U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-155/94008(DRSS)

Docket No. 50-155 License No. DPR-6

Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Big Rock Point Nuclear Plant

Inspection At: Big Rock Point Site, Charlevoix, Michigan

Inspection Conducted: March 28 through April 1, 1994

Inspector: S. K. Orth 4-8-94
Date

Approved By: J. W. McCormick-Barger, Chief
Radiological Programs Section 1 4/10/94
Date

Inspection Summary

Inspection on March 28 through April 1, 1994 (Report No. 50-155/94008(DRSS))
Areas Inspected: Routine announced inspection of the chemistry program including: (1) radiological confirmatory measurements (Inspection Procedure (IP) 84750), (2) quality assurance/quality control (QA/QC) program in the laboratory (IP 84750), (3) chemistry organization and changes (IP 84750), (4) reactor water quality (IP 84750), and (5) the radiological environmental monitoring program (REMP) (IP 84750).
Results: No violations were identified. The radiological confirmatory measurements indicated that the licensee's chemistry measurements continued to be very good. The licensee had four disagreements in the analysis of liquid radioactive waste, but this was attributed to the quality of the sample split and the settling of particulates in the liquid (Section 3). With the exception of the chemistry supervisor, the chemistry group continued to be very stable and experienced (Section 2). The laboratory quality control program and radiological environmental monitoring program were well implemented and maintained. However, the maintenance and operability of chemistry instruments was a concern (Section 4). Following the last outage in March 1994, the licensee experienced difficulties in the control of turbidity and in the performance of ion exchange resins (Section 7).

DETAILS

1. Persons Contacted

*E. Bogue, Chemistry and Health Physics Manager
*T. Popa, Chemistry Supervisor
*M. Bourassa, Licensing Supervisor
G. Withrow, Plant Safety and Licensing Director
J. Rang, Decommissioning Project Team Leader
C. Barsy, Senior Chemistry Technologist
D. Parish, Senior Chemistry Technologist

R. Leemon, Senior Resident Inspector, USNRC

*The above personnel were present at the exit meeting on March 31, 1994.

Other licensee personnel were contacted during the course of the inspection.

2. Management Control and Organization (IP 84750)

The chemistry group implemented a supervisory change since the last inspection (Inspection Report No. 50-155/92025(DRSS)). The former chemistry supervisor (CS) was reassigned to the licensee's decommissioning project team effective September 1993. After minimal turnover, the licensee's ALARA coordinator was temporarily reassigned as CS. This individual had an associate of science degree in science and pre-engineering and had been a radiation protection/chemistry technologist from about 1982 through 1988. Although the individual's background and experience in chemistry met the licensee's Technical Specification requirements, the inspector discussed the individuals limited chemistry background and recent chemistry experience with the licensee. The manager of chemistry and health physics understood the inspector's concerns and indicated that the appointment was temporary and that the responsibilities of the support staff have been increased. The inspector expressed this concern at the exit meeting (Section 8).

The chemistry staff continued to consist of four senior chemistry technologists (CTs). These individuals have been on the staff for several years, were experienced, and provided adequate resources for completing chemistry sampling and analyses requirements.

No violations or deviations were identified.

3. Radiological Confirmatory Measurements (IP 84750)

The licensee maintained three high purity germanium (HPGe) detectors to analyze samples for gamma emitting nuclides; however, one of these detectors was not functioning during the inspection. Five samples (air particulate filter, charcoal filter, composite liquid radioactive waste, primary coolant, and gas) were analyzed by the licensee and in the

Region III mobile laboratory. Comparisons were made on two of the three licensee's HPGe detectors. Additionally, an air particulate filter (AP) standard was analyzed and compared. The results of these comparisons are listed in Table 1 with the comparison criteria in Attachment 1.

The licensee achieved 49 agreements out of 60 comparisons. Four of the comparisons were disagreements, and seven comparisons were below the licensee's detection limits.

The licensee analysis of the composite liquid radioactive waste (radwaste) sample resulted in four disagreements. The inspector reviewed the licensee's interlaboratory comparison program for this analysis; radioanalytical results were consistently in good agreement. When the licensee transferred and analyzed the NRC's aliquot of the sample, the results were in better agreement with NRC measurements. The licensee noted that both the licensee and NRC's samples contained small quantities of particulates. The inspector attributed the initial disagreements to the adequacy of the sample split and the settling out of the particulates. The licensee agreed with the inspector's assessment.

