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Regulatory

DOCKET NO. 70-682

UNION CARBIDE

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U.S. ATOMIC ENERGY COMMISSION
Regulatory
Mail Section

February 8, 1973

U. S. Atomic Energy Commission
Division of Materials Licensing
Washington, D. C. 20545

Subject: Proposed amendment to Special Nuclear Materials License No. SNM-639

Reference: (a) Union Carbide Corporation letter April 28, 1969
(b) Amendment No. 1 to SNM-639 dated January 25, 1971

Gentlemen:

It is requested that our Special Nuclear Materials license (SNM-639) be amended to authorize an increase in the possession limit of ^{235}U, item 13b, from 650 grams to 2600 grams of Uranium 235.

The facility description and general operating procedures as outlined in reference (a) shall continue to apply. Revised process specifications and accountability procedures previously authorized by reference (b) to insure criticality safety while in possession of this increased quantity of Uranium are included in the attached proposal for license amendment.

It is considered that the granting of this amendment will not result in an unsafe condition.

Very truly yours,

J. J. McGovern

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JJMcG:js
Enclosures

PROPOSAL TO AMEND

SNM-639

It is proposed that the quantity of ^{235}U which we may possess at any time under SNM-639 be increased from the present limit of 650 grams to 2600 grams. Operations with ^{235}U will be conducted by authorized individuals in accordance with the process specifications and accountability procedures which follow. The movement and storage of ^{235}U will be controlled so that the prescribed limits are not exceeded.

The American National Standard (ANSI) N 16.1 - 1969 "Nuclear Criticality Safety in Operations With Fissionable Materials Outside Reactors" specifies that 700 grams of ^{235}U in non-uniform slurries, 760 grams in uniform aqueous solutions and 20.1 Kg in metal units are single parameter mass limits for criticality safety. The following process specifications are intended to limit the uranium mass present in a single location to 700 grams.

A. Process Specifications

1. All purchases of special nuclear material shall be approved by the Health Physics supervisor, who is the custodian of the SNM Master Log (App. I). Not more than 650 grams of ^{235}U shall be ordered at any one time.

2. All unirradiated SNM, when not in use shall be kept in locked steel cabinets. These cabinets shall be kept in a restricted area of the hot laboratory. The amount of ^{235}U in a single cabinet shall be limited to 650 grams. The spacing between SNM storage cabinets shall be a minimum of 3 ft. and each cabinet shall be fastened to prevent inadvertent movement.

3. Unirradiated uranium in solution shall not exceed 300 grams in a single laboratory.

4. Uranium encapsulated for irradiation shall not exceed 650 grams in a single laboratory. Encapsulated uranium for irradiation shall be kept in locked storage compartments in a laboratory in a restricted area.

5. The amount of uranium located in any hot cell shall not exceed 650 grams.

6. Other special nuclear material and/or source material shall not be permitted in hot cells or laboratories where there is ^{235}U.

7. Reflecting materials such as beryllium and deuterium shall not be permitted in the hot cells or laboratories where there is ^{235}U.

Applicant

Check No. 97375

Amount $390

Date of Check 2-21-73

Date Check Rec'd 2-26-73

8. A running inventory of the special nuclear material in any one location (App. II) is to be maintained by the authorized individual who is the custodian of the SNM in that location.

9. Waste solutions will be stored in the hot cells so that the identity of each batch can be ascertained and a running inventory is to be maintained by the authorized individual so the process specification limit will not be exceeded.

10. Waste solutions containing irradiated ^{235}U shall be solidified, placed in DOT approved containers, and shipped as solid waste to licensed and regulated burial sites. Disposal operations shall be under the supervision of the Superintendent of Nuclear Operations or the Health Physics Supervisor.

11. When unirradiated Uranium is transferred or put into a new physical form an assay shall be performed.

12. Restricted areas are usually occupied by authorized individuals during normal working hours and they are patrolled on 2 hour intervals during other times. Intrusion alarms are on all entrances to these restricted areas.

13. Keys for the SNM storage cabinets shall be kept by the Accountability Officer and an alternate authorized individual designated by him.

14. Whenever work is performed with unencapsulated ^{235}U surveys shall be conducted for alpha contamination in work areas and in the air effluent from the hot lab. In addition, portable alpha detection equipment will be available for personnel monitoring in these areas.

B. Accountability Errors

1. To insure that the single parameter limit of 700 grams will not be exceeded, the following margins of error associated with our assay techniques have been ascertained:

Weighing of Uranium oxide	± 0.1%
Assay of encapsulated UO_2 (gravimetric and radio metric)	± 3.0%
Assay of Uranium in Solution	± 1.5%
Amount of Uranium in hot cell	± 3.0%

2. Assuming that the assay errors pertaining to a batch of Uranium which is transformed into several physical forms while in process are all in the same direction, the total error occurring in any one location could be:

650 gms. of Uranium in storage	(.001)	=	0.65 gms.
300 gms. of Uranium in solution	(.015)	=	4.5 gms.
650 gms. of Uranium in targets	(.03)	=	19.5 gms.
650 gms. of Uranium in hot cell	(.03)	=	19.5 gms.
	TOTAL		44.15 gms.

Therefore, the proposed limits of mass at the various locations are set to allow for any assay inaccurrencies that could cause the lowest single parameter critical mass limit of 700 grams for ^{235}U to be inadvertently exceeded.

C. Accountability

Accountability of SNM shall be maintained in accordance with the following procedures:

1. All purchase requisitions for any amount of ^{235}U must be submitted to the site Accountability Officer.

2. The Accountability Officer will prepare the necessary order forms and submit them, with the purchase requisition, to the Purchasing Dept.

3. All incoming material will be directed to the Health Physics Dept. They will supervise the unpacking procedure and lock the material in the authorized storage cabinets.

4. The Health Physics Technician will assure that the material is logged into the storage area inventory sheet, and that the Accountability Officer is informed of its arrival.

5. All requests for use of ^{235}U from the storage cabinet will be directed to the Health Physics Department who will maintain custody of the storage cabinet key.

6. Under Health Physics supervision, authorized individuals shall sign material out of the storage cabinet and log it in their inventory sheet for a work area. The Health Physics Technician will assure that the total inventory in the work area does not exceed the process specification limit.

7. Material shall not be released from a work area until an authorized individual signs it into a new work area.

8. The Health Physics Department will sign for all material being shipped out as waste.

9. The Accountability Officer will maintain a master log sheet of all material on the site.

10. Inventories shall be conducted after each shipment or receipt of special nuclear material.

SITE ACCOUNTABILITY OFFICER:	C. J. Konnerth J. J. McGovern (Alternate)
AUTHORIZED INDIVIDUALS:	J. L. Ditton J. P. Dise D. D. Grogan H. C. Hart A. B. Innis A. K. Thornton

APPENDIX I

^{235}U MASTER LOG

DATE	DESCRIPTION OF TRANSACTION	QUANTITY IN READY STORAGE			QUANTITY IN PROCESS			QUANTITY IN WASTE STORAGE			BALANCE ON HAND			CUSTODIAN	H.P. SUPV.
		Element	Enr.	Isotope	Element	Enr.	Isotope	Element	Enr.	Isotope	Element	Enr.	Isotope		

APPENDIX II

^{235}U INVENTORY

LOCATION _____

DATE	DESCRIPTION OF TRANSACTION	ELEMENT WEIGHT	WEIGHT % ISOTOPE	ISOTOPE WEIGHT	BALANCE ON HAND			RECORDED
					ELEMENT	% ISOTOPE	ISOTOPE	