U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-266/87003(DRSS); 50-301/87003(DRSS)

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

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

Facility Name: Point Beach Nuclear Power Plant

Inspection At: Point Beach Site, Two Creeks, Wisconsin

Inspection Conducted: January 5-9, 1987 and
Telephone discussion, January 21, 1987

Inspectors: R. B. Holtzman — Date: 2/3/87

M. J. Oestmann — Date: 2/3/87

J. E. House — Date: 2/3/87

Approved By: M. C. Schumacher, Chief
Radiological Effluents and
Chemistry Section — Date: 2/3/87

Inspection Summary

Inspection on January 5-9, and 21, 1987 (Reports No. 50-266/87003(DRSS); No. 50-301/87003(DRSS))
Areas Inspected: Routine unannounced inspection of: (1) chemistry and radiochemistry, including water chemistry control; quality assurance/quality control of sampling and analysis in the laboratory, observations of technician performance in the laboratory and sampling facilities; (2) training and qualifications of the chemistry staff; (3) confirmatory measurements of non-radiological samples; and (4) licensee internal audits.
Results: No violations or deviations were identified during this inspection.

DETAILS

1. Persons Contacted

J. Zach, Manager-PBNP, WEP Co.
J. C. Reisenbuechler, Superintendent EQRS, WEP Co.
[1,2]T. L. Fredericks, Superintendent-Chemistry, WEP Co.
R. F. Arnold, Supervisor-Chemistry, WEP Co.
J. E. Knorr, Regulatory Engineer, WEP Co.
F. A. Flentje, Administrative Specialist, WEP Co.
M. J. Logan, Quality Engineer-EQRS, WEP Co.
T. L. Slack, Nuclear Specialist, WEP Co.
S. Gucwa, Training Specialist, WEP Co.
K. Berglin, Radiation Chemistry Technician
R. Bruno, Director, Training Program, WEP Co.
D. Gesch, RCT, WEP Co.
S. Gifford, RCT, WEP Co.
D. Weyenberg, RCT, WEP Co.
R. Neustadter, Chemistry Specialist, WEP Co.
R. L. Hague, Senior Resident Inspector, NRC
R. J. Leemon, Resident Inspector, NRC

The inspectors also interviewed other licensee personnel in various departments in the course of the inspection.

[1]Denotes those present at the plant exit interview on January 9, 1987.

[2]Telephone discussion on January 21, 1987.

2. Licensee Action on Previous Inspection Findings

a. (Closed) Open Item (50-266/84014-01; 50-301/84012-01): Development of RCT Training Program and completion of training of five new RCTs in chemistry. The inspectors discussed the status of the RCT training program with licensee representatives and reviewed lesson plans and tasks performed by the five RCTs. All five RCTs have completed the formal lecture program and the on-the-job-tasks to gain experience for performing sampling and analysis required in chemistry.

b. (Open) Open Item (50-266/86009-02; 50-301/86009-02): Detailed review of counting room QC during a subsequent inspection. The inspectors reviewed the quality control program for the radiological instruments, including the Ge (Li) spectrometers, the Canberra Alpha/Beta counter, and Packard Tri-Carb liquid scintillation counter (LSC). The licensee has run performance standards of Co-60 and Cs-137 daily and, since November 1986, has plotted the results on control charts for the Ge (Li) detectors. The program also includes the counting of standard sources weekly in which, in a computer printout, the activity of each of the various nuclides is compared to its reference value. The inspectors were concerned because the control limits on the charts were arbitrarily set at ±5% of the

mean value, rather than being based on the variabilities of the actual counting rates, e.g., two or three standard deviations about the mean. Further, for the Canberra alpha/beta counter and the LSC, the control source data were tabulated, but not plotted on control charts. Licensee representatives considered the program adequate for their needs, but they noted the concerns and agreed to consider the more conventional QC methods. Since aspects of this program have only recently been instituted, this item is will kept open to examine progress in the radiological QA/QC program.

3. Management Controls, Organization and Training, and Qualification

The inspectors reviewed the management controls and organization of the Radiation Chemistry Department. A Chemistry Supervisor, Radwaste Supervisor, and four Nuclear Specialists report to the Radiochemist. Eight Radiochemical Technician's (RCTs) and two trainees work under the Chemistry Supervisor. The Radiochemist meets the qualifications of the routine description provided in ANSI/ANS 3.1-1978 and appears to have adequate management support to effectively meet plant chemistry requirements. The Supervisors and the Nuclear Specialists have Bachelor of Science Degrees in Chemistry and have been at Point Beach for five or more years. The eight RCTs, four of whom have Bachelor of Science Degrees in Chemistry, also meet the requirements described in ANSI/ANS 3.1-1978. The two trainees with about a year's experience will complete their training by 1988, including completion of their qualification OJT cards.

