

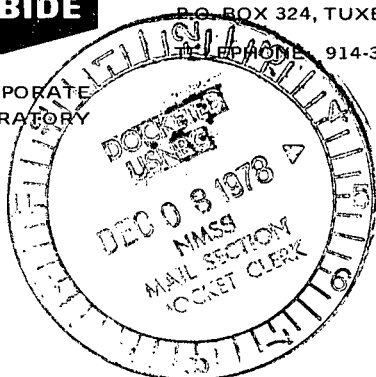


UNION CARBIDE CORPORATION

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CORPORATE RESEARCH LABORATORY



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U.S. NUCLEAR REG. COMMISSION MAIL SECTION

November 17, 1978

U. S. Nuclear Regulatory Commission Fuel Reprocessing & Fabrication Branch Division of Fuel Cycle & Material Safety Washington, D. C. 20555

Attn: Leland C. Rause, Chief

Subj: PROPOSED AMENDMENT TO SPECIAL NUCLEAR MATERIAL (SNM) LICENSE No. 639.

RECEIVED BY LFMB Date... 11/29/78 Log... Nov 28-3 By... admin Orig. To... Action Compl. 12/6/78

Dear Sir:

In a recent review of our subject license, it was noted that provisions exist that are inconsistent with current practice and that lack continuity with other provisions in the license. It is desirable to amend the license to make it easier to administer, make it compatible with current practice, and, in one case, provide a combined limit for SNM in the target plating process. The following proposed changes will not reduce the safety margins that now exist under the license.

- 1. The current license conditions regarding ordering or purchasing SNM are stated in Union Carbide Corporation (UCC) letter of 2/8/73 para. A.1.. The quantity of SNM that may be ordered for delivery at any one time is limited to 650 grams U-235 (as UO2 or U3O8).

In order to make the provisions of this section more descriptive of current practice in receiving, assaying and storing such material, it is requested that the wording of this paragraph be changed to read as follows:

Applicant... Check No... 19259... Amount/Fee Category... 16... Type of Fee... admin... Date Check Rec'd... 11/29... Received By... admin

Nov 28-3

11293

- "A.1. All purchases of special nuclear material shall be approved by the SNM Accountability Officer and also the custodian of the Master Log (App. I). The quantity of SNM that can be ordered for delivery at any one time shall be limited to 650 grams (as  $UO_2$  or  $U_3O_8$ ). Furthermore, the quantity of SNM that is to be contained in any single primary container shall be  $\leq$  350 grams."
2. The current license conditions regarding the quantity limits for storing SNM in solution prior to use in electroplating isotope targets or other laboratory use are stated in UCC letters 2/8/73 para. A.2. and 2/11/75 (revision of UCC letter 6/13/78 para. B. (a) para. 1.) These sections should be changed to clarify the limits and make the storage limits compatible with delivery and other process limits. These sections should read as follows:

"A.2. All unirradiated SNM when not in use, shall be kept in locked steel cabinets which are located within a restricted area of the hot laboratory. The amount of U-235 in a single cabinet shall be limited to 350 grams in solution or 650 grams as  $UO_2$  or  $U_3O_8$ . The spacing between SNM storage cabinets shall be a minimum of three feet and each cabinet shall be fastened to prevent inadvertent movement. SNM in liquid form shall be doubly contained."

"B.a. para. 1 Criticality Control In Storage Areas

Uranium is stored in storage cabinets in the upper level of the hot laboratory (Fig. 1A). Material in liquid form is doubly contained. Storage cabinets are of fireproof construction, are separated by a minimum distance of three feet and are fastened to prevent inadvertent movement. All cabinets are locked and keys are in the custody of the SNM custodian for the area. Criticality control is implemented by limiting the quantity of SNM in solution to 350 grams per storage cabinet. This limit allows a safe margin below the single parameter limit of 760 grams U-235 in uniform aqueous solutions specified in the ANSI N16.1-1969 standard even

if "double batching" were to occur. The storage space within each cabinet is large enough for only one 350 gram batch of material in solution and therefore it is unlikely that double batching could occur but in the event that it did the 760 gram single parameter mass limit would not be exceeded. In the event it is necessary to store SNM as  $UO_2$  or  $U_3O_8$ , the quantity limit for this form of material shall be 650 grams of SNM. This quantity is not likely to be exceeded because of the 650 gram order limit previously discussed. The quantity is well below the 29.6 Kg or 43.5 Kg subcritical mass limits stated for dry  $UO_2$  or  $U_3O_8$  respectively as presented in Table 3.1 of Nuclear Safety Guide TID 7016 Rev. 2, p. 71. Due to the location of the storage facilities, it is not credible that this material would be contacted by water or other moderating material."

