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

REGION III

Report No. 50-155/77-09; 30-4866/77-01; 70-660/77-01

Docket No. 50-155; 30-4866; 70-660 License No. DPR-6; 21-08606-01; SNM-614

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, MI

Inspection conducted: July 25-29, 1977

Inspectors: L. J. Hueter L. Hueter 8/16/77

M. C. Schumacher M. C. Schumacher 8/16/77

Approved by: W. L. Fisher, Chief W. L. Fisher 8/16/77
Fuel Facility Projects and
Radiation Support Section


Inspection Summary

Inspection on July 25-29, 1977 (Report No. 50-155/77-09; 30-4866/77-01; 70-660/77-01)

Areas Inspected: Routine, unannounced inspection of radiation protection program for normal facility operation and the 1977 refueling outage, including: qualifications; audits; training; radiation protection procedures; instruments and equipment; exposure control; posting, labeling, and control; surveys; notifications and reports; advanced planning and preparation; followup of previous inspection findings; and review of reportable occurrences. Activities under Materials Licenses 21-08606-01 and SNM-614 were also inspected. The inspection involved 92 inspector-hours onsite by two NRC inspectors.

Results: No items of noncompliance were identified in the 13 areas inspected.

## DETAILS

1. Persons Contacted

C. J. Hartman, Plant Superintendent
*C. E. Axtell, Plant Health Physicist
*T. M. Brun, Chemical & Radiation Protection Supervisor
F. J. Valode, Shift Engineer
R. Doan, Training Supervisor
*D. DeMoor, Technical Engineer
*B. O'Donald, QA Engineer
E. McNamara, Training Department

The inspector also talked with other licensee employees, including health physics and instrument and control technicians.

*denotes those present at exit interview.

2. General

This inspection, which began with visual observation of radiological working conditions in the turbine building and containment at 6:15 a.m. on July 25, 1977, was conducted to examine licensee radiation protection activities including those related to the refueling outage that began on July 23. Additional visits were made to various locations in controlled areas during the course of the inspection. The inspectors noted satisfactory posting of radiological conditions and control of access to radiation and high radiation areas. However, it was noted that conditions in the access control area were very crowded with apparently incompatible activities taking place there. The area contains the health physics field office, the laundry, a sink used for cleaning of respirators and occasional decontamination, and respirator supplies as well as the check out monitor. Respirator training and fitting is also done in this small area. Preparation of work areas was satisfactory. Adequate supplies of respirators, protective clothing and survey instruments were noted. Supplies of self reading dosimeters were somewhat short and the licensee had on order an additional 25 units which were to be rented for use during the outage.

No items of noncompliance were noted.

3. Licensee Action on Previous Inspection Findings

(Closed) Infraction A.1 (155/76-22): High radiation area barricades preventing egress. Licensee corrective actions stipulated in their letters dated March 3 and April 11, 1977 were confirmed.

(Closed) Infraction A.2 (155/76-22): Inadequate measurement of released particulates owing to bypass of improperly sealed filter. Licensee corrective action was confirmed.

(Closed) Deficiency (155/76-22): Solid waste shipment data omitted from January-June 1976 report. The data was submitted to NRR in a letter dated January 11, 1977.

4. Radiation Protection Organization

The organizational structure and personnel staffing in the supervisory positions in the plant Health Physics Department are unchanged from that described in a previous inspection report.[1/] Seven (an increase of one in the past year) Chemical and Radiation Protection Technicians report to the Chemical and Radiation Protection Supervisor. In addition, during the summer months, a college student training in health physics is assisting the licensee. Both new technicians hired within the past year, one in October 1976 and the other in April 1977, have had previous health physics training and experience. It was learned through observations during the inspection and through discussions with personnel that the health physics staff is smaller than desirable particularly on occasion during outages. A licensee representative stated plans to obtain another full-time technician next year which should alleviate this recurring problem.

No items of noncompliance were identified.

