintenance and refueling tasks including ALARA considerations; and required records, reports, and notifications.

The program to control internal exposures includes engineering controls, air sampling and contamination surveillance, limiting exposure times to airborne concentration, approved respiratory equipment, and protective clothing. Whole body counting is used to supplement the monitoring program to ensure its effectiveness.

A commercial whole body counter is used to determine personal internal contamination. A weekly spectrum check is performed on the system using low level cobalt-60 and cesium-137 mixed with water in a test phantom. In addition, an americium-241 check source is mounted on the frame near the detector. The method of using phantoms of mixed nuclide sources for system performance checks appears to meet ANSI N343-1978 "American National Standard for Internal Dosimetry for Mixed Fission and Activation Products" criteria. It appeared the weekly spectrum checks are performed in accordance with the requirements of procedure HPIP.1.5.7.2, Revision 5. The inspectors noted that no exposures greater than the 40 MPC-hour control measure occurred in 1987.

8. Facilities and Equipment (IP 83727)

The inspectors reviewed relevant procedures and records of functional checks and calibrations conducted in 1987 to date for the Gamma-10 portal monitors and discussed monitor alarm setpoint methodology with the licensee. The station maintains four portal monitors; three located at the south gatehouse and one at the north gate. The monitors are operated in a "timed-out" six-second count mode. Station procedure HPCAL 2.7, "National Nuclear Corporation (NNC) Gamma-10 Portal Monitor", is established to direct the performance of functional checks of the monitor and calibration of it's single channel analyzer (SCA). HPCAL 2.7.1, "Gamma-10 Portal Monitor Calibration Procedure", is established to optimize portal monitor operation and to determine operating characteristics. Parts of the latter procedure are implemented by direction of Health Physics Supervision in the event monitor operation is unsatisfactory or suspect, significant problems are encountered during SCA calibrations, and/or pursuant to manufacturer's recommendations. HPCAL 2.7.1 includes determination of the monitor's minimum reliable detectable activity (MRDA) (i.e. the minimum activity, integrated over the surface area of a standard man, that will alarm the monitor 90% of the time corresponding to the lowest efficiency detector).

Functional checks for the portal monitors are normally performed weekly using a nominal 120 nCi mixed Cs-137/Co-60 source. The check includes confirmation that monitor alarms activate four out of five times with the source in the geometric center of the monitor's detectors. Calibration of the SCA is performed yearly, or whenever the sensitivity/functional test reveals a problem in the SCA adjustment. Calibrations are conducted using Ba-133 and mixed Cs-137/Co-60 NBS traceable sources. All four of the portal monitor's SCAs were calibrated since June 1987, and were adequately performed in accordance with procedures; no problems were noted. Monitor alarm setpoints are established to achieve 100% alarm using a 140-nCi

mixed source, and varying SCA sensitivity to limit false alarm rates from background fluctuations to less than six per hour. The setpoints translate to detector sensitivity of greater than 5000 dpm/100 cm^2, which meets the guidance in IE Circular No. 81-07. MRDAs were determined to be approximately 100 nCi for each monitor within the last two years.

The inspector also reviewed records of efficiency determinations for alpha and beta/gamma counting equipment used for analyzing air and area smear samples. The efficiencies are typically determined every calendar quarter or more frequently if a detector tube was replaced or counter geometry changed. Pu-239 (alpha) and Sr-90/Yt-90 (beta) disc sources are used for the determinations. Records were reviewed for 1987 to date and showed that efficiencies for equipment currently in use were determined pursuant to and at the frequency required by HPIP 5.58, "Counting Equipment Efficiency Determination". No problems were noted.

The licensee has purchased four Eberline PCM-113 whole body friskers and is currently installing and calibrating three of the units. The units will replace the hand-held detectors used at the access control checkpoint. Plant personnel have reportedly been trained on the proper use of the new monitors. The calibrations of these units and procedures for their operation will be reviewed during a future inspection (Open Items 266/88003-03; 301/88003-03).

No violations or deviations were identified.

9. Audits (IP 83722)

The licensee's site QA group recently performed (December 14-22, 1987) an audit of selected aspects of the station's radiation protection program. The audit focused on establishment and implementation of radiation protection procedures, their correlation to the health physics policy manual, and included direct observation of radiological control operator trainee (RCOT) field performance. The audit identified two findings and several deficiencies concerning posting, procedural inadequacies and RCOT performance. The audit report is pending issuance. Audit results and partial or proposed corrective actions were discussed with the licensee and are detailed below.

