U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 70-687/85-02

Docket No. 70-687

License No. SNM-639

Safeguards Group I

Licensee: Union Carbide Corporation
P.O. Box 324
Tuxedo, New York 10987

Facility Name: Sterling Forest Research Center

Inspection At: Tuxedo, New York

Inspection Conducted: April 15-19, 1985

Date of Last Material Control and Accounting Inspection: Oct. 29-Nov. 2, 1984

Type of Inspection: Routine, Unannounced Material Control and Accounting

Inspectors: _____ 5-7-85
A. Della Ratta, Safeguards Auditor — date

_____ 5-7-85
H. Zibulsky, Safeguards Chemist — date

Approved by: _____ 5-7-85
R. R. Keimig, Chief, Safeguards Section, DRSS — date

Inspection Summary: Inspection on April 15-19, 1985 (Report No. 70-687/85-02)
Areas Inspected: Routine, unannounced inspection of nuclear material control and accounting including: measurement systems; measurement control and statistics; physical inventory; and, records and reports. The inspection involved 66 inspector-hours on site and 1 hour in office by two region-based inspectors.

Results: The licensee was in compliance with NRC requirements in the areas examined during the inspection.

DETAILS

1. Key Persons Contacted

* J. McGovern, Business Manager, Radiochemicals
* C. Konnerth, Manager Health, Safety, and Environmental Affairs
* P. O'Callaghan, Supervisor, Quality Control
* J. Ditton, Supervisor, Health Physics
* G. Wright, MBA-1 Custodian
* L. Pitt, MBA-2 Custodian
  S. Lupinski, Chief Reactor Operator and MBA-3 Custodian
  L. Bartley, MBA-4 Alternate Custodian
  A. Ackerman, Chemist

The inspectors also interviewed other licensee employees associated with plant operations and nuclear material control.

* present at exit interview

2. 30703 - Exit Interview

The inspectors met with the licensee representatives indicated in paragraph 1 at the conclusion of the inspection on April 19, 1985. The inspectors summarized the scope and findings of the inspection. At no time during this inspection was written material provided to the licensee by the inspectors.

3. 92713 - Independent Inspection Effort

The inspectors toured the facility and observed the licensee's adherence to the Fundamental Nuclear Material Control Plan (FNMCP), material control procedures and health and safety procedures within the material access area and the reactor area. Personnel contamination monitors were operating and being used by employees upon exiting from the process area.

4. 85207 - Measurement Systems

Eight uranyl nitrate solutions of varying concentrations were sampled for analysis by the licensee on April 18, 1985. Duplicate samples were obtained by the inspector to be sent to the New Brunswick Laboratory (NBL) for independent verification. On completion of the U and U-235 analyses by both laboratories, a statistical evaluation will be made. (Inspector Follow-Up Item 85-02-01)

The inspector observed the licensee analyze the uranium content of three standards that were prepared with normal uranium and certified by NBL. One analyst, using the gravimetric Davies and Gray titration procedure, performed the analysis. The matrices and concentrations of the standards were within the licensee's normal operating range.

Each of the three standard solutions were statistically evaluated and showed insignificant biases at the two sigma confidence level.

NBL Standard	Relative % Bias	Limit of Error
0.005293gU/ml	-0.14	±0.25
0.008038gU/ml	+0.08	±0.11
0.010494gU/ml	+0.18	±0.21

5. 85209 - Measurement Control and Statistics

The adequacy and effectiveness of the licensee's measurement control for chemical analyses was reviewed against the requirements of Chapter 4 of the licensee's FNMCP.

All glassware (volumetric flasks and pipettes) used in the accountability analyses of uranium were calibrated and documented. The uranium calibration and working standards were prepared and certified from NBS-960, uranium metal, primary standard. Data were generated from the working standards to develop a control chart with ± 2 sigma and ± 3 sigma acceptance criteria.

Since 1983, the licensee has controlled the temperature of the standard uranium solutions and titrant and has eliminated significant measurement error in the uranium analysis. License Conditions 4.1, 4.2, and 4.3 exempts the licensee from determining systematic errors, random errors and associated limit of error of material unaccounted for (LEID) if the plant inventory difference is less than 300 grams of uranium of U-235. The licensee had not exceeded the limit.

6. 85211 - Physical Inventory

The inspector reviewed the licensee's supporting records of the last four physical inventories dating back to September 5, 1984 and determined that these inventories were conducted in accordance with approved procedures, based upon measured values, and accurately presented within the SNM inventory reports. The master log and MBA logs were reconciled and adjusted to each of the physical inventory results within 30 days. The inspector verified the presence of the licensee's plutonium-beryllium neutron source authorized under License Number SNM-639.

7. 85215 - Records and Reports

The inspector audited the nuclear material control records and reports for the high enriched uranium physical inventory material balance periods ending September 5, 1984, October 25, 1984, January 4, 1985 and March 5, 1985. All line items on the SNM inventory reports were traced to source documents and cross checked to the records maintained by the licensee and

to the DOE-NMMSS computer tabulations. No discrepancies were noted. The material Status Reports (DOE/NRC Form-742) covering the period ending September 30, 1984 were submitted in accordance with the requirments of 10 CFR 70.53.