U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 70-008/85002(DRSS)

Docket No. 70-008 License No. SNM-7

Licensee: Battelle Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Facility Name: West Jefferson Facility

Inspection At: Battelle Columbus Laboratories

Inspection Conducted: August 19-23, 1985

Inspector: G. M. France, III

September 16, 1985
Date

Approved By: L. R. Greger, Chief
Facilities Radiation Protection
Section

9/16/85
Date

Inspection Summary

Inspection on August 19-23, 1985 (Report No. 70-008/85002(DRSS))
Areas Inspected: Routine, unannounced health and safety inspection, including: organization; internal reviews and audits; training and operations review; nuclear criticality safety; radiation protection program, including audits, training, instruments and equipment, exposure control, and surveys; radioactive waste management including solid wastes; transportation activities; maintenance surveillance; and environmental monitoring. The inspection involved 26 inspector-hours onsite by one NRC inspector.
Results: The licensee was found to be in compliance of NRC requirements within the areas examined.

DETAILS

1. Persons Contacted

T. Emswiler, Transportation Specialist
R. Evans, Environmental Health Physics Program, (Part-Time Employee)
D. Flint, Supervisor, Instrument Laboratory
E. Fromm, Supervisor, Quality Assurance
*G. Kirsch, Supervisor, Operational Health Physics
*D. McKown, Radiological Safety Officer
*R. Nathan, Director of Programs
*V. Pasupathi, Hot Cell Laboratory Manager
E. Roe, Health Physicist
R. Snider, Master Research Technician
D. Stewart, Research Technician
F. Swindall, Master Technician
H. Toy, Manager, BCL Nuclear Services Group

The inspector also interviewed other members of the licensee's staff.

*Denotes those present at the exit meeting conducted August 23, 1985.

2. General

This inspection of onsite licensee activities, which began at 12:45 p.m. on August 19, 1985, was conducted to examine activities at the West Jefferson site under Materials License No. SNM-7. The inspector toured the Hot Cell Laboratory and Retired Reactor Facility. An exit meeting was conducted on August 23, 1985.

3. Management Organization and Controls

The inspector reviewed the licensee's management organization, and controls for radiation protection, operations, and radwaste management including changes in the organizational structure, procedure revising and updating, and utilization of audit systems.

a. Organization

Several personnel changes that may affect the health physics program have occurred since the previous inspection (70-008/85001).

The Administrator, Environmental Health Physics Program (EHPP), has retired; he compiled data to publish the annual BCL environmental report. The general administration of this program will be performed by the Master Technician from the onsite BCL Nuclear Services Group.

The onsite radiation protection organization consists of the Supervisor, Operational Health Physics, Health Physicist who shares time between the King Avenue and West Jefferson sites, Master Technician, Master Research Technician, and Research Technician. The licensee noted that the Administrator, Environmental Health Physics Program and one Master

Research Technician, also retired, have been retained to support BCL radiation protection programs on a part time basis. The Supervisor, Operational Health Physics, noted that by coordinating radiation protection duties within the organization, programmatic requirements can be maintained with the the present staff.

Other personnel changes include: BCL has a new Director; and the Manager, Nuclear Technology and Physical Sciences, has been promoted to Director of Programs.

The inspector concluded that the radiation protection organization appears to have sufficient onsite management support and corporate support to ensure implementation of an effective control program.

b. Procedure Revising and Updating

The inspector confirmed that the licensee periodically reviews and updates radiation protection procedures and has established a quality assurance program that assures the use of approved and current procedures. The inspector reviewed several health and safety procedures, and verified that procedures pertaining to onsite health and safety are reviewed by the Supervisor, Operational Health Physics and the Manager, BCL Nuclear Services Group.

The inspector also verified that procedures are flagged for periodic review and/or update and maintained by the Supervisor, Quality Assurance.

The inspector concluded that the licensee's system for reviewing and approving procedures complies with license requirements.

c. Internal Reviews and Independent Audits

The inspector verified that the licensee utilizes independent audits conducted by the Radiation Safety Officer, Department of Energy representatives, and American Nuclear Insurers as means of reporting deficiencies to management.