One audit finding concerned improper RCOT performance promulgated by HP Supervisory interpretation of a technical specification regarding authorization/notification on ingress/egress of high radiation areas; the individuals involved were counseled concerning the technical specification requirement. The second audit finding concerned posting of a high radiation area (>1R/hr) contrary to health physics procedures; immediate actions were taken to correct the posting discrepancy. Five deficiencies were identified and involved posting inadequacies and lack of procedural guidance/specificity and resultant RCOT performance. Short-term corrective actions included posting corrections and additional training. The licensee is developing long-term corrective actions to address the identified problems. A task force established to improve posting weaknesses is discussed in Section 15. Formal response to the

audit findings is normally required 30-days after issuance of the audit report; the report is planned to be issued by February 8, 1988. The audit report and implementation of corrective actions will be reviewed during a future inspection (Open Items 266/88003-01; 301/88003-01).

No violations or deviations were identified.

10. Control of Radioactive Materials and Contamination (IP 83726)

The inspectors reviewed the licensee's program for control of radioactive materials and contamination, including: changes in instrumentation, equipment, and procedures; effectiveness of survey methods, practices, and procedures; adequacy of review of dissemination of survey data; effectiveness of methods of control of radioactive and contaminated materials; management techniques used to implement the program; and experience concerning self-identification and correction of program implementation weaknesses. Audits are discussed in Section 9.

a. Survey Program

Procedure HP 3.1, "Radiological Surveys and Records", directs the performance of surveys in radiologically controlled and uncontrolled areas. Surveys are performed by members of the radiation protection staff and include smears, direct measurements, hot spot updating, and collection of air samples as deemed necessary. RCOs/RCOTs perform routine daily surveys in various areas of the auxiliary building and in selected uncontrolled areas so that most auxiliary building areas are surveyed at least once per week. Certain areas are resurveyed daily depending on potential changing conditions. The inspectors selectively reviewed routine controlled area (auxiliary building) and uncontrolled area survey results for 1987 to date and records of nonroutine surveys in support of 1987 Unit-2 outage activities; no problems were noted. Most general auxiliary building areas are maintained at less than 300 dpm/100 cm^2 beta/gamma smearable; areas which exceed this limit are posted as a contamination area. RWPs are normally required for work in areas exceeding 10,000 dpm/100 cm^2 beta/gamma smearable.

The inspectors reviewed the licensee's radiological control program for tools and equipment which are used in radiologically controlled areas. The requirements for control of contaminated tools and equipment are described in procedure HP 3.5. Based on the inspectors findings, it appears the controls are in accordance with procedural requirements.

b. Personal Contamination Events

Station Health Physics Procedure HP 2.1.2 requires all incidents of personal (skin or clothing) contamination detected as a result of hand-held frisking to be reported on form CHP-39 (a). Similarly, HP 1.11 requires reporting of contamination initially detected by portal monitors on CHP-39 (b). All personal contamination reports

are entered in a computerized Personal Contamination Tracking System which identifies several parameters including detection method, location of contamination, and probable cause, and allows tracking/trending.

In 1986, 221 personnel contamination incidents were reported; approximately 87% of these met INPO reporting criteria (i.e. 100 cpm above background detected on skin and/or clothing). The majority of the events were detected by hand-held frisking and were primarily contamination of hands, head or socks. In 1987, 159 personnel contamination incidents were reported, 82% met INPO criteria. No hot particle contamination events were reported since the last inspection (Reports No. 266/87019; No. 301/87019). In October 1987, 40 contamination incidents were reported and coincide, with peak Unit-2 outage activities when steam generator tube sleeving and resistance temperature detector repiping work was performed. The majority of October events were skin contamination on the hands and legs/ankles; most were detected using hand-held friskers. The licensee does not currently use state-of-the-art whole body contamination monitors and relies on conventional hand-held friskers; however, as discussed in Section 8, the licensee has purchased several whole body contamination monitors which are expected to be operational early in 1988. Use of such monitors tend to increase the number of personnel contaminations identified.

No violations or deviations were identified.

11. Incident Reports (IP 83722)

Selected Radiological Incident Reports (RIRs) for 1987 were reviewed. Upper management, including the Plant Manager, routinely review these incidents for matters of generic significance and appropriate corrective action. The most significant problem noted during the review of the incidents was shortcomings concerning documentation and followup of identified problems. This matter was discussed with the Supervisor-HP who stated that he also identified weaknesses involving the intent, use, and implementation of the RIR system, specifically those areas concerning root cause analysis, preventing recurrences, and trending events. As a result, an action item has been initiated to develop an RIR root cause analysis program to strengthen the RIR system. This matter was discussed at the exit meeting and will be reviewed during a future inspection. (Open Item 266/88003-04; 301/88003-04).

12. Spent Fuel Pool Liner Leakage

The station's two-units share a spent fuel storage pool consisting of a single pool with a four-foot thick reinforced concrete divider wall separating the pool into north and south sections. An opening is provided in the divider to allow movement of fuel and water between pit halves. A common transfer canal traverses the east side of the pool, separated from the main pool sections by reinforced concrete walls. A gated opening is provided in both sections of the pool/transfer canal wall to permit fuel

assembly movement between the main pool and transfer canal and to allow isolation from the main pool. To reduce liner leakage of pool water through the walls or floor, interior surfaces are lined with a stainless steel plate. Collection (leakoff) channels are provided between the plate and the concrete wall to allow detection of leakage through the liners' weld joints. Three leakoff lines exist, one from each of the north and south pool sections and one from the common transfer canal. The leakoff channels drain into a collection bottle housed within a dike to retain possible overflow. The dike drains to the waste holdup tank thereby collecting all liner leakage.