3. The current license conditions regarding the quantity limits for SNM in process in a laboratory are stated in UCC letter 2/8/73 para. A. 3 & 4 and 6/13/73 para. B.b.

In order to make these provisions compatible with current practice and other sections of this license, and also to better define the limits allowed in the plating process, the wording of these sections should be changed to read as follows:

- "A.3. Unirradiated SNM in solution shall not exceed 350 grams in a single laboratory."
- "A.4. SNM, as an oxide, encapsulated for irradiation shall not exceed 650 grams in a single laboratory. When SNM is in process in the plating lab (Fig. 1A), it can be either as a solid (oxide) or in solution (electrolyte 15 gms/liter, H:U ~ 1500) and the quantity of either form shall be governed by the formula:

$$\frac{U-235 \text{ Oxide Form}^{(gms)}}{650} + \frac{U-235 \text{ Electrolyte Solution (gms)}}{350} < 1."$$

"B.b. para. 2 Criticality Control In Chemistry Laboratory

Criticality control is effected through limiting the quantity of SNM in solution that is permitted in a single laboratory to 350 grams or less. This is less than half the single parameter limit of 760 grams stated in the ANSI N16.1-1969 standard. The material in process in the plating laboratory may be either as an oxide or as an electrolyte in solution depending upon the stage of the electroplating process. If the respective quantities are limited by the formula;

$$\frac{\text{SNM As Oxide (gms)}}{650} + \frac{\text{SNM In Solution (gms)}}{350} \leq 1, \text{ and}$$

the concentration of U-235 in the electrolyte is less than 15 gms/liter (H:U. 1500), criticality limits for these materials will not be breached even if double batching were to occur. The criticality limits that apply are as follows:

<u>Form Of Mat'l</u>	<u>Limit</u>	<u>Reference</u>
UO <sub>2</sub> Dry	29.6 Kg	Nuclear Safety Guide TID7016, Table 3.1,p.71.
U <sub>3</sub> O <sub>8</sub> Dry	43.5 Kg	Nuclear Safety Guide TID7016, Table 3.1,p.71.
U in Solution <15 gms/liter	2 Kg (Sphere)	Nuclear Safety Guide TID7016, Fig. 2.1,p.28.

- The current license, item 6D, allows possession of 400 grams U-235 in a fuel assembly to be brought into a hot cell from the reactor. This is to allow close inspection of such irradiated fuel in the event it is deemed desirable. Since such an inspection is out of the ordinary, it would be advantageous to allow this quantity of material to be added to that allowable under item 6B (4600 gm vs the current 4200 gm). It is proposed that the following note be added to item 6 of the license.

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"When it is not required to have reactor fuel elements in the hot laboratory, the 400 grams of U-235 allowed under item 6D may be added to that material that is allowed under 6B, thereby increasing it from 4200 to 4600 grams."

Revised floor plans are included to reflect the current storage locations and processing laboratories. A check in the amount of \$150.00 is enclosed to cover the administrative fee requirements of 10 CFR 170.31.

These changes are desired to more clearly define criticality limits and allow easier administration of license conditions in the production of medical radioisotopes.

The granting of these changes will not reduce the safety margins currently existing under this license and therefore, will not endanger life or property and is in the public interest.

Thank you for your consideration.