The inspector examined licensee records of compliance audits and verified that corrective measures were traceable to audit findings. The inspector noted that the licensee had reviewed the calibration of, and recalibrated, the JN-1-HCL stack air monitors as recommended by an independent audit; there was no apparent change in efficiency. The inspector examined the efficiency curves and confirmed the calibration.

The annual health physics appraisal conducted by DOE specifically noted that radiation exposures have decreased from 58 man-rem in 1983 to 43 man-rem in 1984.

No violations or deviations were identified.

4. Radiation Protection

Tne inspector reviewed the licensee's internal and external exposure control programs, including the required records, reports and notifications, and the licensee's program for maintaining occupational exposures ALARA.

a. Internal Exposure Control

About 42 workers received whole body counts for mixed fission, corrosion, and activation products on March 28, 1985. No activity other than natural potassium was observed.

The inspector reviewed the results of routine urinalysis performed on West Jefferson and King Avenue personnel since the last inspection (70-008/85001). No significant detectable activity was found.

No violations or deviations were noted.

b. External Exposure Control

Biweekly results of TLD badge readings were reviewed for the period February through mid-August 1985. No doses exceeding 10 CFR 20.101 limits were noted. The maximum whole body dose to any individual in the first half of the year was about 1100 millirems.

c. Source Leak Tests

The inspector examined licensee records for leak testing byproduct material sealed sources. According to License Condition No. 11, each source shall be tested at six month intervals. The tests were performed in accordance with the provisions of SNM-7. Four sources failed to meet the leak test criteria and were removed from service. Each of the four sources contained tritium which was originally packaged at levels ranging from 250 to 1000 millicuries.

d. Maintaining Occupational Exposures ALARA

In an effort to formally document the use of engineering controls in reducing occupational exposures, the licensee noted that replacement of prefilter material in hot cell operations was accomplished with remote units. The licensee used master slave/manipulators to emplace rough filter and prefilter material upstream of the hot cell's main filter. This maneuver enabled the hot cell operator to perform the maintenance function without entering the hot cell, where exposure levels approached 2 rems/hour.

No violations or deviations were noted.

e. Airborne Releases and Quantification

The licensee is committed to the license requirement to continuously sample/monitor exhaust ventilation systems for alpha and/or beta

gamma activity. However, as discussed in Inspection Report No. 70-008/85001, the licensee had no program in place to track the cumulative weekly concentration and determine whether or not the concentration in process ventilation systems had exceeded the licensee's action level of 50 percent of the unrestricted area concentrations as listed in 10 CFR 20. At the inspector's recommendation, the licensee reviewed data to cover the period from license issue (April 1983) to the current operating period. The data disclosed that cummulative concentrations of alpha and beta/gamma had periodically exceeded the 10 CFR 20 limit. However, a quantitative review of the data showed that no isotopic component exceeded the limit. The licensee's interpretation of the license requirement includes corrective measures that apply quantitative isotopic analysis to the data. The limiting value for the air mixture of more than one radionuclide may be determined by application of quantitative isotopic analyses as described in 10 CFR 20, Appendix B, paragraph 1, under "note". The licensee has requested NMSS to review and clarify the matter (letter dated July 15, 1985). This matter is considered unresolved pending completion of the licensee's evaluation and the NRC review. (Unresolved Item 70-008/85001-01).

f. Contamination Control

The inspector examined the survey log maintained in the HCL lobby and observed personnel performing exit monitoring procedures both from the lobby and the guardhouse. The survey log disclosed that since the last inspection at least two persons had recorded count rates near the instrument setpoint limit. The inspector observed that without exception each person exiting the HCL lobby and/or the guardhouse performed the newly instituted frisking requirements. Instructions outlining the method of frisking was posted both in the HCL lobby and the guardhouse. No further problems were noted (Closed; Open Item 70-008/85001-02).

No violations or deviations were identified.

5. Operations Review

The inspector reviewed with the licensee the status of operations at the West Jefferson and King Avenue sites.

