JUL 19 1973

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70-687
SNM-69

Note to Files
Thru: Robert J. Dube

The Union Carbide Corporation submitted an application dated February 8, 1973 and supplements dated June 13 and 29, 1973 for an amendment to license SNM-639 which would authorize an increase in the possession limit from 650 grams to 2600 grams of 90 +% enriched Uranium 235 (encapsulated and unencapsulated). The increased possession quantity of SNM was not requested for a new process.

Nature of Operation

This SNM license is used in conjunction with other state and Federal licenses to cover a broad program of research and development. Because of the research nature of the activities of the Union Carbide Corporation it is not practicable to provide exact details on equipment and procedures. All equipment and procedures involving the use of SNM are required to be reviewed and approved by their Nuclear Safeguards Committee.

In addition to research and development activities, uranium is irradiated in the Union Carbide reactor to get the fission product Molybdenum 99 which is used in Technetium 99 generators. The quantity of special nuclear material handled is exempted from Part 50, pursuant to Title 10, Code of Federal Regulations Part 50.2(a)3111.

Administrative Control

The Union Carbide Corporation Nuclear Safeguards Committee is charged with the responsibility for ensuring that the administrative controls, operating procedures and experimental programs of the reactor and hot laboratory are reviewed and approved to minimize the hazards to the facility, the staff, and the general public. The Committee is to ensure that all operations and experiments are conducted in accordance with existing State and Federal regulations, and that any procedures and experiments not authorized by their special nuclear material license are not conducted until approval and appropriate amendment is received from the Atomic Energy Commission. The Nuclear Safeguards Committee continually reviews the conditions of the experiments to ascertain that procedures are being properly followed and that operational conditions have not been so altered as to effect the overall nuclear criticality safety parameters as indicated in the proposal.

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The Committee is composed of the following persons:

1. Chairman, a senior technically qualified person not in the line of organization of the Operations or Research Group.

2. A senior technically qualified person responsible for the operation of the laboratory.

3. An engineer directly responsible for the operation of the Hot Lab.

4. A responsible health physicist.

5. A consultant in the field of reactor technology.

6. A consultant in the field of hot laboratory operations.

Operations in the Hot Lab are the direct responsibility of the Supervisor - Nuclear Operations, who reports to the Director - Nuclear Operations of the Research Center. It is the responsibility of the supervisor to direct operations, assign and schedule all work in the Hot Lab and see that this work is carried out safely.

Health Physics and General Safety

A senior Health Physicist is responsible for all phases of Health Physics as well as the general safety procedures for the Reactor and Hot Lab areas. He supervises the activities of Health Physics technicians.

All personnel working with radioactive material in the Hot Lab receive basic radiation safety training. This initial radiation safety instruction is supplemented by on-the-job training during each new operation.

All personnel working in the Hot Lab wear a film badge and two pocket ionization chambers. The pocket chambers are read daily and the film badges are evaluated biweekly by an approved commercial laboratory.

All radiation detection and monitoring equipment are set and kept in proper operating condition by the Health Physicist.

Radiation detection instruments available for monitoring include at least five Ion Chamber Meters with ranges up to 50,000 mr/hr, two Geiger Detectors with range up to 20 mr/hr, one alpha scintaillation counter, one Atomic Model 1095 Scaler and End Window G. M. Counter, one Gas-Flow Proportional Counter with Tracerlab Ampliscaler, and one Pulse Height Analyzer.

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Portable radiation detection equipment such as cutie-pies and G-M survey meters are located at various points in the area and a Hand and Foot Counter is near the main exit from the Hot Lab. It is used by visitors and personnel before going to lunch or leaving the building.

Area radiation monitrons are located in 15 different positions throughout the Hot Lab. Five are located in-cell (one in each cell), three in the charging area, two in the second level area above the cells, and one each at 1) south loading dock, 2) canal gamma facility, 3) ion exchange columns in Radioactive Waste Water Treatment System, 4) exhaust air filter room, and 5) operating areas. These monitors have audio and visual alarms at the local point and at the main monitron control panel in the operating area of the Hot Lab.

These area monitrons, excluding the in-cell units are normally set to alarm at 5.0 mr/hr. The in-cell monitrons can be set to alarm at any level from 1 to 10,000 mr/hr.

