U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Radiological Protection Inspection

IE Inspection Report No. 050-155/76-05

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

Big Rock Point Nuclear Plant
Charlevoix, Michigan

License No. DPR-6
Category: C

Type of Licensee: BWR-240 Mwt

Type of Inspection: Refueling, Announced

Dates of Inspection: February 3-5, 1976

Principal Inspector: J. A. Finn J. A. Finn 3/15/76 (Date)

Accompanying Inspector: L. J. Hueter L. J. Hueter for 3/16/76 (Date)

Other Accompanying Personnel: None

Reviewed By: W. L. Fisher, Chief L. J. Hueter for 3/16/76 (Date)
Fuel Facility Projects
Radiation Support Section

8101220226

SUMMARY OF FINDINGS

Inspection Summary

Inspection on February 3-5, (76-05): Reviewed radiation protection program during refueling outage.

Enforcement Items

None.

Licensee Action on Previously Identified Enforcement Items

None.

Other Significant Items

A. Systems and Components

None.

B. Facility Items (Plans and Procedures)

None.

C. Managerial Items

None.

D. Noncompliance Identified and Corrected by Licensee

None.

E. Deviations

None.

F. Status of Previously Reported Unresolved Items

None.

Management Interview

The following individuals were present during the management interview at the conclusion of the inspection:

C. J. Hartman, Plant Superintendent
C. E. Axtell, Chemical and Radiation Protection Supervisor
T. M. Brun, Assistant Chemical and Radiation Protection Supervisor

The following matters were discussed:

A. The scope of the inspection.

B. The inspectors expressed concern about air bubble occurrences. The February 4 "air bubble" occurrence was discussed. The inspectors questioned the practice of remaining in the immediate area when an air bubble is observed approaching the pool surface. The licensee stated that many bubbles show no activity and that the reactor deck CAM is relied on to indicate airborne radioactivity problems. They stated that there have been no overexposures to iodine due to air bubbles and that there had been no previous CAM failures. The operability of the CAM is routinely checked daily on the day shift. A second check will be made on the evening shift. CAMs are set to alarm at two times the MPC for unidentified radionuclides. The licensee added that area radiation monitors located on the reactor deck are set to alarm at 15 milliroentgens per hour and should detect significant airborne noble gas activity.

C. The inspectors stated that due to incomplete air sample data, air concentrations to which the three employees on the reactor deck were exposed on February 4 were not available. The licensee stated that urine samples had been taken and that the individuals would be in vivo counted to determine possible burdens and exposures.

D. On February 19, the licensee telephoned the results of the in vivo counts to the inspector. Based on these counts, exposures of the employees to iodine-131 appear to be about 4 MPC-hours. (Paragraph 7, Report Details)

REPORT DETAILS

1. Persons Contacted

C. E. Axtell, Chemical and Radiation Protection Supervisor
T. M. Brun, Assistant Chemical and Radiation Protection Supervisor

2. General

The inspection was limited to radiation safety practices and experiences during a refueling and maintenance outage. The inspector toured the plant and observed fuel bundle removal and piping installation inside containment. Radiation protection records relative to the outage were reviewed.

3. Exposure Control

During outages, daily and quarterly exposures obtained from dosimeters are tabulated daily and reviewed by Radiation Protection supervision. A review of the latest tabulation showed no exposure problems to date.

4. Radiation Protection Equipment

The inspectors noted that there were adequate supplies of survey instruments, protective clothing, and respirators.

5. Radiation Control

Entry into radiation work areas is through the access control station located at the radiation protection office. Information regarding status of work areas and radiation protection requirements is available at this location.

The licensee keeps track of who is in containment by means of tags placed on "in" and "out" boards for regular assigned personnel. This is supplemented by an "in-out" log for others.

High radiation areas and radiation areas are posted. Status boards at the various locations include radiation levels, airborne radioactivity status, and protective clothing and radiation monitoring requirements. During tour of the plant, the inspectors observed that the status boards were kept current.

High radiation areas are locked, with the keys controlled by the shift supervisor. A log is maintained of the use of the keys.

The inspectors observed stepoff boundaries and frisker stations at appropriate locations, including the Access Control Station. Portal monitors are located at the building exit and at the guardhouse.

6. Health Physics Staffing

Staffing for the outage included nine radiation protection technicians, consisting of six Big Rock Point employees and three employees on loan from other plants. The three employees on loan had no prior experience and were used only for taking smear surveys and performing other routine duties.

Six technicians were assigned to the day shift and three to the evening shift. No technicians were assigned to the morning shift, unless maintenance work was scheduled.

Radiation protection technicians are assigned to monitor maintenance work. Plant operators, who are RWP exempt, perform their own monitoring.

7. Iodine-131 Exposure

During removal of a fuel bundle from the core at about 3:30 a.m. on February 4, 1976, three employees received an apparent exposure of 4 MPC-hours to iodine-131, due to an "air bubble" rising to the surface of the water. No increase in activity showed on the chart of the constant air monitor (CAM) sampling the vicinity, so the employees continued to work.

About this time a fourth employee, who was exiting the containment, observed an increase on the CAM located near the airlock. Radiation Protection was notified and high volume air samples for iodine-131 were taken at the reactor deck location at 3:40 a.m. and 4:40 a.m. The 3:40 a.m. sample showed a concentration of 1.2E-9 uCi/ml. The 4:40 a.m. sample showed a concentration of 4.2E-10 uCi/ml. MPC for soluble iodine-131 is 9E-9 uCi/ml. The employees left the reactor deck at 3:55 a.m. and fuel bundle removal operations were discontinued.

A check on the CAM on the reactor deck revealed a broken hose connection which prevented the CAM sampling the air where the men were working. The CAM was repaired and placed back

in service during the day shift on February 4, and fuel bundle removal operations were resumed. The three employees were restricted from further radiation work pending determination of their exposures. Urine samples were taken and arrangements were made for in vivo counts.

In vivo counts made at Big Rock Point February 9-11, 1976, showed approximately one per cent of a maximum permissible body burden (MPBB) for iodine-131 in the two employees handling the fuel bundle. No iodine-131 was detected in the third emplcyee (crane operator.) A maximum of 3% of a MPBB for cobalt-60 was detected and lesser amounts of cesium-134, cesium-137, and manganese-54 were detected.

Results of urine samples have not been received. Based on the in vivo counts, an exposure to airborne concentrations of iodine-131 of 4 MPC-hours is estimated for the two employees handling the fuel bundles, with a lower exposure for the crane operator.

8. Records Reviewed

Radiation Protection Log
Daily Radiation and Contamination Survey Sheets
Air Sample Log
Radiation Protection Procedures
Radiation Protection Procedures