Very truly yours,

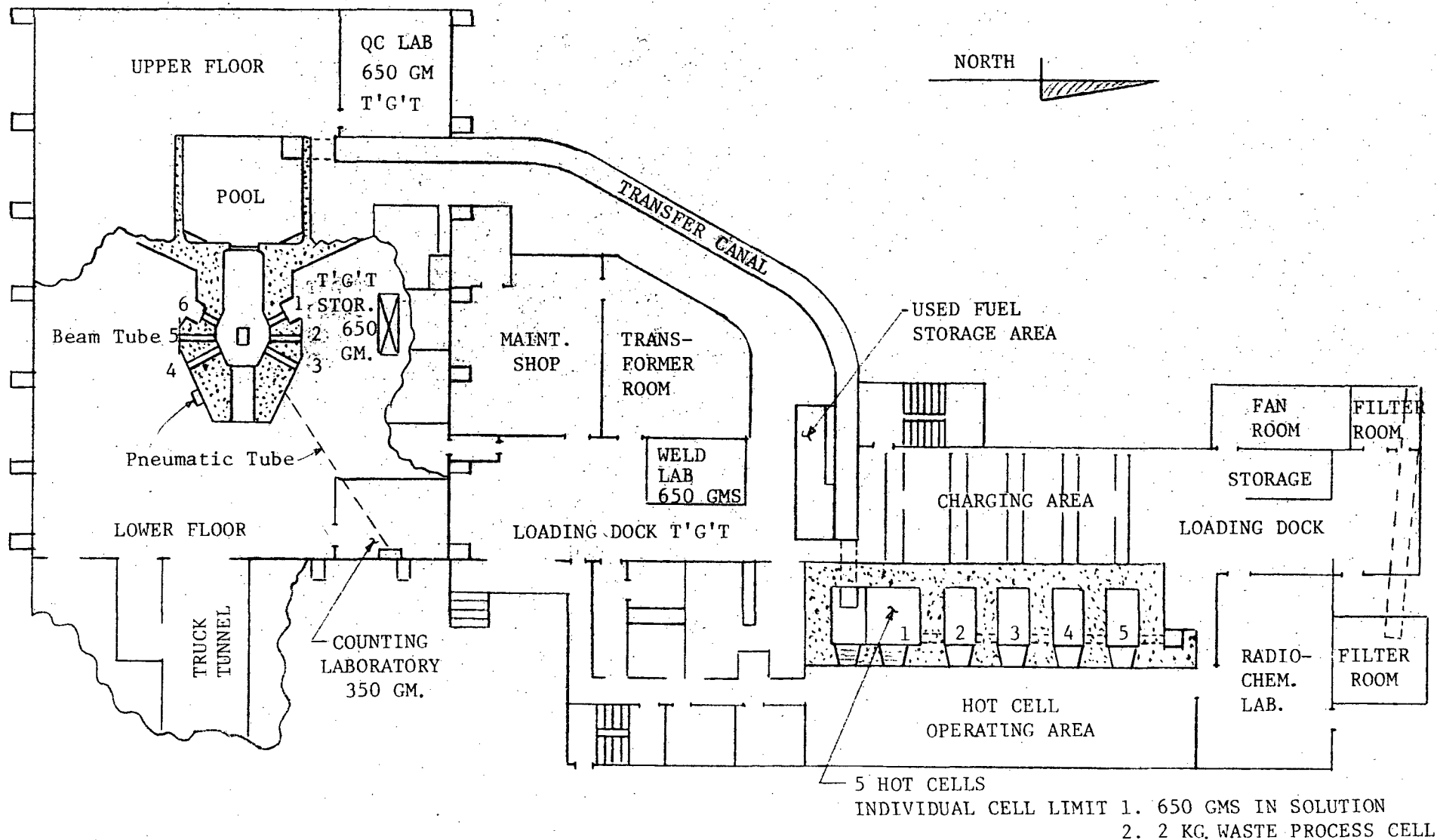


James J. McGovern  
Manager  
Radiochemical Production

JJMcG:js

Enclosures (1) Check  
(2) Figure 1  
(3) Figure 1A

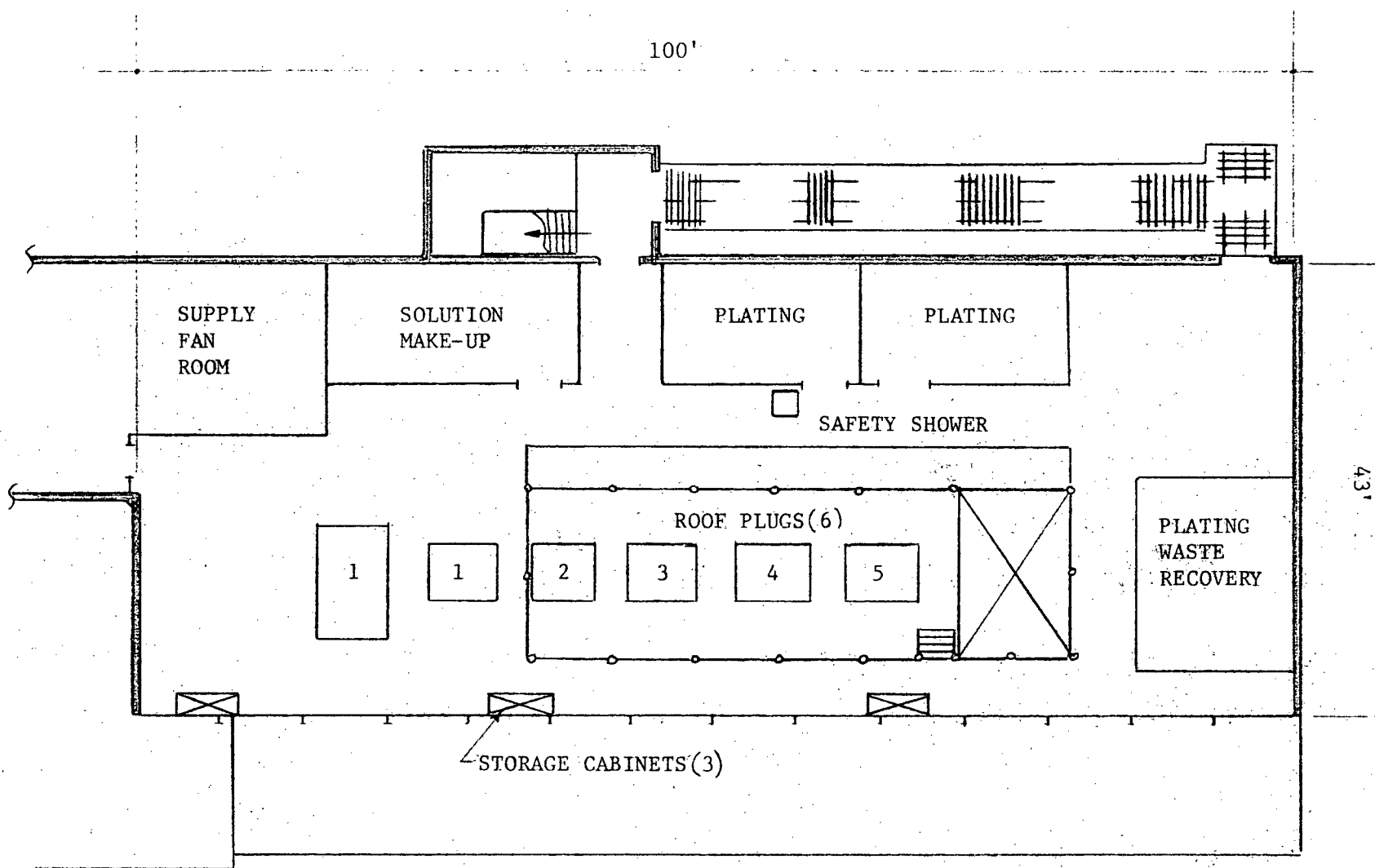
FIGURE 1



PLAN OF REACTOR AND HOT LABORATORY

SK 1390  
16 NOV 78  
T.H.R.

FIGURE 1A



HOT LABORATORY - FLOOR PLAN - UPPER LEVEL

SK 1389  
16 NOV. '78  
M.A.R.

Walter Crow

"LICENSE AMENDMENTS"

Docket No. 70-607

# 11293

William O. Miller, License Fee Management Branch, ADM

MATERIALS LICENSE AMENDMENT CLASSIFICATION:

Applicant: Union Carbide  
 License No: SWM-639 Fee Category: 1G  
 Application Dated: 11-17-78 Received: 11-28-78  
 Applicant's Classification: administrative

The above application for amendment has been reviewed by NMSS in accordance with §170.31 of Part 170, and is classified as follows:

1. Safety and Environmental Amendments to Licenses in Fee Categories 1A through 1H, 2A, 2B, 2C, and 4A
  - (a) \_\_\_ Major safety and environmental
  - (b) \_\_\_ Minor safety and environmental
  - (c) \_\_\_ Safety and environmental (Categories 1D through 1G only)
  - (d) X Administrative

2. Justification for reclassification: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3. The application was filed (a) \_\_\_ pursuant to written NRC request and the amendment is being issued for the convenience of the Commission, or (b) \_\_\_ Other (State reason): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature W.S. Crow  
 Division of Fuel Cycle & Material Safety  
 Date 12/7/78