Two continuously-operated air monitors are located in the Hot Lab. These units include an audible alarm system and a recorder. In addition, there are approximately ten two-inch diameter air sampling units operating continuously, connected to the building vacuum system. They contain both a particulate filter and activated carbon. These samples are evaluated at least once during each working day.

The exhaust air from both the Reactor and Hot Laboratory are continuously monitored for radioactive particulate matter and for gaseous activity. This monitor is equipped with a recorder and alarm circuits to indicate high activity or equipment failure. It is checked on a routine basis at least once a day. Any unexpected increase in stack activity is investigated to determine the cause and the corrective action necessary to eliminate it.

An intercom system is in operation with units located in every major area of the Hot Lab. Auxiliary amplifiers have been provided and tests have proved that an evacuation alarm announced over this system from the front office on the first floor can be clearly heard in any area. This is utilized in the evacuation alarm system and all personnel have been instructed in the use of the system.

Fire extinguishers (dry chemical and CO_2) are available. They are located in the cell if flammable materials are being handled. The fire extinguisher itself is located in-cell with the operating mechanism for discharging the unit located in the operating area.

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Facilities and Equipment

The special nuclear materials covered by this license are used in Union Carbide Corporation Radioactive Materials Laboratory (Hot Lab) in a broad program of research and development.

The Hot Laboratory is a concrete structure 139 feet long by 57 feet wide by 37 feet high. There are five hot cells, each having 4 foot thick walls of high density concrete (240 lbs/ft.^{3}). The cells are separated from each other by 4 foot thick, high density concrete walls.

The Hot Laboratory ventilation system is pressure regulated to insure a continuous, positive flow of air from non-radioactive areas to contaminated or radiation area. There are two major supply fans. One fan supplies 21,000 cu/ft/min of air to the first floor offices, loading dock, second floor offices, operating area, and the Radiochemical Lab. A second fan supplies 9,000 cu.ft/min of air (total) to three laboratories on the second floor.

All exhaust air from the Hot Lab passes through roughing filters, absolute filters and discharges into a 4 foot diameter vent header which leads to a stack. All exhaust air entering the stack passes through the two HEPA filters and is continuously monitored for gaseous and particulate radioactivity.

The cells are general purpose units designed to accommodate a variety of operations including chemical experiments; radiochemical separations of isotopes, physical testing for evaluation of irradiated material, solid state investigations and metallurgical work.

The cells are maintained at a negative pressure with respect to the operating area and the charging area. The system is designed to provide 20 air changes per hour in all cells. In any cell where fission products or other radioactive particulate matter may be handled the inlet is equipped with an Aerosolve 95 filter. Such filters have an efficiency of 90-95% for removal of atmospheric dust. These filters will limit "blowback" to the operating area during a sudden pressurization within the cell.

The Radioactive Waste Water Treatment System is utilized to treat wastes containing special nuclear materials to maintain releases in effluents to unrestricted areas, as far belows the limits specified in Sec.20.106 10 CFR Part 20 as practicable. The handling and treatment facilities combine storage, evaporation, ion exchange, and recycle if it is required, to accomplish this objective.

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Waste solutions containing irradiated U-235 from the current programs are being solidified, placed in DOT approved containers, and shipped as solid waste to licensed and regulated burial sites.

Nuclear safety aspects have been reviewed by R. W. Szempruch of our Technical Support Branch. He concluded that with a possession limit of 2600 grams. ^{235}U, Union Carbide may conduct operations as described in the application and supplements in a manner consistent with accepted nuclear criticality safety criteria. Mr. Szempruch's comments are contained in his letter dated July 18, 1973.

The licensee hot cells have been exempted from the requirements of Section 70.24 of 10 CFR (monitoring system to detect an incident of Criticality) due to the presence of a high background radiation level in the cells. In the event of such an occurrence, there are particulate, gaseous and iodine radiation monitors on the exhaust ventilation system of the Hot Cells which would sound an alarm.

Recommendation

That the applicant be bound by letters submitted by them on February 8, June 13 and 29, 1973 and all prevailing conditions of License No. SNM-639. After checking this application, I am of the opinion that all requirements of 10 CFR 70.23 have been met and that the license amendment should be granted.

(S)
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Fuel Fabrication and Reprocessing
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