Review of the training program for RCTs indicates that extensive lesson plans with over 600 tasks have been developed by the Training Department. This Department works closely with the Radiation Chemistry Department to develop training programs to meet the needs of the Department.

A new technician will take about two years to complete the course Modules which involve 37 weeks of direct contact time. Course material is prepared by an experienced RCT who now works full time in the training program. The inspectors reviewed the Ion Chromatography Module which provided basic knowledge of the ion exchange process and fundamentals of Column Chromatography. Detailed information concerning equipment operation was provided. Observation of RCTs performing Ion Chromatography indicated that this training Module provides the necessary education for operation of the Ion Chromatograph.

The licensee is seeking INPO accreditation by the end of 1987 or 1988. The licensee's training of personnel along with a well qualified staff has resulted in a well established Chemistry Department.

No violations or deviations were identified.

4. Water Chemistry Control Program

The inspectors reviewed the licensee's PWR Water Chemistry Control Program based on a corporate policy issued on January 9, 1985 and Procedure PBNP 8.4.1, "Secondary Water Chemistry Monitoring Program," Revision 8, dated September 5, 1986. This program meets Technical Specification requirements and is consistent with the Steam Generators Owners Group Guidelines. This program adequately addresses management policies, assignment of authority and responsibilities to implement the program, and provides guidance on operational chemistry limits designed to minimize localized corrosion in steam generators and turbines. An analytical measurements program, performance monitoring of the program, data management and trending of chemical data, and definitions of action levels when off-normal values are obtained are also included. Procedure 8.4.1 is presently undergoing revision to incorporate the PWR primary water chemistry control limits which will be similar to those published in a recent document on this subject issued by EPRI.

The inspectors confirmed through review of log sheets on secondary chemistry and of trend plots of key chemical parameters with time that the licensee is currently satisfactorily implementing this program. The licensee began this program in 1984 and from the plots it is evident that water chemistry quality has improved with time. There are fewer instances when off-normal values required imposition of Action Levels. The licensee prepares Excursion Reports which detail the causes and consequences of operating with off-normal values of chemical parameters and corrective action taken to restore the plant or system to normal operating values. Through improvements in the make up water treatment plant (see Section 5), the licensee has been able to operate plant systems with improved water quality. Trend plots reviewed were for cation conductivity, chloride, sulfate in steam generators blowdown and conductivity in water storage tanks and in condensate. From discussion with licensee representatives and review of records, the inspectors confirmed that the Chemistry Department and Operations Department work closely together to maintain tight controls over water quality.

No violations or deviations were identified.

5. Plant System Affecting Water Quality Control

The inspectors reviewed the feedwater purification system. Since the plant does not have condensate polishers, the quality of makeup water is critical. Because the existing treatment plant cannot provide makeup water at the rate needed during reactor startups, a new treatment facility has been designed and is being built. It is expected to be on-line by early 1988. This plant will be housed in a new building along with the new cold chemistry laboratory. The overall process will not change, but additional clarification and demineralization capacity, along with some filter modifications, will provide a throughput of 400 GPM to satisfy startup requirements of 375-500 GPM. A 300,000 - 500,000 gallon capacity

reservoir for purified makeup water is to provide sufficient water reserve during startups. Improved monitoring systems will be included in the expanded water treatment operation.

No violations or deviations were identified.

6. Implementation of the Chemistry and Radiochemistry Program

The inspectors reviewed the primary and secondary chemistry programs including the physical facilities, laboratory operations, and the counting room. Procedures and practices followed in the hot and cold laboratories and counting room were reviewed.

Laboratory space is marginally adequate for the number of laboratory personnel and the amount of testing performed. The hot and cold chemistry areas are contained in a single room with yellow/black tape separating the two areas. The counting room is separate but small and crowded. This situation is to be resolved this year with the construction of a new building to house the cold chemistry laboratory. The space now housing chemistry and the counting room will have only the hot laboratory and the counting room.