The composite liquid radwaste sample will be analyzed by the licensee for iron-55, strontium(Sr)-89, Sr-90, and hydrogen-3 activity, and the results will be reported to Region III. A portion of this sample will be analyzed by the NRC reference laboratory. The results of these analyses will be tracked as Inspection Follow-up Item (IFI) No. 50-155/94008-01(DRSS).

The inspector observed licensee personnel collecting and preparing samples. Overall, the CTs demonstrated good technique and radiation protection practices.

Prior to this inspection, the licensee also analyzed a liquid sample for Sr-90 activity, which had been prepared by the NRC reference laboratory. The licensee's results were in good agreement with the NRC's reference laboratory's analysis.

No violations or deviations were identified; however, one inspection follow-up item was identified.

4. Implementation of the QA/QC Program in the Laboratory (IP 84750)

The inspector reviewed the chemistry laboratory quality assurance/ quality control (QA/QC) program. Quality control of the laboratory instruments was good.

The licensee maintained performance trend charts for each of the HPGe detectors and proportional counters. Daily, CTs analyzed performance standards and documented results in both graphical and tabular forms. QC results within a statistically determined three standard deviation band from the mean were considered in statistical control. Additional QC analyses and investigations were performed if the results were not

acceptable. The CTs reviewed the trends daily and weekly to identify performance problems. Quarterly, the licensee performed a statistical comparison of the mean and standard deviation to the previous quarter's results. The inspector reviewed these trends and noted that they were properly maintained and that biases were properly identified and evaluated. However, the inspector noted that the licensee's documentation included only minimal detail of investigations and corrective actions.

The inspector reviewed the licensee's instrument log which indicated several, repeated HPGe detector operability problems. The inspector also noted that a corrosion product monitor had been out of service for approximately one year and that the licensee had delayed installation of a permanent, reverse osmosis water treatment system. The inspector discussed the timely resolution of chemistry instrument operability problems with licensee representatives at the exit meeting (Section 8). The inspector stressed the effect of instrument operability on the reliability and adequacy of chemistry measurements and the monitoring of chemistry parameters. The licensee acknowledged the inspector's concerns but indicated that plant priorities had delayed certain chemistry maintenance activities.

The licensee participated in an interlaboratory comparison program administered semiannually by a vendor. Overall, the licensee's results for 1992 and 1993 were excellent.

No violations or deviations were identified.

5. Radiological Environmental Monitoring Program (REMP)(IP 84750)

The inspector reviewed the 1992 Annual Radiological Environmental Operating Report, which contained sample collection and analysis results as required by the licensee's Technical Specifications (TS). All samples were below TS reporting limits. Sample anomalies and missed samples were documented within the report; however, corrective actions for missed samples were not always included. The inspector discussed the lack of documentation of corrective actions with the manager of health physics and chemistry, who acknowledged the inspector's comments.

The inspector observed the licensee's sample collector replace air particulate and charcoal filters at several of the licensee's environmental air sampling stations. The air samplers were operational, in good material condition, and within calibration. The sample collector demonstrated good analytical technique in removing and replacing air filters. The sample collector also continued to maintain control charts for monitoring the performance of each air sampling station.

No violations or deviations were identified.

6. Audits and Appraisals (IP 84750)

The inspector reviewed the 1992 and 1993 environmental monitoring audits (Nos. PT-92-06 and PT-93-09, respectively) and 1993 chemistry audit (PT-93-05). The audits were of good detail. Some observations were focussed on sampling techniques and adequacy of analyses, but generally observations were focused on TS compliance instead of performance based issues.

The 1993 REMP audit (PT-93-09) resulted in a finding that indicated that REMP procedures were not revised when air sampling units were modified. The inspector discussed the finding with licensee personnel who indicated that the effected procedure had been properly revised. The inspector stressed the importance of reviewing and revising procedures to address system modifications at the exit meeting (Section 8).

