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

REGION III

Report of Radiation Protection Inspection

IE Inspection Report No. 050-155/76-15

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: Routine, Unannounced

Dates of Inspection: June 14 - 18, 1976

Principal Inspector: J. A. Finn J. A. Finn 7/19/76 (Date)

Accompanying Inspectors: None

Other Accompanying Personnel: None

Reviewed By: W. L. Fisher, Chief for
Fuel Facility Projects and
Radiation Support Section

7/20/76 (Date)

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SUMMARY OF FINDINGS

Inspection Summary

Inspection on June 14-18, (76-15): Radiation protection inspection included review of personal monitoring procedures and records, air sampling, and in vivo counts.

Enforcement Items

No items of noncompliance with NRC requirements were identified during this inspection.

Licensee Action on Previously Identified Enforcement Matters

Not applicable.

Other Significant Findings

A. Systems and Components

None.

B. Facility Items (Plans and Procedures)

None.

C. Managerial Items

The licensee had not evaluated in vivo count data for compliance with 10 CFR 20.103.

D. Noncompliance Identified and Corrected by Licensee

None.

E. Deviations

None.

F. Status of Previously Report Unresolved Items

None reviewed during this inspection.

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, Plant Health Physicist

The following matters were discussed:

A. The scope of the inspection.

B. The problem of recurrent freezing of the stack effluent sampling line was discussed. An engineer has been assigned the problem and corrective action is anticipated before the winter of 1976-1977. Off-gas data has been logged for the periods stack sampling was out of service. These data will be used, as appropriate, to correct stack release data.

C. The inspector noted that the licensee had estimated the internal dose to an individual based on the increase in cobalt-60 depositions measured from the in vivo counts made on May 6 and May 13, 1976. However, no estimate had been made of air concentrations to which the individual had been exposed. The licensee stated that air concentrations would be calculated and that the individual would be given additional in vivo counts. The licensee further stated that future in vivo count data would be evaluated for compliance with the airbore radioactive material exposure limits specified in 10 CFR 20.103.

REPORT DETAILS

1. Persons Contacted

C. J. Hartman, Plant Superintendent
C. E. Axtell, Plant Health Physicist
T. M. Brun, Chemical and Radiation Protection (CRP) Supervisor
P. J. Santek, Senior CRP Technician
S. Vanderheide, Senior CRP Technician
M. J. Russell, CRP Technician

2. Organization

A plant Health Physics Department was created effective March 1, 1976. C. E. Axtell was appointed Plant Health Physicist, reporting to the Plant Superintendent. T. M. Brun was appointed Chemical and Radiation Protection Supervisor, reporting to the Plant Health Physicist. Six Chemical and Radiation Protection Technicians report to Mr. Brun.

3. Personal Monitoring - External

Beta-gamma film badges are provided by Radiation Detection Company on a monthly basis. Direct reading gamma dosimeters are worn along with the film badges. Ring badges are assigned for selected jobs where potential extremity exposures are significantly greater than whole body exposures.

Forms AEC-4 or their equivalent have been completed for all radiation workers. The vendor's reports include lifetime doses, year-to-date doses, and current quarter doses. To control exposures, the licensee uses an accumulated exposure worksheet on which is recorded, for each individual, the dose accumulated during the current quarter and week. The work sheet is updated weekly during operation and daily during outages. Pocket dosimeter readings are used to update doses since the last film badge report. Accumulated exposures are posted in the control room and other locations.

A review of exposure records for the last half of 1975 and the first four months of 1976 showed no overexposures. The highest annual whole body dose was 4930 millirem. The highest quarterly whole body dose was 2600 millirem.

4. Stack Effluent Sampling/Monitoring

During the 1975-1976 winter season, the stack effluent sampling line was out of service for periods of 0.4 to 9.2 hours on 15 occasions. Cause was attributed to frozen lines.

An engineer has been assigned the problem and correction of the causes is planned before the winter of 1976-1977. The off-gas strip chart was reviewed and readings were recorded for each period from four hours before removal of the stack sampling system from service to four hours after returning it to service. These data were sent to Corporate Health Physics for appropriate correction of iodine and particulate stack releases.

A review of the data indicated a stable release rate during each of the out-of-service periods.

5. Airborne Radioactivity Surveys

During operation, continuous air monitors (CAMs) are located in the turbine area, the containment sphere (entrance), and containment exhaust (for steam leak detection.)

During shutdown, the turbine area CAM is moved to the reactor deck and the containment exhaust CAM is used to monitor fuel sipping operations. The CAMs in the turbine area and in containment are particulate monitors.

High volume grab samples are taken routinely during operation. and shutdown. These include samples for iodine on the reactor deck.

Licensee procedures for counting and calculating air samples were reviewed and no problems were identified.

A review of Internal Dose Estimate records identified no airborne overexposures as determined by air samples.

6. Respiratory Protection

The licensee's respiratory protection program, which consists of training, face piece fitting, testing, cleaning, inspection, repair, and storage, was reviewed. Half masks and full-face masks with filter cartridges are worn. The types used have been approved by Bureau of Mines or the National Institute for Occupational Safety and Health.

7. In Vivo Counting

The licensee has installed a rental whole body counter. Data is processed and reported by Helgeson. The unit utilizes shadow shielding. The 8 x 4 sodium iodide detector travels the length of the body. Counts for mixed fission, corrosion, and activation products are made twice a year for selected employees. In the spring all individuals having potential for airborne exposure are counted. The fall count is limited to operators, maintenance personnel and technicians.

A review of in vivo count records for counts made in May 1976 showed that 105 counts were made on 90 individuals. The most frequently observed radioisotopes were cesium-137, cobalt-60, and cesium-134. Cobalt-58, manganese-54 and iodine-131 were also detected.

A series of counts were made on one individual at intervals of four to seven days. Measured depositions, in nanocuries, were reported as follows:

Date	Cobalt-60	Cobalt-58	Cesium-134	Cesium-137
5/6/76	77	72	115	N.D.
5/13/76	255	89	261	157
5/17/76	96	96	120	N.D.
5/21/76	81	72	114	N.D.

N.D. - Not detected.

To determine the cause of the increase in the May 13 count, the licensee investigated the individual's work assignments and could find no definite cause of the high count. A review of CAM charts and grab air samples did not identify any high airborne activity. Analysis of whole body count profiles did not indicate presence of significant external contamination.

Calculations by the licensee indicated a small internal dose on the basis of the apparent increase in internal deposition. No estimate was made by the licensee of the airborne concentrations to which the individual was exposed based on the increase in internal deposition between the May 6 and May 13 counts. The licensee's calculation of airborne exposure for this individual will be reviewed during a subsequent inspection. Calculations made by IE:III indicate the individual was exposed to air concentrations of less than 40 MPC-hours. These calculations were based on in vivo count data and were made in accordance with International Commission on Radiological Protection (ICRP) Publication 2.

The inspector noted that the licensee did not routinely evaluate the results of the in vivo counts for compliance with the airborne radioactive material exposure limits specified in 10 CFR 20.103.

8. Radiation Work Permits (RWP's)

The radiation work permits in current use were reviewed and no problems were noted. RWP's were posted at Access Control. The current list of RWP-exempt personnel was also posted at Access Control.

9. Tour

During a tour of the plant the inspector observed posting of various areas in accordance with Part 20. Area status boards were noted to be current. Posting required by Part 19 was noted at several locations.

10. Records Reviewed

Survey Meter Calibrations
Sealed Source Leak Tests
In Vivo Counts
Film Badge Reports
Selected Forms AEC-4
Selected Accumulated Radiation Exposure Worksheets
Air Sample Log
Health Physics Log