Housekeeping was good and the laboratories are well equipped. Reagent bottles observed were found to be properly labeled. No solutions or chemicals were found that had passed their stated expiration dates. The chemistry laboratories are equipped with modern, computerized instruments and laboratory personnel operating the instruments appeared competent and well-trained in their use. The laboratory instrumentation included a Perkin-Elmer Atomic Absorption Spectrophotometer, a Hewlett-Packard Gas Chromatograph, two Dionex Ion Chromatographs, a Milton Roy Spectrophotometer (out of service due to burned out bulb), Orion pH meters and automatic boron titration equipment. No calibration stickers indicating date and frequency of calibration were observed on laboratory instrumentation. Further inquiry disclosed that there was no log book for each instrument although some information for equipment is maintained in a file. Documentation for instrument maintenance and calibration needs improvement through better organization. Also, there is no reagent preparation logbook showing formulation procedures for all reagents and a record of their preparation including the name of the person, date, weights, volumes and lot numbers of reagents used in preparation. This information is kept by RCTs in their individual note books. This is a cumbersome practice which makes it difficult to track down the preparation history of a given reagent. Licensee representatives noted the inspector's concerns and agreed to consider the suggested modifications. Improvement in instrument maintenance and reagent preparation documentation will be reviewed in a subsequent inspection. (Open Item 50-266/87003-01; 50-301/87003-01)

Counting room equipment is of good quality and appears to be well maintained. The room has four Ge(Li) detectors operated by a Canberra Series 90 computerized gamma ray spectrometry system. A Canberra Alpha-Beta proportional counter is available for gross alpha/beta counting.

Chemistry Analytical Methods and Procedures (CAMPs) have been markedly improved and well implemented. The following procedures were reviewed and the actual analyses monitored by the inspectors:

CAMP - 202	Ammonia: Colorimetric - Nesslerization, Revision 5, 11-26-86,
CAMP - 205	Boron: Titration - Mannitol/PH Method, Revision 5, 10-3-86,
CAMP - 217	Hydrazine: PDAB Colorimetric Method, Revision 2, 11-08-85,
CAMP - 211	Chloride Analysis Using a "GAMRAD" Chloride Electrode, Revision 5, 05-24-85, and
CAMP - 500	Perkin-Elmer Model 2380 Operating Instructi ns, Revision 0, 07-07-81. (Iron, Copper, Nickel and Chromium)

The inspectors observed an RCT collect primary coolant samples taken in the Primary Sampling Room. The RCT appeared knowledgeable in following the appropriate procedure, obtained the samples with no difficulty and used proper radiological practices in handling the solutions.

Improved analytical capabilities have enabled the chemistry laboratory to provide greater assistance to plant operations in maintaining the plant within the required operational parameters. The secondary water system must be within defined limits of key chemical parameters such as chloride, fluoride, and sulfate during reactor operation. The acquisition of two Dionex Ion Chromatographs has provided both accuracy and precision (low ppb range) plus rapid sample analysis.

No violations or deviations were identified.

7. Implementation of the QA/QC Program in the Chemistry Laboratory

The inspectors reviewed the non-radiological Chemistry QA/QC program described in the procedures and implemented in the laboratory. The program was based on the Chemistry Administrative Procedures.

CAMP-001	PBNP Chemistry Laboratory Quality Assurance Program, Revision 2, 06-13-86,
CAMP-107	PBNP Analytical Chemistry Intra-laboratory QA Checks, Revision 0, 05-24-85, and
CAMP-108	PBNP Analytical Chemistry Sample Spiking QA Checks, Revision 3, 10-31-86.

The instruments were calibrated at one or two points and performance was monitored regularly with check samples, usually near the upper and lower ends of the analytical ranges of the analyses, including pH, boron, silica, fluoride, chloride, and sulfate, hydrazine and ammonia. Since November, 1986, control charts were maintained on some, but not all of the instruments used to perform these analyses. In other cases, data on various parameters were tabulated, such as for the analyses of chloride, fluoride and sulfate, done on the ion chromatograph (IC). Precision and accuracy values of the analyses were available only from data acquired prior to early 1985. The inspectors noted that improved estimates of analytical variability and control of the analyses could be obtained by the use of charts, particularly if the control limits were based on recent results. Licensee representatives recognized these concerns and stated that the QC program is still under development and improvements are being considered for it.

Performance of the technicians and precision of the procedures were monitored with sets of spiked samples submitted to each RCT semi-annually. The results were tabulated for each RCT and the acceptabilities were noted on the data sheet, based on the acceptance criteria for each type of analysis as given in Table 2 of CAMP-107. This procedure provides for the handling of out-of-limit results. The inspectors' review of the performance checks showed the results to be generally satisfactory.