The licensee is still pursuing plans to demonstrate the feasibility of reducing radwaste volume by incineration. Discussions concerning the licensing of the incineration process are ongoing with USNRC NMSS and the State of Ohio's Environmental Pollution Staff.

Licensee and DOE audits concluded that the Nuclear Services Group is adequately staffed to provide radiation protection services to onsite projects and to the radwaste incineration program. BCL management agrees with the HP appraisal and plans to shift work loads in accordance with project requirements.

During the course of this inspection the inspector noted that cement block walls were used to reduce exposure levels to persons working in the vicinity of waste storage. In response to inspector concerns about exposure levels behind concrete shielding, measurements ranging from 0.1 to 0.7 mR/hr were made behind the outer wall at the near fence line. The inspector noted that the inner fence and block walls are located in a restricted or controlled area. The licensee noted that TLD packages were posted along the inner fence to determine exposure levels behind the outer wall. These levels ranged from 0.5-1 mR/hr. Hence, the measurements performed during the inspection were consistent with TLD results.

No violations or deviations were identified.

6. Criticality Safety

The inspector reviewed criticality safety audits, documentation of criticality training, toured the Hot Cell Laboratory (HCL), and reviewed documentation of facility changes requiring criticality considerations.

Apparently, no major maintenance or modifications to facilities requiring criticality analyses were reported since the last inspection (Inspection Report No. 70-008/85001). Quality assurance records disclosed results of the licensee's annual criticality safety lecture and the corresponding written examination. The examination covered the standard operating limits for high energy cell operations and identified substances such as Be, C, and D_2O, that are not permitted in the cell. During the HCL tour the inspector observed that signs posted for criticality awareness were visible and discernible to good criticality practices.

In response to the inspector's concern about the storage of used filters that may unknowingly contain critical quantities of SNM material, the licensee noted that about 50 used HEPA filters were stored in waste containers. The licensee assured the inspector that the HEPA filters were used in HCL operations that did not include SNM material. The potential for buildup of fissile material in ventilation ducts was also dismissed because prefilter material is normally installed upstream of the filter.

The inspector confirmed that management of the licensee's nuclear safety program is commensurate with the license application.

7. Training

The inspector reviewed the licensee's provisions for training and periodic retraining of employees, as related to employee work assignments with radioactive and fissionable materials.

A new employee was hired since the last inspection (70-008/85001). Subjects given during the new employees orientation include:

- Evacuation procedures and requirements.
- Discussion, Regulatory Guide 8.13, Female Employees, Preventive Radiation Exposure.
- Radioactive Exposure Awareness.

The inspector examined documentation of attendance records and verified that the training sessions were conducted according to the notification system provided under the quality assurance program.

The inspector concluded that the training sessions appear to meet the requirements of 10 CFR 10.12, "Instructions to Workers."

No violations or deviations were identified.

8. Maintenance Surveillance

The inspector examined the licensee's maintenance operations to determine if records are maintained on HCL systems pertinent to safety.

QA records disclosed safety and alarm checks were made in accordance with the Hot Laboratory Operational Safety Manual. The inspector observed workers removing the JN-1A Neutron Criticality Detector, located inside the in-cell Charpy Facility, for testing and repair. During the absence of cell activity, two workers removed a lead plug on the wall of the high energy cell and disengaged the neutron criticality detector. In response to inspector concerns about systems maintained for nuclear criticality safety alarms, the licensee noted that a standby criticality monitor was available. Prior to disengaging and removing the criticality detector the Master Technician (Health Physics Technician) performed an exposure level survey. About 100 mR/hr was detected in the first foot of the tunnel beyond the lead plug. The required maintenance was performed on the neutron detector assembly and the system was returned to service.

No violations or deviations were identified.

9. Radioactive Waste Management

The inspector reviewed licensee records to determine licensee compliance with regulations and license requirements for release and disposal of radioactive waste. According to the licensee's Transportation Specialist, activities performed in the licensee's solid waste generation program include the following:

- Radioactive waste was compacted in drums, analyzed for radioactive content, and classified and characterized in accordance with 10 CFR 61.

- Contents of several damaged drums were repackaged, classified, and characterized in accordance with 10 CFR 61.