5. Licensee Audits

The inspector reviewed the reports of two onsite and two offsite audits conducted in late 1976 and early 1977 involving chemistry and radiation protection topics. Several items of varying significance were identified, all of which had been either corrected or corrective measures were in progress.

No items of noncompliance were identified.

1/ IE Inspection Rpt No. 50-155/76-15.

6. Training

Radiation protection training and retraining was reviewed. New employees and visitors who will be unescorted receive general indoctrination which includes radiation protection. The course, attended by the inspector on the first day of inspection, was of about three hours duration. It consisted of three video tapes with question and answer periods at the end of tape segments. The tapes, which were recently produced by a licensee contractor, appeared to satisfy the requirements of 10 CFR 19.12. Licensee representatives stated that this presentation is essentially the same as that given to new plant employees as part of a general indoctrination. The tapes were also shown to all plant employees as part of annual retraining prior to the current refueling outage. Subsequent retraining for plant personnel will consist of a review each year of the Radiation Protection Manual (Volume 11 of the Big Rock Point Plant Manual) and particularly of changes thereto. The presentations will be tailored for the various categories of employees, according to training department representatives.

The licensee recognizes a category of employees who are certified as RWP exempt by the plant health physicist. The exemption is granted after additional training and passing of an examination prior to certification. Exempt personnel include health physics, operation, the technical department and certain members of the maintenance department. Certification is reviewed by examination given every two years. Exempt personnel are regarded as qualified to make surveys and therefore to work in posted areas without a work permit or health physics coverage. They are, however, required to observe posting, to work with a second individual in entering certain high radiation areas and to consult with health physics before work in airborne areas. Records of RWP exempt personnel are maintained by the health physicist.

The licensee has recently implemented a master training plan described in Volume 18 of the Big Rock Point Plant Manual. It details training requirements, including radiation protection for the various categories of plant employees. The inspectors reviewed Volume 18 after the inspection and noted the following:

a. Training requirements for visitors not consistently addressed.

b. Requirements for respirator training and retraining not addressed for all categories of workers.

c. Requirements for RWP exempt personnel not addressed.

d. Absence of cross references between volume 18 and the Radiation Protection Manual (Volumes 11 and 12) wherein other training requirements are addressed.

e. Titles used to refer to radiation protection training courses inconsistent within Volume 18 and between Volumes 18 and 11.

These items were discussed with the training coordinator by telephone on August 2 and with the plant superintendent on August 9, 1977.

No items of noncompliance were identified in this review of training. Program improvements, particularly in the area of respirator training, will be reviewed during a forthcoming inspection.

7. Radiation Protection Procedures

The licensee's radiation protection procedures have been completely rewritten and incorporated into the "Big Rock Point Plant Manual," Volume 11, "Radiation Protection Manual-General," and Volume 12, "Radiation Protection-Departmental."

The inspectors briefly reviewed Volume 11 and selected procedures from Volume 12 including RP-29, "Radiological Surveys," and RP-37, "Respiratory Protection Program." Problems noted in review (Paragraphs 6 and 10) were discussed with licensee personnel at the exit interview.

No items of noncompliance were identified.

8. Instruments and Equipment

The licensee has generally adequate numbers of operable survey instruments and equipment. Survey instruments are calibrated quarterly. The area radiation monitors, two of which also serve as criticality monitors, are calibrated monthly.

A shortage of dosimeters was noted during the inspection. Rented dosimeters were on order.

No items of noncompliance were identified.

9. Exposure Contr

External Expos

Film badge data the approximate 100 regular employees and the non-regular employees (including visitors) at Big Rock Point were reviewed for the last half of 1976 and the first half of 1977. Forms NRC-4 and NRC-5 for randomly selected individuals from both groups were reviewed with no problems or overexposure of personnel being noted.

The total man-rem received in 1976 was about 270 based on film badge data; this was the highest for any year except 1973, when about 300 man-rem dose was received. About 80 percent of this man-rem dose was received during a lengthy refueling and maintenance outage.