Overall, the licensee's QA/QC program appears to provide a basis for the development of a satisfactory quality assessment program, particularly on the control of the analytical procedures and on the proficiencies of the RCTs. However, the assessment of the data is weak and needs improvement with more control charts on the instrument performance. The progress of this program and the development of the above procedures will be reviewed at subsequent inspections (Open Item 50-266/87003-02; 50-301/87003-02)

No violations or deviations were identified.

8. Non-radiological Confirmatory Measurements

The inspectors submitted chemistry samples to the licensee for analysis as part of a program to evaluate the laboratory's capabilities to monitor chemical parameters in various plant systems with respect to various Technical Specification and other regulatory and administrative requirements. These samples had been prepared and standardized for the NRC by the Safety and Environmental Protection Division of Brookhaven National Laboratory (BNL). The samples were analyzed by the licensee using routine methods and equipment.

The samples were diluted by licensee personnel as necessary to bring the concentrations within the ranges normally analyzed by the laboratory, and run in triplicate along with routine samples. The results are presented in Table 1 and the criteria for agreement in Attachment 1. These criteria

for agreement are based on comparisons of the mean values and estimates of the standard deviations of the measurements. Consideration was given the fact that the uncertainties of the licensee results were not necessarily representative of those of the laboratory because they were obtained by one analyst doing the analyses over a short period of time. Consequently, when the licensee standard deviation was less than that of BNL, the latter value was substituted for the licensee standard deviation (Sx) in calculating the standard deviation (Sz) of the ratio (Z). Nineteen of the 29 licensee results were in agreement with those of BNL and 10 were in disagreement. Most of the fluoride, sulfate, ammonia, and boron values were in good agreement, while those for the metals done by atomic absorption spectrometry (AAS) appeared to be high with respect to the BNL values, which resulted in disagreements. The hydrazine sample showing disagreement reflected a bias of unknown origins. The same result was obtained by two different RCTs at substantially different times.

The last column of Table 1 shows the agreements based on the licensee's "Acceptance Criteria for QA Comparisons," in Table 2 of CAMP-107. These criteria result in 12 disagreements in the 23 comparisons. Seven of the agreements by the NRC criteria are disagreements under the acceptance criteria of CAMP-107. Possible causes of the discrepancies are contamination of the diluting solutions and equipment, and defective calibration standards. Unless the glassware had been washed with extreme care the analytes from previous samples could be contaminants.

In a subsequent telephone discussion, the Radiochemist stated that the laboratory was investigating aspects of their analyses, such as reanalysis of the metal ion samples using new standards, to determine the causes of the disagreements. Progress of this assessment will be examined in a subsequent inspection under Open Item (50-266/87003-03; No. 50-301/87003-03).

No violations or deviations were identified.

9. Water Sampling Monitoring and Processing

The inspectors reviewed water treatment, sampling, and monitoring programs. Sampling and monitoring panels for the secondary side were observed. On-line instrumentation was recently upgraded and has the capability of measuring cation conductivity, pH, hydrazine, and dissolved oxygen. Primary side monitors including cation conductivity and pH were observed and found operable. Grab samples from the primary side were analyzed for gamma isotopic radiation, boron, chloride, fluoride dissolved oxygen, sulfate, and cation conductivity. Overall monitoring of water quality (primary and secondary) is good.

No violations or deviations were identified.

10. Licensee Internal Audits

The inspectors examined licensee internal audits and surveillances in the area of chemistry and radiochemistry performed in 1985 and 1986 by the licensee's QA Department and offsite Review Committee to assure compliance with T/S 15.6.5.3. The inspectors noted in particular that the Secondary System Chemistry Program Audit (AR-A-P-85-06) conducted in June 12-14, 1985 appeared to be comprehensive. Checklists from the audit and responses to the findings were no longer readily available at the plant; licensee representatives stated that adequate response to several concerns identified in the audit had been made. Another audit in this area will be performed within the next few months which will be reviewed in subsequent inspections. The licensee agreed to have a complete audit package available for review including checklists, responses to all findings and observations, and closure of findings.

No violations or deviations were identified.

11. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspectors, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Sections 6, 7 and 8.

12. Exit Interview

The scope and findings of the inspection were reviewed with licensee representatives (Section 1) at the conclusion of the inspection on January 9, 1987. Further findings were discussed in a telephone conversation with the Radiochemist on January 21, 1987. The inspectors discussed the use of instrument repair and maintenance logbooks and the uses of control charts in the QA/QC Program. The licensee representatives noted the inspectors' concerns that not all analytical or instruments procedures had control charts and that the control limits were based on percentages of mean values, rather than on standard deviations calculated from the data from the procedure. They agreed to consider the suggested modifications.