The inspector discussed the quality assurance (QA) function with members of the QA staff. The QA department was recently realigned into teams which reflect the performance areas of the NRC's Systematic Assessment of Licensee Performance (SALP) program. Often the particular audit team included specialists from other facilities. The QA staff indicated that the focus of QA audits was changing and should address the inspector observations regarding the lack of performance based audit observations. The QA staff discussed the integrated assessment plan which would greater utilize formal audits and field monitoring activities to perform a complete assessment of a particular area.

The inspector reviewed the qualification of auditors performing REMP and chemistry audits. The auditors had backgrounds consistent with chemistry and radiation protection and appeared well qualified.

No violations or deviations were identified.

7. Water Chemistry Parameters (IP 84750)

The inspector reviewed the licensee's March 1994 start-up turbidity level increase and ion exchange resin problems. The turbidity level of condensate and radwaste systems increased as a result of draining and filling the condensate system, containment sumps, and steam drum to perform outage work on several components. On March 15, 1994, the radwaste ion exchange resin was exchanged adding additional suspended solids into the radwaste system. In aggregate, these evolutions introduced elevated levels of turbidity in the condensate and radwaste systems in excess of the licensee's start-up limit, which was established to prevent plugging of the control rod drive (CRD) block filters.

The operations staff exacerbated chemistry problems during the fill of the steam drum. Initially, water from the clean waste receiver tanks was processed through the radwaste filters and demineralizers. During the evolution, the differential pressure across the radwaste filters and demineralizers increased, indicating that the mechanical filters were

exhausted. Instead of delaying the water transfer to changeout filters and ion exchange resins, the operations staff continued to process water through the demineralizer, bypassing the mechanical filter and exhausting the resins, which further degraded the water chemistry.

Concurrently, the licensee encountered difficulties with ion exchange resins placed in the radwaste demineralizers. The licensee replaced the radwaste resins with a nonroutine type of resin which had been used in the condensate demineralizers and had shcwn effective ionic removal, especially of iron and copper impurities. Following the resin exchange, the radwaste system was measuring sustained, elevated effluent organic contaminants and ionic conductivity. Added to the turbidity problems, the licensee was tasked with responding to the possible resin failure or intrusion of chemical contaminants.

The licensee assembled a water quality team to evaluate the turbidity problem and devise methods to remove the impurities. Through efforts in mechanical filtration and clean demineralized water additions, the licensee reduced the level of suspended solids in the condensate hotwell and condensate storage tanks to an acceptable start-up level. The poor performing ion exchange resins were taken out of service and replaced with the routine radwaste resins. However, the fundamental ion exchange resin concerns were not yet resolved. The licensee and the resin vendor were performing additional testing to determine the cause of the system contamination and demineralizer performance problems. The results of the evaluations regarding the elevated chemistry parameters and the performance of the ion exchange resins will be reviewed in subsequent inspections (IFI No. 50-155/94008-02(DRSS)).

No violations or deviations were identified; however, one inspection follow-up item was identified.

8. Exit Interview

The scope and findings of the inspection were reviewed with licensee representatives (Section 1) at the conclusion of the inspection on March 31, 1994. During the exit interview, the inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. Licensee representatives did not identify any such documents or processes as proprietary. The inspector emphasized the following areas of review:

a. the results of the radiological confirmatory measurements (Section 3);

b. the HPGe detector and chemistry instrument operability problems and timeliness of corrective actions (Section 4);

c. the elevated chemistry parameters and ion exchange resin performance issues during the March 1994 start-up (Section 7); and

d. the qualifications of the new chemistry supervisor (Section 2).

Attachments:

1. Table 1, Radiological Confirmatory Measurements Results, First Quarter of 1994.

2. Attachment 1, Criteria for Comparing Analytical Results.

Table 1

U.S. NUCLEAR REGULATORY COMMISSION
REGION III
CONFIRMATORY MEASUREMENTS PROGRAM

FACILITY: BIG ROCK POINT

FOR THE 1st QUARTER OF 1994

SAMPLE	NUCLIDE	NRC VAL.[1]	NRC ERR.[1]	LIC.VAL.[1]	LIC.ERR.[1]	RATIO[2]	RES[3]	RESULT[4]
Rx WATER[5] DET #1	NA-24	4.63E-04	1.49E-05	4.90E-04	3.08E-05	1.06	31.1	A
	CR-51	1.24E-03	8.83E-05	1.27E-03	1.33E-04	1.03	14.0	A
	CO-58	5.38E-05	9.03E-06	7.76E-05	1.88E-05	1.44	6.0	A
	CO-60	1.11E-04	1.16E-05	1.15E-04	1.76E-05	1.04	9.5	A
	ZN-65	8.17E-05	1.62E-05	< MDA			5.0	NC
	AS-76	5.87E-04	2.02E-05	6.42E-04	4.00E-05	1.09	29.0	A
	AG-110M	4.12E-05	7.92E-06	6.60E-05	2.25E-05	1.60	5.2	A
	NP-239	4.41E-04	2.92E-05	5.07E-04	3.39E-05	1.15	15.1	A
	I-131	6.44E-05	1.19E-05	5.97E-05	1.37E-05	0.93	5.4	A
	I-132	1.09E-03	3.34E-05	1.33E-03	5.00E-05	1.22	32.8	A
	I-133	6.18E-04	1.26E-05	6.44E-04	2.39E-05	1.04	49.1	A
	I-134	3.82E-03	1.32E-04	4.08E-03	3.57E-04	1.07	28.9	A
	I-135	1.32E-03	5.70E-05	1.46E-03	1.11E-04	1.11	23.2	A
	SR-91	4.23E-04	4.18E-05	2.86E-04	7.39E-05	0.68	10.1	A
	SR-92	1.09E-03	3.06E-05	1.05E-03	6.26E-05	0.97	35.5	A
	Y-92	7.11E-04	1.06E-04	< MDA			6.7	NC
	BA-139	1.69E-03	1.71E-04	1.43E-03	2.24E-04	0.85	9.9	A
Rx WATER DET.#2	NA-24	4.63E-04	1.49E-05	4.92E-04	3.49E-05	1.06	31.1	A
	CR-51	1.24E-03	8.83E-05	1.24E-03	1.31E-04	1.00	14.0	A
	CO-58	5.38E-05	9.03E-06	< MDA		0.00	6.0	NC
	CO-60	1.05E-04	1.16E-05	1.10E-04	1.85E-05	1.04	9.1	A
	ZN-65	8.17E-05	1.62E-05	< MDA			5.0	NC
	AS-76	5.87E-04	2.02E-05	5.96E-04	3.58E-05	1.02	29.0	A
	AG-110M	4.12E-05	7.92E-06	< MDA			5.2	NC
	NP-239	4.41E-04	2.92E-05	4.99E-04	2.58E-05	1.13	15.1	A
	I-131	6.44E-05	1.19E-05	5.05E-05	1.11E-05	0.78	5.4	A
	I-132	1.09E-03	3.34E-05	1.30E-03	9.18E-05	1.19	32.8	A
	I-133	6.18E-04	1.26E-05	5.79E-04	3.66E-05	0.94	49.1	A
	I-134	3.82E-03	1.32E-04	< MDA		0.00	28.9	NC
	I-135	1.32E-03	5.70E-05	1.65E-03	1.60E-04	1.25	23.2	A
	SR-91	4.23E-04	4.18E-05	5.06E-04	9.89E-05	1.19	10.1	A
	SR-92	1.09E-03	3.06E-05	1.26E-03	1.15E-04	1.16	35.5	A
	Y-92	7.11E-04	1.06E-04	1.29E-03	3.27E-04	1.81	6.7	A
	BA-139	1.69E-03	1.71E-04	1.57E-03	4.02E-04	0.93	9.9	A

Table 1 (cont.)