- Scrap metal containing high levels of radioactivity was separated and deposited among several containers and cemented for additional shielding.

The inspector concluded that conduct of the licensee's radwaste program provides reasonable assurance that waste form requirements of 10 CFR 20 and 61 are being met.

No violations or deviations were identified.

10. Transportation Activities

The inspector reviewed the transportation activities to determine whether the licensee is maintaining an adequate program to assure radiological safety in the receipt, packaging, and delivery of licensed radioactive materials.

The inspector reviewed licensee shipping records and confirmed that health physics surveys were documented. Review of records also disclosed that the BMI-1 shipping package received a renewed certificate of compliance. The licensee is authorized to ship various types and forms of nuclear material including irradiated MTR or BRR type fuel assemblies with enrichment levels to 93 weight percent in the U-235 isotope. Concerning disposition of the 50 used HEPA filters, discussed in Paragraph 6, the Transportation Specialist noted that waste form characterization and classification requirements must be completed in accordance with 10 CFR 61. Since the last inspection report (70-008/85001), about 1,024 cu. ft. of waste material consisting of metal oxide, laboratory trash, and metal and paper was shipped to an approved disposal site.

During a tour of the decommissioned reactor facility, the inspector observed the fabrication of wooden shipping crates for the packaging and shipment of three decontaminated gloveboxes.

No violations or deviations were identified.

11. Quality Assurance (QA)/Instrument Maintenance

Through direct observations, discussions with licensee personnel, and review of records of instrument calibrations, the inspector verified that the licensee maintains procedures and descriptions of actions that assures support of the safety program.

The inspector reviewed QA records and interviewed the respective supervisors of QA and the Instrument Laboratory and confirmed the following:

- Radioactive sources were used to check portable instrument efficiency.
- Audible alarm criticality monitors are response checked each 6 months.
- Sources for air monitoring instrumentation calibration were NBS traceable.
- The inspector randomly selected a portable survey meter and confirmed by serial number and record review that the instrument was in service and being maintained on a periodic calibration schedule.
- Procedures for calibration of constant air monitors for alpha detection, and constant air monitors for beta gamma detection were QA confirmed.
- Instrument calibration procedures include schematic diagrams for maintenance, and formulas for performing statistical review of counting efficiencies.

The licensee is taking steps to include the review of license conditions compliance in QA audits. This appeared as an open item (70-008/85001-04) during the last inspection and will be reviewed during a future inspection.

As discussed in Inspection Report (70-008/85001) non-routine operations for the JN-1B HCL pool water require limiting parameters for beta-gamma concentrations and for alpha concentrations. The interpretation of the use of parameter limits remains an open item until clarification is received from NMSS (Open Item 70-008/85001-03). On August 29, 1985, the inspector conferred with NMSS concerning the open items. NMSS will provide written clarification of this matter.

During this inspection, the inspector noted that pool monitoring results showed concentrations of radioactivity that were less than the action levels required by the license.

No violations or deviations were identified.

12. Environmental Monitoring

The inspector reviewed the licensee's environmental monitoring program, the annual environmental report, and specific requirements of Materials License No. SNM-7, License Condition 19.

The annual environmental report was forwarded to the Director, Division of Fuel Cycle and Materials Safety, USNRC, and the Administrator, Region III Office, as required by Materials License No. SNM-7, License Condition 19.

The inspector conducted a cursory review of the environmental report, and interviewed one of the principal contributors.

Alpha activity emissions were based on the insoluble oxide form of plutonium (Pu-239). Atmospheric emissions from the site led to maximum estimated whole body radiation doses of about 0.01 percent of that expected from natural background. The estimated radiation dose to the nearest resident (approximately 0.750 Km NW) from airborne (inhalation) emissions was 2.05 E-03 mrem/yr.

No violations or deviations were identified.

13. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on August 23, 1985. The inspector summarized the scope and findings of the inspection and stated that there were no violations or deviations identified within the scope of this inspection.

During the course of the inspection and the exit meeting, the licensee did not identify any documents or inspector statements and references to specific processes as proprietary.