No items of noncompliance were identified.

10. Internal Exposure Control

a. Respiratory Protection

The licensee's respiratory protection program consisting of training, face piece fitting, testing, cleaning, inspection, repair, and storage was reviewed. All devices observed had been approved by NIOSH. Supplies of respirators appeared adequate. Records of respirator fitting are maintained for individuals and a master list is kept for plant personnel. The licensee also maintains a record, "Internal Dose Estimates from Inhalation of Airborne Radioactive Material," on which respirator use times, locations, and airborne concentrations are logged.

Respirator issuance is controlled by the health physicist. Selection, training and fitting are done by the health physics technicians at the access control point. Fitting is by qualitative test with isoamyl acetate. The inspectors observed a training and fitting session for three contractor employees. One individual had difficulty obtaining a fit and several masks were tried before success. The difficulty may have been caused by failure to adequately tighten the headstraps to achieve a good seal. The test canisters on the first mask tried were double stacked and being heavier than the normal canister, tended to pull the mask away from the face. It was also noted that training conditions were poor owing to the crowded and distracting

conditions which occur in the access control area. It was also noted that the licensee imposes no requirements for medical examination of users. The program will probably require upgrading to meet the requirements that will become effective December 1977.

No items of noncompliance were identified.

b. Air Sampling

Records of air samples for the period July 1976 through July 1977 were reviewed. High volume air samples are taken routinely during normal operation at selected locations, for entry into areas rarely frequented, and for special maintenance jobs. The records show much more frequent air sampling, including iodine, during the refueling outage.

Continuous air monitors, used for trending devices, are located in the turbine building, the containment sphere entrance, and the sphere exhaust during normal operations.

For the outage, the exhaust CAM, which has both iodine and particulate capability, was moved to the reactor deck to monitor conditions over the fuel pool.

GeLi spectrometer analysis of air samples is used if gross counts exceed a specified threshold. An associated computer program is used to determine an MPC for the aggregate of identified and unidentified nuclides (obtained by subtraction from the gross count). No significant problems were noted in the review of this program.

If the GeLi spectrometer is unavailable, a sodium iodide analyser is used for isotopic identification and an effective MPC is computed by hand. The algorithm for this computation, given in Procedure RP-29, "Radiological Surveys," appeared to be incorrect. The licensee agreed to review this procedure.

The licensee also agreed to review the formula for calculating air concentrations based on gross counting. A collection efficiency factor of 0.9 which is in the numerator of the equation properly belongs in the denominator.

No items of noncompliance were identified.

c. Bioassay Program

Whole body counting records were reviewed for the period August 1976 through July 1977. Counting is done on a rental whole body counter with data processing and reporting by the vendor. The program appears to have been conducted in accordance with section 11.5 of the Radiation Protection Manual and Procedure RP-37, "Respiratory Protection Program." The most frequently observed isotopes are cesium-137 and cobalt-60. No indications of body burdens in excess of 10% were noted.

The inspectors reviewed the licensee's evaluation of airborne exposure (MPC-hours) for a previously examined series of counts of an individual made in May 1976. The licensee's and RIII inspector's evaluations indicated the exposure had been less than 40 MPC-hours.[2/]

No items of noncompliance were identified.

11. Advanced Planning and ALARA

The inspectors reviewed outage planning with regard to ALARA. The Chemistry and Radiation Protection Supervisor reviews the daily outage schedule of maintenance jobs and assigns specific technicians to follow each job. The man-rem dose commitment for broad categories of jobs is based upon experience from previous outages. The inspectors reviewed internal correspondence wherein the licensee analyzed the sources of dose (240 man-rem) incurred during the six-month 1976 outage. The documentation listed measures to consider for dose reduction in subsequent outages. For trial during the current outage, the licensee has initiated an ALARA evaluation form which the health physics technicians use to evaluate, for dose reduction, those jobs with anticipated dose commitments greater than 10 man-rems. Evaluations indicating cost benefit factors of $600 per man-rem or less are to be submitted to the plant superintendent for consideration.