The licensee has established a surveillance procedure to monitor liner leakage. Pursuant to PC-33, (Revision 0), dated March 15, 1983, the licensee performs shiftly surveillances and records the water height in the collection bottle. At least once a month, the collected liquid is analyzed by the station's chemistry group and a monthly leak rate is determined. Reportedly, leakage rates over the last several years average less than one liter/month with the following exception. In early August 1987, transfer canal leakage was identified at a maximum rate of approximately six gallons per day. The canal was drained in late August and the leak was subsequently repaired. No further leakage was detected.

No violations or deviations were identified.

13. Fuel Assembly Inspections - Prevention of Leaking Fuel

The licensee is not currently operating with failed fuel. The licensee performs a 100 percent ultrasonic inspection of each in-core rodlet prior to insertion in the core to ensure that each rodlet placed into the core is not leaking. This pratice was started following incidents identified in 1985 in which the licensee identified at least two instances of fuel erosion and one instance in which a fuel rodlet was severed resulting in loose fuel pellets. Since then, the licensee has made an upflow modification to reduce the potential for fuel failure. The upflow modification reduces water jetting impingement which could cause vibration in each fuel assembly.

14. Surveillance; Independent Surveys; Plant Tours

Based on several tours of the plant the inspectors noted: (1) Posting, labelling and radiological controls for radiation and high radiation areas were in accordance with regulatory requirements; however, some observed current practices concerning labelling of containers used to store or collect radioactive material need improvement. As a result of these observations the plant manager issued a memo to all plant personnel instructing them to ensure that containers using radioactive material are clearly labelled. To accomplish this, the following practices are to be followed:

- DRUMS: Two labels are to be applied at the middle of the opposite sides of the drum.

- BOXES: Labels should be applied to each end of the box. For box-type containers with lids, one label should be applied to the lid.

- BAGS: Bag-type containers are to have the opening sealed with radioactive material tape or a visible label affixed to the side of the bag.

- OTHER: Labeling for containers other than that noted above should be applied in such a manner that it is readily visible to personnel handling and/or working in the near vicinity of the container.

In addition, the licensee is considering the purchase of pre-labeled "Radioactive Material" plastic bags for use in all containers designated for radioactive material. (2) Barrels containing what appeared to be new and unused protective clothing and equipment were observed to be inappropriately labelled with "Radioactive Material" labels on the outside of the barrels. This same observation was made during a previous inspection (Inspection Reports No. 266/87019; 301/87019) after which the labels were removed from the containers. Although, it is not the licensee's intent to store non-radioactive material in containers labelled as such, during preparation for and during outage conditions, the barrels often times have mixed contents of PCs, some with fixed radioactivity and some without radioactivity. These matters were discussed at the exit interview and will be reviewed during a future inspection (Open Item 266/88003-05; 301/88003-05). (3) Independent radiation surveys performed by the inspectors indicated radiation postings corresponded to the actual radiation fields. The results of approximately 20 smears of horizontal surfaces, floors, and equipment indicated no areas were in excess of the licensee's limit for controlling contaminated areas (300 dpm/100 cm^2). (4) No persons were observed violating requirements; this includes observation of workers performing activities under the requirements of different RWPs.

15. Environmental Assessment and Finding of No Significant Impact

In response to the licensee's applications dated July 14, August 6, and October 8, 1987, for approval for application of slightly radioactive sewerage sludge to surrounding land owned by the licensee, the NRC concluded that the proposed action will not have a significant effect on the quality of the human environment. This response is documented in an attachment to a letter to the licensee dated December 16, 1987, from the Division of Reactor Projects, NRR.

In a subsequent letter to the licensee dated January 13, 1988, the commission approved the procedures for disposal of the sludge under 10 CFR 20.302(a). The licensee is committed to follow these procedures to minimize the risk of unexpected or hazardous exposures.

Based on these findings the licensee intends to transfer the slightly radioactive sewerage sludge to the land sites in the near future. The licensee's adherence to the specified conditions will be reviewed during a future inspection (Open Item 266/88003-06; 301/88003-06).

16. Exit Meeting

The inspectors met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on January 15, 1988. The inspectors summarized the scope and findings of the inspection. The inspectors also discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee identified no such documents/processes as proprietary. In response to certain items discussed by the inspectors, the licensee:

a. Stated that the RIR system is in the process of being strengthened (Section 11).

b. Stated that actions will be taken to correct the weaknesses noted in the labelling of containers used for collecting radioactive and non-radioactive materials/equipment (Section 15).