SAMPLE	NUCLIDE	NRC VAL.[1]	NRC ERR.[1]	LIC.VAL.[1]	LIC.ERR.[1]	RATIO[2]	RES[3]	RESULT[4]
LIQUID	CR-51	2.13E-05	1.05E-06	1.58E-05	4.17E-06	0.74	20.4	D
WASTE[6]	MN-54	9.89E-05	4.26E-07	1.23E-04	1.61E-06	1.24	232.4	D
DET #1	FE-59	3.00E-06	3.28E-07	7.41E-06	1.04E-06	2.47	9.1	D
	CO-58	2.63E-06	1.61E-07	2.21E-06	7.11E-07	0.84	16.3	A
	CO-60	1.29E-04	5.14E-07	1.82E-04	1.94E-06	1.41	251.5	D
	ZN-65	5.98E-06	5.01E-07	9.24E-06	2.20E-06	1.55	11.9	A
	AG-110M	2.07E-06	1.52E-07	< MDA			13.6	NC
	I-131	1.33E-06	1.49E-07	1.19E-06	4.75E-07	0.90	8.9	A
	CS-134	7.77E-06	2.06E-07	8.43E-06	9.17E-07	1.09	37.7	A
	CS-137	9.47E-05	3.81E-07	8.64E-05	1.46E-06	0.91	248.3	A
STACK	BR-82	5.64E-04	8.74E-05	4.43E-04	5.30E-05	0.78	6.5	A
CHARCOAL[7]	I-131	2.87E-03	7.94E-05	2.93E-03	7.13E-05	1.02	36.2	A
DET #1	I-133	1.99E-03	1.45E-04	1.79E-03	9.67E-05	0.90	13.8	A
STACK	CO-60	1.29E-04	6.33E-05	1.21E-04	3.16E-05	0.93	2.0	A
AIR PART[8]	CS-137	1.49E-04	4.21E-05	8.84E-05	2.72E-05	0.59	3.5	A
DET #1	LA-140	3.15E-04	5.77E-05	4.46E-04	5.26E-05	1.42	5.5	A
STACK	CO-60	1.29E-04	6.33E-05	2.33E-04	4.64E-05	1.80	2.0	A
AIR PART	CS-137	1.49E-04	4.21E-05	1.79E-04	3.54E-05	1.20	3.5	A
DET #2	LA-140	3.15E-04	5.77E-05	4.05E-04	8.98E-05	1.29	5.5	A
AP	CO-60	2.94E-02	2.50E-04	3.37E-02	3.36E-04	1.15	117.5	A
STAND[9]	CS-137	6.11E-02	3.09E-04	6.66E-02	3.73E-04	1.09	198.0	A
DET #1								
AP	CO-60	2.94E-02	2.50E-04	3.62E-02	4.49E-04	1.23	117.5	A
STAND	CS-137	6.11E-02	3.09E-04	6.88E-02	4.44E-04	1.13	198.0	A
DET #2								
OFF	KR-85M	1.19E-03	2.96E-05	1.28E-03	3.16E-05	1.08	40.4	A
GAS	KR-87	5.47E-03	1.35E-04	5.02E-03	1.47E-04	0.92	40.5	A
DET #1	KR-88	3.72E-03	1.11E-04	3.51E-03	1.09E-04	0.94	33.5	A
	XE-133	1.35E-03	6.07E-05	1.46E-03	4.77E-05	1.07	22.3	A
	XE-135	4.52E-03	4.31E-05	4.79E-03	5.05E-05	1.06	105.0	A

[1] These quantities are unitless and are used only for the purposes of comparison.

[2] Ratio = Licensee Value / NRC Value

[3] Resolution = NRC Value / NRC Error (one standard deviation)

Table 1 (cont)

[4] Result : The result of the comparison is based on the criteria in Attachment 1 and is expressed by the following:

A = Agreement	* = Criteria Relaxed
D = Disagreement	NC = No Comparison

[5] Reactor coolant sample

[6] Liquid radioactive waste composite sample

[7] Charcoal filter from licensee's stack sampler

[8] Air particulate filter from licensee's stack sampler

[9] Simulated air particulate filter standard

ATTACHMENT 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgement limits are variable in relation to comparisons of the NRC's value to its associated one sigma uncertainty. As that ratio, referred to in this program as "Resolution", increases, the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement should be considered acceptable as the resolution decreases. The values in the ratio criteria may be rounded to fewer significant figures reported by the NRC Reference Laboratory, unless such rounding will result in a narrowed category of acceptance.

RESOLUTION	RATIO = LICENSEE VALUE/ NRC REFERENCE VALUE
	AGREEMENT
< 4	NO COMPARISON
4 - 7	0.5 - 2.0
8 - 15	0.6 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
> 200	0.85 - 1.18

Some discrepancies may result from the use of different equipment, techniques, and for some specific nuclides. These may be factored into the acceptance criteria and identified on the data sheet.