During the exit interview, the inspectors discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. Licensee representatives did not identify any such documents or processes as proprietary.

Attachments:
1. Table 1, Non-radiological Interlaboratory Test Results
2. Attachment 1, Criteria for Comparing Analytical Measurements

TABLE 1

Non-Radiological Interlaboratory Test Results
Point Beach Nuclear Plant, Units 1 and 2

January 5-9, 1987

Comparison Parameter	Analysis Method	NRC $Y \pm S_y(n)$ [a]	Licensee $X \pm S_x(n)$	Ratio $Z \pm S_z$	Comparison [b] NRC	Comparison [b] CAMP [c]
			Concentration, ppb			
Chloride	IC	24.1±3.1(7)	29.3±2.3	1.22±0.18	A	D
		37.4±1.2(7)	43.0±2.6	1.15±0.08	A	D
		80.5±2.2(8)	87.3±2.9	1.08±0.05	A	A
Fluoride	IC	23.1±0.5(8)	20.7±2.3	0.895±0.100	A	D
		43.5±1.9(8)	40.7±0.6	0.936±0.043	A	A
		83.5±2.8(7)	78.7±3.2	0.942±0.050	A	A
Sulfate	IC	20.0±0.9(7)	20.7±2.3	1.04±0.12	A	A
		41.0±2.4(8)	39.7±0.6	0.968±0.59	A	A
			Concentration, ppm			
Boron	Titration	985±10.(7)	999±1	1.014±0.010	A	D
		2980±50.(7)	2987.±6	1.002±0.017	A	A
		4870±60.(6)	4990±3	1.025±0.013	A	D
Ammonia	Spectrometric	87.6±5.3(9)	84.0±2.0	0.959±0.062	A	A
		314±26.0(8)	269.3±2.3	0.858±0.071	A	A
		938±85.(7)	886.7±11.5	0.945±0.087	A	A
Hydrazine	Spectrometric	22.3±1.4(7)	20.3±0.6	0.910±0.063	A	A
		56.9±0.7(7)	51.3±0.6	0.902±0.017	D	D
		104±1.(7)	104.7±1.2	1.006±0.015	A	A
Iron	AAS	4.89±0.35(13)	8.57±0.06	1.75±0.12	D	D
		9.55±0.34(14)	14.2±0.21	1.47±0.06	D	D
		14.5±0.6(13)	18.3±0.6	1.26±0.07	D	D
Copper	AAS	4.68±0.24(12)	5.68±0.14	1.21±0.07	D	D
		9.66±0.49(14)	11.0±0.22	1.14±0.06	D	D
		14.5±0.6(13)	16.1±0.15	1.11±0.05	D	D
Nickel	AAS	5.09±0.26(6)	5.75±0.17(4)	1.13±0.07	A	-
		10.2±0.3(7)	11.3±0.21(4)	1.11±0.04	D	-
		15.3±0.4(6)	17.35±0.3(4)	1.13±0.04	D	-

Chromium	AAS	5.1±0.3(6)	5.15±0.13(4)	1.01±0.06	A	-
		9.4±0.3(6)	10.45±0.17(4)	1.11±0.04	D	-
		14.3±0.8(6)	15.85±0.17(4)	1.11±0.06	A	-

a. Value ± standard deviation; n is number of BNL analyses. The number of licensee analyses is 3 unless otherwise noted.

b. A = Agreement.
D = Disagreement.
- = Not given in CAMP-107.

c. Licensee criteria for agreement in Procedure CAMP-107.

ATTACHMENT I

Criteria For Comparing Analytical Measurements

This attachment provides criteria for comparing results of capability tests. In these criteria the judgement limits are based on the uncertainty of the ratio of the licensee's value to the NRC value. The following steps are performed: (1) the ratio of the licensee's value to the NRC value is computed

$$\text{ratio} = \frac{\text{Licensee Value}}{\text{NRC value}} ;$$

(2) the uncertainty of the ratio is propagated.[1]

If the absolute value of one minus the ratio is less than or equal to twice the ratio uncertainty, the results are in agreement. ($|1-\text{ratio}| \leq 2$ uncertainty)

$$Z = \frac{x}{y}, \text{ then } \frac{Sz^2}{Z^2} = \frac{Sx^2}{X^2} + \frac{Sy^2}{Y^2}$$

(From: Bevington, P. R., Data Reduction and Error Analysis for the Physical Sciences, McGraw-Hill, New York, 1969)