12. Posting, Labeling and Control

The inspectors observed labeling of containers, posting of areas containing radioactive materials, posting of radiation areas including, high radiation areas, and posting of airborne radioactivity areas. Bulletin boards were observed for the postings required by 10 CFR 19.11. No labeling or posting problems were noted.

2/ IE Inspection Rpt No. 50-155/76-19.

The licensee has administrative procedures for controlling access to and work in controlled areas. These procedures, which are contained in the Radiation Protection Manual, specify that work in controlled areas by non-RWP exempt personnel be reviewed by health physics in advance. Work in posted areas by such individuals must be under a Radiation Work Permit (RWP) or with the surveillance of a health physics technician. Few RWP's are used at the plant. RWP exempt personnel may work alone in posted areas but must adhere to specific requirements posted on applicable status boards. They must notify the health physics department of the need to enter posted airborne areas so that respirators may be assigned and air samples may be taken.

The radiation protection log for March 15, 1977, contains a record regarding the entry into a controlled area by contractor personnel for the purpose of doing minor maintenance on the stack. The visitors were escorted by RWP exempt personnel but health physics had not been consulted beforehand nor had a "Guest Record" been filled out, as required by Section 11.6 of the Radioactive Protection Manual and procedure RP-4. Corrective action for this violation of procedures, documented under Deviation Report No. 77-35, included a review of controlled area access requirements with involved personnel by the Chemistry and Health Physics Supervisor.

No items of noncompliance were identified in the inspectors' review.

13. Surveys

Selected records of routine (daily, weekly, monthly) and special surveys of direct radiation and surface contamination were reviewed for the period July 1976 through July 1977. The surveys, performed under procedure RP-29 "Radiological Surveys," appeared adequate to satisfy regulatory requirements.

The inspectors examined licensee records to confirm the performance of leak tests on sealed sources as required by Material Licenses 21-08606-01 and SNM-614. No items of noncompliance were identified.

14. Notification and Reports

Based on statements made by licensee representatives and substantiated to the extent of records reviewed by the inspectors, it was concluded that the licensee has had no theft or loss of licensed material. The inspectors examined and discussed, with licensee personnel, records and reports of personal exposure to radiation and radioactive material.

No items of noncompliance or deviations were identified.

15. Licensee Event Report No. RO-77-13

On May 16, 1977, the licensee reported the inoperability of air ejector offgas monitors during steady state power operation,, on April 21, 1977. The cause was attributed to excess moisture collection in the monitoring system. The inspectors reviewed licensee records of offgas and stack samples and the stack monitor to confirm that release rates were essentially constant during the six hour period of inoperability. Release rate quantification was not affected by this failure. Further licensee corrective action being pursued during this outage is being reviewed by the RIII operations inspector.[3/]

16. Materials Licenses

The licensee possesses an 80-gram plutonium-beryllium neutron source under NRC License SNM-614 and various byproduct material sources under License No. 21-08606-01. The inspectors reviewed the licensee's use of these sources, including leak test and inventory records. The sources are used by or under the supervision of the plant health physicist, who is named on the license.

No items of noncompliance were identified.

17. Exit Interview

The inspect met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on July 29, 1977. Further discussions of the inspection findings were conducted by telephone with Mr. R. Doan, Training Coordinator, on August 2, 1977, Mr. C. Axtell, Plant Health Physicist, on August 8, 1977, and Mr. C. Hartman, Plant Superintendent, on August 9, 1977.

The inspectors summarized the findings of the inspection. The licensee agreed to review and revise as necessary, the procedures relating to air sample analysis, to review and strengthen respirator training as necessary, and to amend the master training plan to better address radiation protection training and retraining requirements. A licensee representative stated that budget funds were being requested to provide additional space for activities conducted at the access control area.

3/ IE Inspection Rpt No. 50-155/77-11.

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